METROPOLITAN EXPOSITION RECREATION COMMISSION

Resolution 17-06

For the purpose of selecting Tube Art Displays, Inc. for the Arlene Schnitzer Concert hall – "Portland" Sign Repair and Refurbishment and authorizing the General Manager of Visitor Venues to execute a contract with Tube Art Displays, Inc.

WHEREAS, several components of the "Portland" sign are in need of maintenance and repair; and

WHEREAS, Portland'5 Centers for the Arts and cPMO staff have worked with Architectural Resources Group to evaluate the condition and provide designs and specifications for repair options of the structural, decorative, and electrical components of the sign; and

WHEREAS, Staff issued a Request for Bids in accordance with Section 7(B) of the Metropolitan Exposition Recreation Commission's ("the Commission") Contracting and Purchasing Rules, which requires competitive sealed bids under ORS Chapter 279C for public improvements such as this project; and

WHEREAS, MERC staff has evaluated the bids, and Tube Art Displays, Inc. is the lowest responsive and responsible bidder with a bid amount $474,085.

BE IT THEREFORE RESOLVED as follows:

1. The Commission selects Tube Art Displays, Inc. as the lowest responsive and responsible bidder in response to the Request for Bids for the Arlene Schnitzer Concert Hall, "Portland" Sign Repair and Refurbishment; and

2. The Commission approves the contract with Tube Art Displays, Inc. in the form substantially similar to the attached Exhibit A and authorizes the General Manager of Visitor Venues to execute the contract on behalf of the Commission.

Passed by the Commission on March 1, 2017

Chair

Secretary/Treasurer

Approved As to Form:
Alison R. Kean, Metro Attorney

By: _____
Nathan A. S. Sykes
Deputy Metro Attorney

MERC STAFF REPORT

Agenda Item/Issue: Metropolitan Exposition and Recreation Commission approval of the contract and award to the lowest responsible bidder, Tube Art Displays, Inc., for the Arlene Schnitzer Concert Hall, "Portland" Sign Repair and Refurbishment and delegate authority to the General Manager of Visitor Venues to execute the contract.

Resolution No: 17-06 **Presented by: Nancy Strening**

Date: March 1, 2017

BACKGROUND: The "Portland" sign at the Arlene Schnitzer Concert Hall is a beloved and frequently photographed city icon. The current sign was fabricated and installed in 1984 as part of a major renovation to the "Schnitz". An assessment of the Portland Sign on the Arlene Schnitzer Concert Hall performed in September 2015 indicates that several components are in need of maintenance & repair. Drawings and specifications were prepared for the upgrade and repair of the sign and its structural and electrical elements with the intention to give an additional 25-40 years of life to the sign.

MERC Staff prepared and issued Bid Documents and a Request for Bids that included a detailed scope of work. Scope of work includes, but is not limited to, removal of sign in order to repair or replace the support steel, refurbish the blade signs by re-fabricating the sign cladding with corrosion resistant aluminum panels installed on the blade sign frame. New coating should provide UV resistance sufficient to preserve the sign 25-40 years. Replace weather worn lamp sockets and wiring. Replace neon in the letters, and replace the existing junction box that feeds the sign.

The RFB was issued in accordance with MERC's Purchasing and Contracting Rules and in compliance with Metro Policy and any and all state (ORS) requirements. The RFB was published on ORPIN and in the Daily Journal of Commerce, the Asian Reporter, and on the Metro website. On January 10, 2017, two base bids were received and ranged from $353,085 and $714,573. Staff recommends Tube Art Displays, Inc. be considered as the lowest responsive and responsible bidder with the bid as submitted in the amount of $353,085, and that Alternate #1, Replace Entire Upper Support Beam ($121,000) be included for a total contract price of $474,085.

No bids were received from a COBID or FOTA area business. Tube Art Displays, Inc. intends to subcontract with COBID welding and sheet metal subcontractors for the work for a total dollar amount of $47,153.

FISCAL IMPACT: This project is budgeted in FY 2016-17 in the amount of $360,000. The bids and Alternate #1 were received at a much higher cost than expected. At the March 1, 2017 Commission meeting it was proposed to increase this project budget by $200,000 to $560,000 by reducing the project budget for the Keller Wall Panels by $200,000 as this project has been moved to FY 2018-19. The proposed new budget of $560,000 will be sufficient to accommodate the construction contract cost as well as other project related costs. A majority, if not all of the work on the sign is expected to be complete in the current fiscal year by June 30, 2017. Little to no budget is expected to be carried over into FY 2017-18.

RECOMMENDATION: Staff recommends that the Metropolitan Exposition and Recreation Commission, by Resolution No.17-06, approve the contract award and written contract (attached hereto) with Tube Art Displays, Inc. for the amount of Four Hundred Seventy Four Thousand, Eighty Five and 00/100 DOLLARS ($474,085.00) for the Arlene Schnitzer Concert Hall – "Portland" Sign Repair and Refurbishment as detailed in the RFB and delegate authority to the General Manager of Visitor Venues to execute the contract.

Construction Agreement

600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. 307005

THIS CONSTRUCTION AGREEMENT is between Metropolitan Exposition Recreation Commission, an appointed commission of Metro, located at 600 N.E. Grand Avenue, Portland, OR 97232-2736, referred to herein as “MERC” or “Metro,” and Tube Art Displays, Inc., referred to herein as "Contractor," located at 4243-A SE International Way, Milwaukie, OR 97222

THE PARTIES AGREE AS FOLLOWS:

ARTICLE I
SCOPE OF WORK AND CONTRACT TERMS

CONTRACTOR shall perform the work and/or deliver to MERC the goods described in the Scope of Work attached hereto and incorporated herein as Attachment A. All services and goods shall be of good quality and otherwise in accordance with the Scope of Work. CONTRACTOR shall perform the work and/or deliver to MERC the goods described in the Scope of Work strictly in accord with the terms of this Construction Agreement and the General Conditions attached hereto and incorporated herein as Attachment B.

ARTICLE II
TERM OF CONTRACT

The term of this Contract shall be for the period commencing March 1, 2017 through and including December 31 31, 2017. Substantial completion per Section 9.4 of the General Conditions is June 30, 2017.

ARTICLE III
CONTRACT SUM AND TERMS OF PAYMENT

MERC shall pay the CONTRACTOR for work performed and/or goods supplied as described in the Scope of Work, in the maximum amount of FOUR HUNDRED SEVENTY-FOUR THOUSAND, EIGHTY-FIVE AND NO/100THS DOLLARS ($474,085.00) (the “Maximum Price”). MERC shall not be responsible for payment of any materials, expenses or costs other than those which are specifically included in the Scope of Work. The Maximum Price includes all fees, costs and expenses of whatever nature. Each of MERC's payments to Contractor shall equal the percentage of the work Contractor accomplished during the billing period. Contractor’s billing invoices shall include the MERC contract number, Contractor name, remittance address, invoice date, invoice number, invoice amount, tax amount (if applicable), and an itemized statement of work performed and expenses incurred during the billing period, and will not be submitted more frequently than once a month.

Contractor’s billing invoices shall be sent to metroaccountspayable@oregonmetro.gov. The MERC contract number shall be referenced in the email subject line. MERC requests that Contractors submit billing invoices for services within 10 business days of performance. Payment shall be made by MERC on a Net 30 day basis upon receipt of CONTRACTOR invoice.

ARTICLE IV
BONDS

In addition, for public works subject to ORS 279C.800 to 279C.870, CONTRACTOR and every subcontractor shall have a public works bond required by 2005 Oregon Laws Chapter 360 filed with the Construction Contractors Board before starting work on the project, unless exempt under Section 2 of 2005 Oregon Laws Chapter 360.

ARTICLE V
PUBLIC CONTRACTS

All applicable provisions of ORS chapters 187 and 279A, 279B, and 279C and all other terms and conditions necessary to be inserted into public contracts in the State of Oregon, are hereby incorporated as if such provision were a part of this Agreement. Specifically, it is a condition of this contract that CONTRACTOR and all employers working under this Agreement are subject employers that will comply with ORS 656.017 as required by 1989 Oregon Laws, Chapter 684.

For public work subject to ORS 279C.800 to 279C.870, the CONTRACTOR shall pay prevailing wages. If such public work is subject both to ORS 279C.800 to 279C.870 and to 40 U.S.C. 276a, the CONTRACTOR and every

subcontractor on such public work shall pay at least the higher prevailing wage. The CONTRACTOR and each subcontractor shall pay workers not less than the specified minimum hourly rate of wage in accordance with Section 7 of 2005 Oregon Laws Chapter 360. MERC shall pay an administrative fee as provided in ORS 279C.825(1) to the Bureau of Labor and Industries pursuant to the administrative rules established by the Commissioner of Labor and Industries. CONTRACTORS must promptly pay, as due, all persons supplying to such contractor labor or material used in this contract. If the CONTRACTOR or first-tier subcontractor fails, neglects, or refuses to make payment to a person furnishing labor or materials in connection with the public contract for a public improvement within 30 days after receipt of payment from the public contracting agency or a contractor, the CONTRACTOR or first-tier subcontractor shall owe the person the amount due plus shall pay interest in accordance with ORS 279C.515. If the CONTRACTOR or first-tier subcontractor fails, neglects, or refuses to make payment, to a person furnishing labor or materials in connection with the public contract, 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.580. CONTRACTOR must pay any and all contributions and amounts due to the Industrial Accident Fund from contractor or subcontractor and incurred in the performance of the contract. No liens or claims are permitted to be filed against MERC on account of any labor or material furnished. CONTRACTORS are required to pay the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

For public improvement work all CONTRACTORS must demonstrate that an employee drug-testing program is in place.

ARTICLE VI
COUNTERPARTS

This Contract may be executed in counterparts or multiples, any one of which will have the full force of an original.

ARTICLE VII
DELIVERY OF NOTICES

Any notice, request, demand, instruction, or any other communications to be given to any party hereunder shall be in writing, sent by registered or certified mail or fax as follows:

To Contractor: Jeffrey Hargett
Tube Art Displays, Inc
4243-A SE International Way
Milwaukie, OR 97222
503-659-9191 fax

To Metro: Metro Procurement Services
600 NE Grand Ave
Portland, Oregon 97232
503-797-1791 fax

With Copy to: Nancy Strening
600 NE Grand Ave
Portland, OR 97232
503-797-1795 fax

CONTRACTOR

By_____

Print Name_____

Date_____

METROPOLITAN EXPOSITION RECREATION COMMISSION

By_____

Print Name_____

Date_____

METRO CONTRACT NO. 307005

ATTACHMENT A TO CONSTRUCTION AGREEMENT – SCOPE OF WORK

1. Purpose and Goal of Work

MERC is contracting for the repair and refurbishment of the "Portland" sign at the Arlene Schnitzer Concert Hall, located at 1037 SW Broadway, Portland, OR 97205. "

The "Portland" sign at the Arlene Schnitzer Concert Hall is a beloved and frequently photographed city icon. The current sign was fabricated and installed in 1984 as part of a major renovation to the "Schnitz". An assessment of the Portland Sign on the Arlene Schnitzer Concert Hall performed in September 2015 indicates that several components are in need of maintenance & repair. Contractor shall upgrade and repair the sign and its structural and electrical elements with the intention to give an additional 25-40 years of life to the sign.

2. Scope of Work

Description of Work

Contractor is to provide all material, labor and equipment necessary for the repair and refurbishment of the "Portland" sign, as detailed below, and as per the attached Supplemental Conditions, Plan Set, Specifications and Structural Calculations as referenced in this document.

Clarifications

ALT 1: Work is to include: Replacement of entire upper support beam vs repair of the existing beam

Although work is expected to be in areas without impact on events, work will need to be completed around the building schedule. Due to a very busy events schedule at the Arlene Schnitzer Concert Hall, Contractor will be required to adhere strictly to work dates and times approved by the Project Manager. In most cases, typical work days and hours (Monday - Friday 7:00am to 3:00pm) will be available, but there are likely to be dates where no work will be possible or where the work day must be curtailed to avoid interfering with an event taking place or with clients using the facility. Contractor shall be notified one week in advance of these non-work days. This project may require Contractor to work outside their typical work hours in order to complete the project in a timely manner as agreed upon with the Portland'5. Schedule will need to be coordinated with Portland'5 project manager. Contractor shall work with the Portland'5 provided schedule.

The Scope of Work includes the Plan Set, Specifications, any Addenda attached hereto, and any Change Orders entered into in accord with the terms of the Contract.

ATTACHMENT C: Supplemental General Conditions

ATTACHMENT D: Plan Set titled "Portland Sign and Marquee Restoration - Portland Sign, Package 1", dated April 22, 2016;

ATTACHMENT E: Specifications titled "Portland Sign and Marquee Restoration - 100% Construction Documents Project Manual" dated April 22, 2016;

ATTACHMENT F: Structural Calculations title Arlene Schnitzer Concert Hall – Portland Sign Revisions", dated April 25, 2016;

And any modifications of any of the foregoing in the form of Addenda or Change Orders entered into in accordance with the terms of the Contract. Where applicable, reference to this Contract herein shall be deemed to refer to all of the Contract Documents.

Contractor shall provide all labor, tools, equipment, machinery, supervision, transportation, permits, and every other item and service necessary to perform the Work described in the Contract Documents. Contractor shall fully comply with each and every term, condition and provision of the Contract Documents.

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

METRO CONTRACT NO. 307005

ATTACHMENT B - SECTION 007200
METRO GENERAL CONDITIONS

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METRO CONTRACT NO. 307005

METRO GENERAL CONDITIONS

ARTICLE 1
GENERAL PROVISIONS

1.1 Definitions. Unless otherwise defined or specified in the Contract Documents, the following terms shall have the meanings indicated:

1.1.1 Addendum: A document issued by Metro during the solicitation period clarifying, adding, deleting, or materially changing Metro's solicitation documents.

1.1.2 Alternate Bids: Portions of the Work for which a Bidder must submit a separate Bid amount. Alternate Bid items may or may not be awarded at Metro's discretion.

1.1.3 Architect: A person retained by Metro as its design professional for the Work and authorized to practice architecture in the State of Oregon. The term "Architect" refers to the Architect or the Architect's authorized representative.

1.1.4 "As-Builts" or Record Documents: Those drawings made, revised, or annotated by Contractor and approved by Metro during the performance of the Contract, fully illustrating how all elements of the Work were actually installed and completed.

1.1.5 Aspirational Target: Target of intended utilization of MBE, WBE, and ESB firms that a contractor has no contractual obligation to meet.

1.1.6 Authorized Representative: A person acting on behalf of another through expressly delegated authority as specified in these Contract Documents.

1.1.7 Bid. The written offer of a Bidder to perform the Work as defined in these Contract Documents submitted in compliance with Metro's Bid Documents and Public Contracting Rules.

1.1.8 Bidder: A person acting directly or through a duly and legally authorized representative who submits or intends to submit a Bid for the Work as described in these Contract Documents.

1.1.9 Bid Documents: Those documents upon which a Bidder bases its bid to Metro.

1.1.10 Business Day: Calendar day excluding Saturdays, Sundays, and legal holidays.

1.1.11 Bid Forms: Forms required by Metro to be submitted with a Bid.

1.1.12 City or County: The city or county in which the Work is located.

1.1.13 Change Order: A written document signed by Metro and Contractor stating their agreement upon all of the following:

1.1.13.1 The change in the Work;

1.1.13.2 The amount of any adjustment in the Contract Amount; and

1.1.13.3 The extent of any adjustment to the Contract Time.

1.1.14 Clarification: A written document consisting of supplementary details, instruction or information issued by Metro after the award of Contract that clarifies or supplements the Contract Documents and becomes a part of the Contract Documents. A Clarification may or may not affect the scope of Work.

1.1.15 Completion: See "Substantial Completion" and "Final Completion and Acceptance."

1.1.16 Construction Schedule or Schedule: The timeline described in Article 5.

1.1.17 Contract: The Contract Documents.

1.1.18 Contract Amount: The total amount shown in the Construction Agreement as modified by any Change Orders.

1.1.19 Contract Documents or Contract or Bidding Documents: All of the following documents: the Advertisement for Bids, the Invitation to Bid, the Instructions to Bidders, the Bid Forms, the Construction Agreement, the Performance Bond, the Labor and Materials Payment Bond, the General Conditions, the Supplementary Conditions, the Specifications, the drawings, the approved and updated Construction Schedule, and any modifications of any of the foregoing in the form of Addenda, Clarifications, Change Orders, or Force Account Work.

1.1.20 Contractor: The person having entered into this Contract with Metro and who is responsible for the complete performance of the Work contemplated by the Contract Documents and for the payment of all legal debts pertaining to the Work, including its officers, agents, employees, and representatives.

1.1.21 Contract Time: The amount of time stated in the Contract Documents for the performance of all or a specified portion of the Work, as modified by any Change Orders.

1.1.22 Critical Path Method or CPM: The critical path method of scheduling as understood and interpreted by standard industry practice.

1.1.23 Day: Calendar day including Saturdays, Sundays, and legal holidays.

1.1.24 Defective Work: Work that (a) is performed in an unsatisfactory, faulty, or deficient manner; (b) does not conform to the Contract Documents; (c) does not meet the requirements of any reference standard, test, or approval referred to or incorporated by the Contract Documents; or (d) has been damaged by anyone other than Metro prior to Acceptance of the Work, whether or not such Work is in Metro's possession or use.

1.1.25 Direct Costs: The costs of labor (including benefits), materials, and equipment incurred by the person performing the Work or part of the Work.

1.1.26 Drawings: The graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

1.1.27 Engineer: A person lawfully practicing engineering. The term “Engineer" refers to the Engineer or the Engineer's authorized representative.

1.1.28 Environmental Laws: Any applicable statute, law, ordinance, order, consent decree, judgment, permit, license, code provision, covenant deed, common law, treaty, convention, or other requirement pertaining to protection of the environment, health or safety, natural resources, conservation, wildlife, waste management, or disposal of hazardous substances or pollution, including but not limited to regulation of releases to air, land, water, and groundwater.

1.1.29 Equal, Approved, Approved Equal: The material or product to be supplied or installed is equal to or better than that specified in function, performance, reliability, quality, and general configuration and is approved by Architect or Engineer. Equality in reference to the Project design requirements shall be determined by Architect or Engineer prior to installation of any material or product in the Project. Where the term "or equal" is not used and a sole product is specified, the term "or equal" is implied.

1.1.30 Final Completion: Full performance of all of the Work and acceptance of the Project by Metro.

1.1.31 Final Payment: The balance of the Contract Amount to be paid to the Contractor upon Final Completion and Acceptance of the Work. “Final Payment” includes payment of any withheld Retainage less deductions permitted or required by the Contract.

1.1.32 Force Account Work: Work, ordered in writing by Metro, for which Contractor must report its actual costs in accordance with Section 8.4 of the General Conditions.

1.1.33 Force Majeur: An earthquake, flood, typhoon, cyclone, or other natural phenomenon of catastrophic proportions or intensity.

1.1.34 General Conditions: The Metro General Conditions of the Contract for Construction set forth in this document.

1.1.35 Hazardous Materials: Any substance defined or designated as being radioactive, infectious, hazardous, dangerous, or toxic by any federal, state, or local statute, regulation, or ordinance presently in effect or subsequently enacted. For purposes of Section 10.7, the term "introduce" means the physical placement or transportation of Hazardous Materials in or on the Project Site regardless of whether the Hazardous Material was specified, required, or otherwise addressed in the Contract Documents.

1.1.36 Landscape Architect: A person lawfully practicing landscape architecture. The term "Landscape Architect" refers to the Landscape Architect or the Landscape Architect's authorized representative.

1.1.37 LEED Certification: A Leadership in Energy and Design Certification issued by the United States Green Building Council (USGBS).

1.1.38 Lump Sum: A way of expressing the Contract Amount for the Work, or the price bid for a portion of the Work, stated as a single price for all labor, materials, supplies, incidental work, overhead, and profit.

1.1.39 Metro: A metropolitan service district organized under the laws of the State of Oregon and the Metro Charter.

1.1.40 Metro Chief Operating Officer or COO: The Chief Operating Officer of Metro.

1.1.41 Metro Council or Council: Metro’s elected governing body.

1.1.42 Minority Business Enterprise, Women Business Enterprise and Emerging Small Business ("MWESB"): A firm eligible to participate as a Minority Business Enterprise, Women Business Enterprise or Emerging Small Business (collectively referred to as "MWESB") because it meets the criteria as established by the Office of Minority Women and Emerging Small Business in the State of Oregon. A firm will no longer qualify as an MWESB on this Contract when it receives notification of decertification, denial of recertification, or notice of graduation by the certifying agency.

1.1.43 MWESB Program: Metro's program to provide maximum opportunities to Minority, Women-Owned and Emerging Small Business Enterprises in contracts, which is contained in Metro Code Section 2.04.100 to 2.04.190.

1.1.44 Notice to Proceed: The written notice given by Metro to the Contractor to proceed with all or part of the Work. The Notice to Proceed will also establish the date and time of a preconstruction conference.

1.1.45 Overhead: When applied to the cost of the Work, includes the following items, when reasonable and necessary for completion of the Work:

1.1.45.1 All on-site payroll costs, taxes, insurance, fringe benefits, and bonuses of same, for supervising, estimating, expediting, purchasing, drafting, and clerical/secretarial services where directly incurred in the performance of the Contract.

1.1.45.2 Small tools (less than $250 capital cost per item).

1.1.45.3 Contractor-owned equipment.

1.1.45.4 Equipment maintenance and repairs.

1.1.45.5 Temporary construction, utilities, and safety requirements.

1.1.45.6 Transportation of materials other than direct identifiable cost of specific deliveries, or as included in price of material.

1.1.45.7 Parking fees for workers (if applicable).

1.1.45.8 Permit fees paid by the Contractor pursuant to the Contract Documents.

1.1.45.9 Cost of reproduction.

1.1.45.10 Field office costs. Home or branch office overhead shall not be included, but shall be part of Contractor's profit and shall include but is not limited to the following:

1.1.45.10.1 Accounting functions of Contractor's home and branch office.

1.1.45.10.2 General expenses of Contractor's home and branch office.

1.1.45.10.3 Interest on capital.

1.1.45.10.4 Salaries of any home and branch office estimators and administration.

1.1.46 Owner: Metro.

1.1.47 Person: An individual, partnership, corporation, joint venture, limited liability corporation, joint stock company, or other legal entity.

1.1.48 Plans: Drawings.

1.1.49 Profit: That portion of Contractor's Bid price that is not Direct Costs or Overhead

1.1.50 Project: The Work described in the Contract Documents.

1.1.51 Project Manager: The Metro representative on the construction Site. The Project Manager will be an employee of Metro who will represent Metro to the extent of his authority as delegated by the Chief Operating Officer. For purposes of administering this Contract the term "Project Manager" will refer to the on-site Metro representative and to any duly appointed assistants who may be designated in writing. The Architect or Engineer will be called upon as required by and at the direction of Metro for technical assistance and for interpretation of the Contract Documents.

1.1.52 Proposal: The written offer of a Proposer to perform the Work as defined in these Contract Documents submitted in compliance with Metro's Request for Proposals and Public Contracting Rules.

1.1.53 Proposal Documents: Those documents upon which a Proposer responds to a Request for Proposals.

1.1.54 Proposer: A person who responds or intends to respond to a Request for Proposals issued by Metro.

1.1.55 Provide: To furnish and install complete and in place and ready for operation and use.

1.1.56 Punch List: The list prepared by the Architect or Engineer and/or Project Manager at the time of Substantial Completion that reflects Contractor's incomplete, nonconforming Work. Punch List items must be completed to the satisfaction of the Architect or Engineer and Metro in order for the Project to reach Final Completion and Acceptance.

1.1.57 Reference Specifications: Bulletins, standards, rules, methods of analysis or testing, codes, and Specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents that when included in the Contract Documents establish the basis by which specific portions of the Work are to be performed. All such references specified refer to the latest edition thereof, including any Amendments in effect and published at the time of advertising for Bids or of issuing the permit for the Project.

1.1.58 Release: When used in regard to environmental laws or regulations, "release" as defined in Oregon or federal law.

1.1.59 Request for Bid (RFB): A solicitation to perform Work where a Contract is awarded based on price.

1.1.60 Request for Information (RFI): A written request made by Contractor for additional information to clarify an ambiguity in the Contact Documents.

1.1.61 Request for Proposals ("RFP"): A solicitation to perform Work issued where a Contract is awarded based on factors other than or in addition to price.

1.1.62 Retainage or Retention: The difference between the amount earned by Contractor on the Contract and the amount paid on the Contract by Metro.

1.1.63 Schedule of Values: The detailed breakdown of a lump-sum contract amount as required in Section 9.2.

1.1.64 Separate Contract: A contract between Metro and a party other than Contractor for the construction or furnishing of a portion of the Project.

1.1.65 Shown, As Shown: Work shown on the drawings that is a part of the Contract Documents.

1.1.66 Site: The real property upon which the Project is located.

1.1.67 Solicitation Documents: An RFB.

1.1.68 Special Inspector: A representative of Metro, Architect, Engineer or Geotechnical Engineer with specialized knowledge applicable to the installation of certain elements of the Work.

1.1.69 Specifications: That portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, and workmanship for the Work, and performance of related services, including any Reference Specifications.

1.1.70 Subcontractor: A person that has a contract with Contractor to perform a portion of the Work at the Site.

1.1.71 Submittals: Includes shop drawings, samples, manufacturer's brochures, pamphlets, catalog cuts, color charts, or other descriptive data, clearly defining the article, material, equipment, or device proposed by Contractor for use in the Work. "Shop drawings" are the drawings and diagrams showing details of fabrication and erection that Contractor is required to submit to the Architect or Engineer.

1.1.72 Substantial Completion: The stage in the progress of the Work, as determined by Metro, when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that Metro can lawfully occupy or use the Work for its intended use.

1.1.73 Supplier: An individual, partnership, corporation or joint venture entering into an agreement with Metro or Contractor for furnishing a portion of the Work that requires no labor at the Site, other than common carriers.

1.1.74 Unit Price: The dollar amount to complete a particular portion of the Contract Work, as defined in the Bid and Supplementary Conditions, and includes all costs, including but not limited to equipment, labor, materials, incidentals, Overhead, and Profit for the portion of Work described.

1.1.75 Unusually Persistent Severe Weather: Exists in any period when daily rainfall exceeds 0.50 inch during a month when the monthly average rainfall exceeds the normal monthly average by over twenty-five percent (25%), or when average daytime temperatures at the Project are less than 32 degrees F and are accompanied by accumulations of ice or snow, continuing for a day or more in excess of the annual average number of consecutive days severe weather conditions persist for the part of the Metro region where the Project is located (“Annual Average”). The Annual Average shall be calculated for this purpose based on ten-year averages reported in the Local Climatological Data for Portland Oregon, available at the Portland Weather Service Office. Contractor shall incorporate said Annual Average number of consecutive days severe weather conditions exist into the Project schedule at Project inception.

1.1.76 Work: Unless the context requires otherwise, the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by Contractor to fulfill Contractor's obligations. The Work may constitute all or a portion of the Project as the context requires.

1.2 Interpretation and Use of Contract Documents.

1.2.1 Intent and Effect of the Contract. The Contract Documents form the Contract for construction and represent an integrated agreement between the Parties. The Contract supersedes all prior negotiations, representations, or agreements between the Parties, either written or oral. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Unless otherwise stated in the Contract Documents, words describing materials or Work that have a well-known technical or trade meaning shall be construed in accordance with such meanings.

1.2.2 Modification of Contract Documents. The Contract Documents may only be modified by written Amendment or Change Order signed by both Parties.

1.2.3 Divisions and Headings. Titles and headings are for the convenience of organizing the Contract Documents and shall not control or limit the Contractor's obligations under the Contract.

1.2.4 Mandatory Nature of Specifications and Drawings. Mention in the Specifications or indication on the drawings of articles, materials, operations, sequence, or methods requires Contractor to furnish and install (i.e., provide) each article mentioned or indicated, of the quality or according to qualifications noted, to perform each operation called for, in the sequence called for, and to provide therefore all necessary labor, equipment, and incidentals. The determination of the type of operations and methods to be utilized in the performance of the Work shall be the responsibility of Contractor unless the Contract Documents prescribe a specific type of operation, sequence, or method, in which case Contractor shall comply with the prescribed operation, sequence, or method. Sentences in the imperative tense or command format in these Contract Documents shall be deemed to be directed to Contractor and to require Contractor to perform the services and/or provide the materials described.

1.2.5 Precedence of Contract Documents. All determination of the precedence of, or resolution of discrepancies in, the Contract Documents shall be made by Metro, but in general, precedence will be in accordance with the following list with the highest precedence item at the top:

1.2.5.1 Executed Construction Agreement.

1.2.5.2 Supplementary Conditions.

1.2.5.3 General Conditions, Advertisement for Bids, Instructions to Bidders, Invitation to Bid, Bid Forms, Performance Bond, and Labor and Materials Payment Bond.

1.2.5.4 Specifications.

1.2.5.5 Drawings.

1.2.5.6 Contractor's Proposal. Within each of the above documents, detailed information takes precedence over general information and words take precedence over numbers unless obviously incorrect.

Amendments, Addenda, Clarifications, and all Change Orders to the Contract Documents take the same order of precedence as the specific sections that they are amending.

1.2.6 Meaning of Miscellaneous Phrases. Unless the context requires otherwise, phrases in the Contract Documents shall be interpreted as follows:

1.2.6.1 Wherever the words "as directed," "as instructed," "as required," "as permitted," or words of like effect are used, it shall be understood that the direction, requirement, or permission of Metro is intended.

1.2.6.2 The words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in the judgment of Metro.

1.2.6.3 The words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to Metro.

1.2.7 Discrepancies, Errors and Omissions. The intent of the Contract Documents is to require Contractor to perform and provide every detail and item necessary for completion of the Project. The Contract Documents are not complete in every detail, however, and Contractor shall comply with their intent and meaning, taken as a whole, and shall not avail itself of any manifest errors or omissions to the detriment of the Work. Should any error, omission, discrepancy, or ambiguity appear in the Contract Documents, instructions, or Work done by others, Contractor shall immediately upon discovery submit a Request for Information to Metro pursuant to Section 3.3. If Contractor proceeds with any such Work without receiving a response to the Request for Information, Contractor shall be responsible for all resulting damage and defects, and shall perform any Work necessary to comply with the Request for Information at no cost to Metro. Any Work or material not indicated in the Contract Documents that is manifestly necessary for full and faithful performance of the Work in accordance with the intent of the Contract Documents shall be indicated by Contractor on the shop drawings and provided by Contractor to the same extent as if both indicated and specified. Any Work indicated on the drawings but not specified, or vice versa, shall be furnished in the manner specified above as though fully set forth in both. Work not particularly detailed, marked, or specified shall be the same as similar parts that are detailed, marked, or specified. In case of discrepancy or ambiguity in quantity or quality, the greater quantity or better quality as determined by Metro shall be provided at no extra cost to Metro.

1.2.8 Standards that Apply Where Detailed Specifications Are Not Furnished. Wherever in these Contract Documents or in any directions given by Metro pursuant to or supplementing these Contract Documents, it is provided that Contractor shall furnish materials or manufactured articles or shall do work for which no detailed Specifications are set forth, the materials or manufactured articles shall conform to the usual standards for first-class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work for which no detailed drawings or Specifications are set forth herein shall conform to the usual standards for first-class work of

the kind required. Dimensions not expressly provided in the Contract Documents are to be computed, rather than determined by scale or rule.

1.3 Supply of Contract Documents. Metro shall supply Contractor, without charge, a maximum of ten (10) sets of Contract Documents. Contractor shall contact Metro for additional sets of documents for which Contractor shall be charged the cost of printing.

1.4 Use of Contract Documents. The Contract Documents were prepared for use in the construction of this Project only. No part of the Contract Documents shall be used for any other construction or for any other purpose except with the written consent of Metro. Any unauthorized use of the Contract Documents is at the sole responsibility of the user and such unauthorized use shall be deemed an activity in the performance of the Contract for purposes of Contractor's duty to indemnify under Article 11.

1.5 Copyright. All submittals, record documents, and any other products or documents produced by Contractor pursuant to this Contract are the property of Metro and it is agreed by the Parties hereto that such documents are works made for hire. Contractor does hereby convey, transfer, and grant to Metro all rights of reproduction and the copyright to all such documents.

1.6 Contractor's Status as Independent Contractor. It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent contractor under ORS 670.600. The Contractor further agrees that Contractor, its officers, agents, and employees, any Subcontractor or Supplier of Contractor of any tier, or its officers, agents, or employees, are not officers, employees, or agents of Metro under the Oregon Tort Claims Act (ORS 30.260 through 30.300). Contractor and its officers, agents, employees, and its Subcontractors and Suppliers of any tier and their officers, agents, and employees will make no claim whatsoever against Metro for indemnification pursuant to ORS 30.260 to 30.300. Contractor agrees to hold Metro harmless and indemnify Metro from any such claims.

1.7 No Third-Party Beneficiary to the Contract. The Parties agree that the execution of the Contract is not intended to, nor does it, create any third-party beneficiary rights in any person.

1.8 Severability Clause. Should any provision of this Contract at any time be in conflict with any law, regulation, or ruling, or be legally unenforceable for any reason, then such provision shall continue in effect only to the extent that it remains valid. In the event that any provision of this Contract shall become legally unenforceable, in whole or in part, the remaining provisions of this Contract shall nevertheless remain in full force and effect.

1.9 Notice or Service. Any written notice required or allowed under the Contract shall be deemed to have been communicated to the other Party and service thereof shall be deemed to have been made if such notice is delivered in person to the individual, a member of the partnership or joint venture, or an officer of the corporation for whom it was intended, or if delivered at or sent by regular, registered, or certified mail to the last business address of the relevant person or Party known to the person or Party giving the notice, or to Contractor's Site office if the notice is directed to Contractor. Notice may be delivered by e-mail as long as a hard copy is mailed the same day to the relevant person by the methods noted above. The date or time of service for purposes of all notices required or allowed under the Contract shall be the date and/or time upon which the relevant document was mailed or delivered as above described. The address given in the Bid or Proposal by the Contractor is hereby designated as the legal business address of Contractor, but such address may be changed at any time by ten (10) days' prior notice in writing, delivered to Metro.

ARTICLE 2
CONTRACTOR

2.1 Responsibilities of the Contractor.

2.1.1 The Contractor will perform the Work as required by the Contract Documents, including but not limited to providing all labor, materials, equipment, tools, machines, and incidental work necessary for its performance. The Contractor will supervise and direct the Work using the Contractor's best skill and attention. Contractor is solely responsible for and will have control of all of the means and methods of construction. Contractor shall be responsible to Metro for the acts and omissions of the Contractor's employees, Subcontractors, and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors. Contractor shall perform or cause to be performed all labor, services, and Work of whatever nature and shall provide or cause to be provided all materials, equipment, tools, and other facilities of whatever nature necessary to complete the Work and shall otherwise cause the Work to be completed in accordance with the Contract Documents.

2.1.2 Until the Work is completed and accepted by Metro, the Contractor is responsible for any damage it causes to either permanent or temporary work, utilities, materials, plants, and equipment, all of which must be repaired to the satisfaction of the Project Manager at the Contractor's expense. Damage caused by vandals must

be covered by the Contractor's insurance. Damage to any portion of the Work that has been completed and accepted by Metro and that is open for public use is not the responsibility of the Contractor if caused by third persons, such as vandals.

2.1.3 It shall be the duty of Contractor to comply with all procedures established and/or implemented by Metro. In the event any such procedures are at variance with other provisions of these Documents, such procedures shall prevail.

2.2 Documents.

2.2.1 The Contractor will maintain at the Site for Metro one record As-Built copy of the drawings, plans, Specifications, Addenda, Change Orders, and other modifications, in good order and marked currently to record changes and selections made during construction, as well as one record copy of shop drawings that have been reviewed and are being used. These as-built documents shall incorporate all changes and substitutions to the Work, including without limitation changes or substitutions arising from Change Orders, construction change directives, and details clarified by requests for information, supplemental instructions, or approved shop drawings. The Contractor's as-built documentation shall be available to the Architect or Engineer and Metro during the course of the Project.

2.2.2 The Contractor shall maintain all approved permit drawings in a manner that will make them accessible at the Project Site to governmental inspectors and other authorized agencies. All approved drawings shall be wrapped, marked, and delivered to Metro within 60 days of Substantial Completion.

2.2.3 The Contractor must continuously maintain at the Project Site all material safety data sheets, safety records, daily logs, and other Contract documentation necessary to immediately ascertain the safety of the Work and to establish compliance with life safety policies, hazardous materials requirements, and the Contract Documents.

2.2.4 The Contractor, with its Subcontractors, will prepare draft record Contract Documents showing all as-built conditions as required under this Section 2.2 and submit them to Metro for review. Based on Metro's review and comments, if any, and pursuant to Metro's close-out policies and procedures, Contractor will prepare and deliver to Metro within 60 days of Substantial Completion, final, accurate, and complete record Contract Documents, including without limitation record drawings and Specifications showing the exact "as-built" conditions of the Work.

2.3 Contractor's Authorized Representative. Prior to commencing any Work under this Contract, the Contractor shall appoint in writing an authorized representative or representatives. Such appointment shall include the name and title of each representative along with the extent to which each representative is authorized to represent, bind, and act for Contractor. The description of extent of representation shall include but not be limited to the maximum dollar value of Change Orders that the individual may authorize, whether the individual may respond to RFPs and for what maximum dollar amount, and whether the individual may submit a claim pursuant to Section 3.4.

2.4 On-Site Representation Required. Contractor shall at all times be represented at the Site by one or more of such authorized representatives who, cumulatively, shall have complete authority to represent, bind, and act for Contractor in all matters pertaining to or related to this Contract. In the event that Metro deems it reasonably necessary to take immediate actions at the Site pertaining or relating to this Contract and Contractor has failed to comply with this Section and is consequently not fully represented at the Site at such time, then Contractor shall be deemed to acquiesce in all actions so taken by Metro.

2.5 Contractor's Office at the Site. Prior to commencement of Work at the Site, Contractor shall establish a field office at the Site acceptable to the Project Manager. This office shall be located in a job trailer or temporary building. This office shall be the headquarters of Contractor's representatives authorized to receive notices, instructions, drawings, or other communications from the Project Manager on behalf of Metro or the Architect or Engineer, and to act on Change Orders or other actions. Such notices, instructions, drawings, or other communications given to such a representative or delivered to Contractor's Site office in his/her absence shall be deemed to have been given to Contractor.

2.6 Use of the Site by Contractor. Contractor shall have complete and exclusive use of the premises for execution of the Work within the boundaries shown on the drawings. The Contractor’s use of the premises is limited only by Metro’s right to perform Work or to retain other contractors on portions of the Project. All construction activities, storage, staging, and Work shall be confined to the limits of Work, as per the drawings. Under no circumstances shall portions of the Site beyond the limits of Work be disturbed. The Contractor shall appropriately fence and maintain barriers to confine limits of Work to those areas indicated on the drawings. All driveways and entrances to the Site shall remain clear and available to Metro and emergency vehicles at all times. The Contractor shall not use these areas for parking or storage of materials. The Contractor shall schedule delivery of materials to minimize space and time requirements for storage of materials and equipment on Site. The Contractor shall keep roadway pavement clean, free of mud, rocks, debris associated with materials, and vehicles. The Contractor shall coordinate use of the premises under the direction of the Architect or Engineer and Owner. The Contractor shall assume all responsibility for

the protection and safe keeping of the Site, structures, and products stored on the Site included in this Contract. At no cost to Metro, the Contractor shall move any stored products that interfere with operations of Metro or construction activities. The Contractor shall obtain and pay for the use of additional storage or Work areas needed for operations.

2.7 Review of Project Conditions. Prior to execution of the Contract, the Contractor will evaluate the conditions and limitations under which the Work is to be performed, including without limitation (i) the geographical and topographical location, condition, layout, and nature of the Project Site and surrounding areas; (ii) generally prevailing climatic conditions; (iii) anticipated labor supply and costs; (iv) availability and cost of materials, tools, and equipment; (vi) ease or difficulty of access to the Project Site by vehicles, equipment and workers; and (v) other similar issues. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. Metro will not be required to make any adjustment to the Contract Time or the Contract Price in connection with any failure by the Contractor to have complied with the requirements of this Section.

2.8 Construction Staking. Contractor shall provide all necessary construction staking as to lines and grades shown on the drawings. Contractor shall protect and preserve all control points in their original position or be responsible for providing new control points established from Architect's original control points.

2.9 Construction Staging Area. Coordinate use of the Site with Owner prior to utilization of the area. Providing Site security, barriers, and other temporary protection is the responsibility of the Contractor. Limit all construction activities within the Work limits shown on the drawings. All areas disturbed in any way or during construction and not covered by roads, parking, or structures shall be rehabilitated to their pre-construction condition.

2.10 Key Personnel. Contractor shall submit, in writing, to Metro a list of the names, addresses, and telephone numbers of its key personnel who are to be contacted in case of emergencies on the job during non-working hours, including Saturdays, Sundays, and holidays, and all other key personnel as may be required.

2.11 Contractor's Employees and Subcontractors.

2.11.1 Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. It is the Contractor's responsibility to hire all personnel for the proper and diligent performance of the Work, and the Contractor shall maintain labor peace for the duration of the Project. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract Sum.

2.11.2 Metro may notify the Contractor that it needs to exclude or remove from the Project Site any or all employees, agents, suppliers, or representatives of the Contractor or its Subcontractors who threaten the safety of others or who are disruptive to the Project or Metro's operations. The Contractor will supply replacement personnel promptly after receiving notice of exclusion or removal. Nothing in this Section requires the Contractor to take any particular employment or contract action with regard to an employee or Subcontractor.

2.11.3 Contractor shall give Metro, at its request at any time, full and correct information as to the number of workers employed in connection with each subdivision of the Work, the classification and rate of pay of each worker, the cost to Contractor of each class of materials, tools, and appliances used by it in the Work, and the amount of each class of materials used in each subdivision of the Work.

2.12 Contractor to Supply Sufficient Material and Workers. Contractor shall at all times keep on the premises sufficient material and employ sufficient supervision and workers to prosecute the Work at the rate necessary to substantially complete the Work within the time specified in the Contract and in accordance with the Construction Schedule. Contractor shall coordinate the Work of its Subcontractors so that information required by one will be provided by others involved in time for incorporation in the Work in proper sequence and without delay of any materials, devices, or provisions for future Work.

2.13 Construction Plant, Equipment, and Methods.

2.13.1 The construction plant and equipment provided by Contractor, and Contractor's methods and organization for handling the Work, shall be such as will secure a good quality of Work and rate of progress that will ensure the completion of the Work within the time specified, in accordance with the Construction Schedule, and without violating city, local, state, or federal environmental regulations during construction.

2.13.2 Contractor shall give Metro full information in advance as to Contractor's plans for carrying on any part of the Work. If at any time before the commencement or during the progress of the Work, any part of Contractor's plant or equipment, or any of Contractor's methods of executing the Work, appear to Metro to be inadequate to ensure the required quality, environmental protection, or rate of progress of the Work, Metro may order Contractor to increase or improve its facilities or methods, and Contractor shall promptly comply with such orders. Neither compliance with such orders nor failure of Metro to issue such orders shall relieve Contractor from the obligation or liability to secure the quality of Work and the rate of progress required by the Contract. Contractor shall

be responsible for overload of any part or parts of structures beyond their safe calculated carrying capacities and for release of pollutants into surrounding waters resulting from Contractor's activities on the Site.

2.13.3 Contractor shall provide temporary utilities pursuant to the Specifications and shall be responsible for the safety and adequacy of its plant, equipment, and methods.

2.14 Permits.

2.14.1 The Contractor, without additional expense to Metro, is responsible for obtaining and paying for any necessary fees, licenses, and Permits and for complying with any federal, state, and municipal laws, codes, and regulations applicable to the performance of the Work, unless expressly provided otherwise in other portions of the Contract Documents. Notwithstanding this Section, Metro will submit Contract Documents to the City of Portland and pay all plan check fees and building permit fees.

2.14.2 The Contractor understands that preliminary approval of Metro's plans and Specifications by regulatory agencies does not prohibit such agencies from requesting changes in order that the Work complies with the provisions of applicable codes, laws, and regulations. The Contractor agrees that a reasonable number of changes directed by regulatory inspectors is inherent in the nature of construction work and that its Bid includes the costs of making them. The Contractor will bear the expense of complying with the requirements of regulatory inspectors for a reasonable number of changes even if such requirements require different or additional Work than that originally contemplated by the Contract Documents.

2.15 Contractor's Temporary Structures. Contractor shall obtain all necessary permits for and shall erect and maintain at its own expense, and remove upon completion of the Work or as ordered by Metro, temporary structures, sheds, barriers, walks, hoisting equipment, scaffolds, etc., as are necessary for the Work pursuant to these Contract Documents. Contractor's temporary structures, equipment, stored materials, stored equipment, etc., shall be located so as not to interfere with the prosecution of the Work. If not so located, they shall be moved by Contractor, as directed by Metro, at no cost to Metro. Contractor's temporary structures, equipment, or materials that obstruct progress of any portion of the Work shall be removed or relocated by Contractor at Contractor's expense.

2.16 Compliance with Product Manufacturer's Recommendations. Unless otherwise directed by the Architect or Engineer, the Contractor shall perform all Work in accordance with the product manufacturer's recommendations, Specifications, or directions for best results. No predatory step or installation procedure may be omitted unless specifically authorized by the Contract Documents or at the direction of the Architect or Engineer. Conflicts among manufacturer's directions or the Contract Documents shall be resolved by the Architect or Engineer.

2.17 Accounting Records.

2.17.1 The Contractor and Subcontractors shall maintain all fiscal records relating to this Contract in accordance with generally accepted accounting principles. In addition, Consultant and sub-consultants shall maintain any other records necessary to clearly document:

2.17.1.1 The performance of the Contractor, including but not limited to Contractor compliance with Contract plans and Specifications, compliance with fair contracting and employment programs, compliance with Oregon law on the payment of wages and accelerated payment provisions, and compliance with any and all requirements imposed on Contractor or Subcontractor under the terms of the Contract or subcontract;

2.17.1.2 Any claims arising from or relating to the performance of Contractor or Subcontractor under this Contract;

2.17.1.3 Any cost and pricing data relating to the Contract; and

2.17.1.4 Payments made to all suppliers and sub-consultants.

2.17.1.5 The records described in this Section 2.17.1 are the Contract Records.

2.17.2 The Contractor and Subcontractors shall maintain the Contract Records for the longer period of (a) six years from the date of final completion of the Contract to which the Contract Records relate or (b) until the conclusion of any audit, controversy, or litigation arising out of or related to the Contract.

2.17.3 The Contractor and Subcontractors shall make Contract Records available to Metro and its authorized representatives, including but not limited to the staff of any Metro department and the staff of Metro's Auditor, within the boundaries of the Metro region, at reasonable times and places regardless of whether litigation has been filed on any claims. If the Contract Records are not made available within the boundaries of Metro, the Contractor or Subcontractor agrees to bear all of the costs for Metro employees, and any necessary consultants hired by Metro, including but not limited to the costs of travel, per diem sums, salary, and any other expenses that Metro incurs in sending its employees or consultants to examine, audit, inspect, and copy those records. If Contractor elects to have such Contract Records outside these boundaries, the costs paid by Contractor to Metro for inspection, auditing, examining, and copying those records shall not be recoverable costs in any legal proceeding.

2.17.4 The Contractor and Subcontractors authorize and permit Metro and its authorized representatives, including but not limited to the staff of any Metro department and the staff of Metro Auditor, to inspect, examine, copy, and audit the books and records of Contractor or Subcontractor relating to this Contract, including tax returns, financial statements, other financial documents, and any documents that may be placed in escrow according to any Contract requirements. Metro shall keep any such documents confidential to the extent permitted by Oregon law.

2.17.5 The Contractor and Subcontractors agree to disclose the Contract Records requested by Metro and agree to the admission of such records as evidence in any proceeding between Metro and Contractor and Subcontractors, including but not limited to a court proceeding, arbitration, mediation, or other alternative dispute resolution process.

2.17.6 The Contractor and Subcontractors agree that in the event such Contract Records or any audit disclose that Metro is owed any sum of money or establish that any portion of any claim made against Metro is not warranted, Contractor and Subcontractors shall pay all costs incurred by Metro in conducting the audit and inspection. Such costs may be withheld from any sum that is due or that becomes due from Metro.

2.17.7 Failure of the Contractor or Subcontractors to keep or disclose Contract Records as required by this Contract or any solicitation document may result in debarment as a bidder or proposer for future Metro contracts as provided in ORS 279B.130 and Metro Code Section 2.04.070(c), or may result in a finding that the Contractor or Subcontractor is not a responsible bidder or proposer as provided in ORS 279B.110 and Metro Code Section 2.04.052.

ARTICLE 3
ADMINISTRATION OF THE CONTRACT

3.1 Authority and Relationships of Metro and Architect or Engineer. Except as specifically provided in this Section, no individual other than the Metro Chief Operating Officer or the Project Manager, duly appointed as set forth below, shall have any authority to make representations, statements, or decisions of whatever nature binding Metro or Architect or Engineer regarding any aspect of this Contract. Except as specifically provided in this Article, Contractor shall have no right to, and shall not rely on, any such representation, statement, or decision. Any reference to action by Metro in this Contract requires the written approval of the Metro Chief Operating Officer or the Project Manager designated in writing by the Metro Chief Operating Officer as having authority to act for Metro, but only to the extent that such authority is expressly delegated in writing.

3.2 Authority of Metro. The Work must be performed to the complete satisfaction of the Project Manager.

3.2.1 The decision of the Project Manager will be final, binding, and conclusive on the Contractor on all questions that arise regarding the quantity of materials and Work, the quality of materials and Work, the acceptability of materials furnished and Work performed, the acceptable rate of progress of the Work, the interpretation of the plans and Specifications, the measurement of all quantities, the acceptable fulfillment of the Contract on the part of the Contractor, and payments under the Contract.

3.2.2 Work will not be considered completed until it has passed final inspection by the Project Manager and is accepted by Metro. The authority of the Project Manager is such that the Contractor must at all times carry out and fulfill the instructions and directions of the Project Manager insofar as they concern the Work to be done under the Contract.

3.2.3 If the Contractor fails to comply with any reasonable order made under the provisions of this Section, the Project Manager may cause unacceptable Work to be remedied or removed and replaced, and unauthorized Work to be removed, and to deduct the costs thereof from any money due or to become due to the Contractor.

3.2.4 The Project Manager has the authority to suspend Work for cause as set forth in Section 3.5.

3.2.5 Metro may call for meetings of Contractor, Contractor's Subcontractors, and Suppliers as Metro deems necessary for the proper supervision and inspection of the Work. Such meetings shall be held at the Site on regular working days during regular working hours, unless otherwise directed by Metro. Attendance shall be mandatory for all Parties notified to attend.

3.2.6 Nothing in this Section or elsewhere in the Contract is to be construed as requiring the Project Manager to direct or advise the Contractor on the method or manner of performing any Work under the Contract. No approval or advice as to the method or manner of performing or producing any materials to be furnished constitutes a representation or warranty by Metro that the result of such method or manner will conform to the Contract, relieve the

Contractor of any of the risks or obligations under the Contract, or create any liability to Metro because of such approval or advice.

3.2.7 An Architect, Engineer, designer, or other person hired by Metro under a separate contract is not the Project Manager, unless the Contract Documents expressly state otherwise. The Contractor will be notified in writing if the Project Manager is to be changed.

3.2.8 Contractor has no right to and shall not rely on representations of whatever nature made by any individual, whether or not employed by or purporting to represent Metro, unless such individual has been specifically and expressly delegated authority to make such representations pursuant to these Contract Documents. Likewise, Contractor has no right to and shall not rely on any representations of authorized changes in the Contract of whatever size or nature unless such change is in writing and signed by Metro.

3.2.9 Nothing contained in this Section shall obligate Metro or Architect or Engineer to supervise Contractor's Work under this Contract, and Contractor shall remain fully responsible for the complete and proper supervision of all of the Work.

3.3 Request for Information. If the Contractor believes that the Work to be done or any of the matters relative to the Contract Documents are not sufficiently detailed or explained in the Contract Documents, or if the Contractor has any questions as to the meaning or intent of the Contract Documents, Contractor shall immediately submit to Architect or Engineer and Metro a written Request for Information ("RFI") that shall fully describe the information sought.

3.3.1 The RFI shall be directed to the Project Manager and Architect or Engineer. Subcontractors shall direct correspondence through the Contractor to the Project Manager and Architect or Engineer. At a minimum the RFI shall contain: (1) project title, (2) identify the nature and location of each clarification/verification, (3) date, (4) response by and RFI number, (5) subject, (6) initiator of the question, (7) indication of the costs, (8) Contract drawings reference, (9) Contract Specification section, and (10) descriptive text and space for a reply. Each RFI shall be numbered sequentially beginning with #001, and a separate RFI shall be submitted for each item. Verbal discussions/clarifications for minor items can be addressed with the Architect or Engineer by phone and the Contractor shall follow up with a confirming RFI.

3.3.2 It is Contractor's responsibility to request information under this Section in sufficient time for review by the Architect or Engineer and Metro so that the orderly progress and prosecution of the Work is not delayed.

3.3.3 The Architect or Engineer, in consultation with Metro, shall interpret the meaning and intent of the Contract Documents and shall issue, within five (5 working days of receiving an RFI from Contractor, a written Clarification describing such meaning and intent. Additionally, the Architect or Engineer, after consulting with Metro, may at any time issue a written RFI as deemed necessary to carry out the Work included in the Contract Documents. Notwithstanding any dispute or disagreement that Contractor may have concerning any such RFI, Contractor shall perform the Work as prescribed and in accordance with all such RFI.

3.3.4 If notified by Metro or the Architect or Engineer that an RFI is forthcoming, any related Work done before the receipt of the RFI shall be coordinated with Metro so as to minimize the effect of the RFI on Work in progress. Any related Work not coordinated with Metro or the Architect or Engineer done before receipt of the RFI shall be at Contractor's risk and at no cost to Metro if that Work does not conform to the Clarification.

3.3.5 If Contractor proceeds with Work that is not sufficiently detailed or explained in the Contract Documents without requesting and obtaining an RFI pursuant to this Section, Contractor shall do so at its own risk and shall, at no cost to Metro, perform any additional Work that may be required by Metro to bring the Work into conformance with the intent of the Contract Documents.

3.4 Contractor's Claims.

3.4.1 Generally. No claim by Contractor shall be considered or allowed under this Contract except as specifically provided and prescribed under this Section. Failure to make a claim as specifically prescribed by this Section or failure to perform disputed Work, if any, as directed by Metro shall bar Contractor from any recovery or extension of time resulting from the facts surrounding the claim. Contractor's full and complete compliance with this Section shall be a condition precedent to any right of Contractor to further prosecute any claim against Metro arising out of or related to Work described in the Contract Documents. Every decision and action of Metro shall be considered final unless Contractor makes a claim concerning such decision or action pursuant to this Section.

3.4.2 Types of Claims. Contractor claims are limited to the following:

3.4.2.1 Claims based on Excusable Delays as described in Section 3.4.3.

3.4.2.2 Claims based on differing Site conditions as described in Section 3.4.4;

3.4.2.3 Claims based on Clarifications or Change Orders issued by Metro or any other decision, action, or failure to act by Metro as described in Section 3.4.5.

3.4.3 Claims For Excusable Delays.

3.4.3.1 Definition of Excusable Delay. A Delay is "Excusable" if such act, event, or condition has a materially adverse effect on the ability of Contractor to perform its obligations under this Contract as scheduled, and/or materially increases the cost to Contractor to perform such obligations as scheduled and if such act, event, or condition and its effect:

3.4.3.1.1 Are beyond the reasonable control of Contractor (or any third party for whom Contractor is directly responsible); and

3.4.3.1.2 Do not arise out of (a) strikes, labor disputes, or other labor difficulties involving Contractor or its Subcontractors or Suppliers or entities providing transportation to Contractor or its Subcontractors or Suppliers; (b) labor shortages; or (c) changing economic conditions; and

3.4.3.1.3 Could not have been reasonably anticipated by Contractor.

3.4.3.2 Types of Excusable Delay Claims. Excusable Delays are either Compensable or Non-compensable. Claims for Non-compensable Excusable Delays are limited to claims for extension of Contract Time. Contractor may claim both an increase in the Contract Amount and an extension of the Contract Time for Compensable Excusable Delays.

3.4.3.3 Non-Compensable Excusable Delay Claims. Delays resulting from the following acts, events, and conditions are Non-Compensable Excusable Delays:

3.4.3.3.1 An act of force majeur.

3.4.3.3.2 Unusually Persistent Severe Weather. No claim for extension of the Contract Time will be considered for Unusually Persistent Severe Weather unless Contractor submits documentation within 72 hours of the occurrence of the Unusually Persistent Severe Weather satisfactory to Metro establishing that the weather at the Project Site satisfied the definition of Unusually Persistent Severe Weather and that the delay could not have been avoided by either rescheduling the Work or implementing reasonable measures to protect against the weather so that the Work could proceed.

3.4.3.3.3 Acts of a public enemy, war (whether or not declared), or governmental intervention resulting therefrom, blockage, embargo, insurrection, riot, or civil disturbance.

3.4.3.3.4 The failure to issue or renew, or the suspension, termination, interruption, or denial of, any permit, license, consent, authorization, or approval essential to the Work, if such act or event is not the result of the willful or negligent action or inaction of Contractor or of any third party for whom Contractor is directly responsible, and if Contractor is taking, has taken, or will cause to be taken, all reasonable actions in good faith to contest such action (it being understood that the contesting in good faith of any such action shall not constitute or be construed as a willful or negligent act of Contractor).

3.4.3.3.5 The failure of any appropriate federal, state, municipal, county, or other public agency or authority or private utility having operational jurisdiction over the Work or Site to provide and maintain utilities, services, water and sewer lines, and power transmission lines to the Site, that are required for and essential to the Work.

3.4.3.3.6 Epidemics or quarantines.

3.4.3.3.7 Material, equipment, or fuel shortages or freight embargoes.

3.4.3.3.8 Priorities or privileges established for the manufacture, assembly, or allotment of material by order, decree, or otherwise of the U. S. or by any department, bureau, commission, committee, agent, or administrator of any legally constituted public authority.

3.4.3.4 Compensable Excusable Delay Claims. Delays resulting from the following acts, events, and conditions are Compensable Excusable Delays:

3.4.3.4.1 Changes in the Work ordered by Metro if they require additional time to complete the Work and adversely impact the Critical Path.

3.4.3.4.2 The prevention by Metro of Contractor from commencing or prosecuting the Work.

3.4.3.4.3 Failure by the Architect or Engineer to respond to a Request for Information within five (5) working days of submittal by the Contractor.

3.4.3.5 Inexcusable Delays. Delays resulting from the following acts, events, and conditions shall not result in Excusable Delays:

3.4.3.5.1 Any delay that could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of Contractor.

3.4.3.5.2 Any delay in the prosecution of parts of the Work that may in itself be unavoidable but that does not necessarily prevent or delay the prosecution of other parts of the Work nor the Substantial Completion of the Work of this Contract within the time specified.

3.4.3.5.3 Any reasonable delay resulting from the time required by Metro for review of submittals or shop drawings submitted by Contractor and for the making of surveys, measurements, and inspections.

3.4.3.5.4 Any delay arising from an interruption in the prosecution of the Work on account of the reasonable interference from Other Metro Contractors that does not necessarily prevent the Substantial Completion of the Work of this Contract within the time specified.

3.4.3.5.5 Any delay resulting in any manner from labor disputes, strikes, or difficulties or any delay resulting in any manner from any labor-related event, act, or condition whether or not Contractor has any control over such event, act, or condition.

3.4.3.5.6 Any delays in delivery of equipment or material purchased by Contractor or its Subcontractors or Suppliers (including Metro-selected equipment. Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all equipment and materials.

3.4.3.6 Excusable Delay Claims Procedure.

3.4.3.6.1 Contractor shall, within forty-eight (48) hours of the start of the occurrence or Contractor's first knowledge of the occurrence that is the basis of the claim for Excusable Delay, whichever is earlier, notify Metro in writing of such delay. The written notice by Contractor shall indicate the cause of the delay and shall estimate the possible time extension requested. Within ten (10) days after the cause of the delay has been remedied, Contractor shall give written notice to the Project Manager of any actual time extension and, if the Excusable Delay is a Compensable Excusable Delay, any increase in the Contract Amount requested as a result of the aforementioned occurrence in accordance with this Contract. If Contractor believes that a single circumstance or set of facts gives rise to both a claim for an extension to the Contract Time and an increase in the Contract Amount, Contractor must state both such allegations in one written claim or waive the unstated allegation.

3.4.3.6.2 Submission of timely written notice as specified above shall be mandatory and failure to comply shall be a conclusive waiver to any claim for Excusable Delay by Contractor. Oral notice or statement will not be sufficient.

3.4.3.6.3 Within twenty-one (21) days after Contractor submits to the Project Manager such a written notice for an extension of Contract Time and/or increase in the Contract Amount, the Project Manager will issue the decision on each request. If Contractor is dissatisfied with such decision, Contractor may preserve its claim as provided and prescribed by Section 3.4.6.

3.4.4 Claims for Differing Site Conditions-- Contractor shall promptly, and before the conditions are disturbed, give written notice to the Project Manager of (i) subsurface or latent physical conditions at the Site that differ materially from those indicated in this Contract, or (ii) physical conditions at the Site that were unknown and not reasonably discoverable by means of the Review of Project Conditions required by Section 2.7, are of an unusual nature that differ materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract. The Project Manager shall investigate the Site conditions promptly after receiving the notice. If the conditions do materially so differ as to cause an increase or decrease in Contractor's cost of, or the time required for, performing any part of the Work under this Contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made and a Change Order issued. If Contractor is dissatisfied with the decision of the Project Manager under this Section, Contractor may preserve its claim as provided and prescribed by Section 3.4.6.

3.4.5 Other Contractor Claims-- Contractor claims based on Clarifications or Change Orders issued by Metro or any other decision, action, or failure to act by Metro shall be made according to this Section.

3.4.5.1 Contractor shall, within forty-eight (48) hours following discovery of the facts that give rise to its claim, notify the Project Manager in writing of its intent to make the claim. Within ten (10) days following discovery of the facts that give rise to its claim and prior to commencing the Work or conforming to the Clarification on which the claim is based, if any, Contractor shall submit its formal written claim to the Project Manager. Contractor's formal claim shall include a description of:

3.4.5.1.1 The factual occurrences upon which Contractor bases the claim including the decision, action, or failure to act by Metro or its authorized representatives that allegedly give rise to the claim;

3.4.5.1.2 How Metro's decision, action, or failure to act has affected Contractor's performance or otherwise affected Contractor;

3.4.5.1.3 Whether the claim is for an extension in the Contract Time or increase in the Contract Amount, or both, and the specific extension or increase requested;

3.4.5.1.4 The provisions of the Contract upon which the claim is based.

3.4.5.2 Submission of written notice of intent to make a formal claim as specified above shall be mandatory and failure to comply shall be a conclusive waiver to any claim by Contractor. Oral notice or statement will not be sufficient nor will notice or statement after commencing the Work in question.

3.4.5.3 After the written notification is submitted by Contractor (if the claim is not resolved or withdrawn in writing) and only upon written direction by the Project Manager, Contractor shall proceed without delay to perform the Work pursuant to the direction of the Project Manager. While the Work on an unresolved claim is being performed, Contractor shall keep track of costs and maintain records in the manner set forth in the section on Force Account Work, at no cost to Metro. Such notice by Contractor and the fact that Contractor is keeping track of costs and maintaining records shall not in any way be construed as proving the validity of the claim nor the costs thereof.

3.4.5.4 Provided the claim or claims have been submitted in accordance with the requirements of this Section, the Project Manager will consider and investigate the claim or claims of Contractor. Within twenty-one (21) days of receipt of the above-described written notification of claim, the Project Manager will advise Contractor of the Project Manager's decision to accept or reject the claim or claims, in full or in part. If Contractor is dissatisfied with the decision of the Project Manager under this Section, Contractor may preserve its claim as provided and prescribed by Section 3.4.6.

3.4.6 Preservation of Claims -- Within thirty (30) days after a rejection of a claim, in whole or in part, by Metro under Sections 3.4.3, 3.4.4 or 3.4.5, Contractor may preserve its claim by submitting a fully documented claim package to the Metro Procurement Officer. That package shall include substantiating documentation with an itemized breakdown of Contractor and Contractor's Subcontractors' costs on a daily basis that shall include but not be limited to labor, material, equipment, supplies, services, Overhead, and Profit. All documentation that Contractor believes is relevant to the claim shall be provided in the claim package, including without limitation payroll records, purchase orders, quotations, invoices, estimates, correspondence, profit and loss statements, daily logs, ledgers, and journals. Failure to submit the claim package in full compliance with this requirement and/or maintain cost records as herein required will constitute a waiver of the claim. If Contractor elects to pursue any claims by filing a lawsuit against Metro, it must commence such lawsuit within six (6) months after the date of Substantial Completion. Failure to commence a lawsuit within this time limitation shall constitute a waiver of all such claims by Contractor.

3.5 Metro's Right to Stop, Perform, or Delete Work.

3.5.1 If the Contractor fails to correct Work not in conformance with the Contract or fails to carry out Work in accordance with the Contract, Metro may issue a written order to the Contractor to stop all or part of the Work until the deficiency set forth in the order has been corrected. Metro has no duty to exercise this right for the benefit of anyone other than Metro.

3.5.2 If the Contractor refuses or fails to comply with the Contract, Metro may correct any deficiency or defect or perform Work that the Contractor has failed to perform, or take other appropriate action, without prejudice to any other remedy Metro may have under the Contract. Before taking that action, Metro will provide the Contractor and its sureties with seven days' written notice of its intentions, unless an emergency or dangerous condition exists, in which case the action may be taken without notice. If Metro performs part of the Contractor's Work, corrects deficiencies, or is required to take action as a result of an emergency or dangerous condition, Metro will deduct the cost of that action from any payment then or thereafter due the Contractor. If the cost of Metro's action exceeds any sums held by Metro and otherwise payable to the Contractor, the Contractor agrees to reimburse Metro for any excess costs.

3.5.3 Metro has the right to delete Work from this Contract, and the Parties agree that such action does not constitute a breach of contract. Therefore, Metro may delete Work from the Contract and perform it with its own forces or have such Work performed by another Contractor. If Work is deleted from the Contract, the cost of performing such Work will be deducted from the Contract Amount to be paid to the Contractor. Any objection to the change in Contract Amount must be processed as a claim as required by Section 3.4.5.

3.5.4 Metro's rights as stated in this Section 3.5 are in addition to and do not limit Metro's other rights or remedies.

3.6 Metro's Right to Adjust Payments.

3.6.1 Adjusted Payments for Delay. Time is of the essence in this Contract. Metro and Contractor understand and agree that Metro will be damaged if Contractor fails to substantially complete the Work within the Contract Time, and that Metro will be vulnerable to further damages if Metro is obligated to continue paying Contractor for Work performed after the Contract Time has expired. It is therefore agreed that upon the expiration of the Contract

Time, Metro may adjust its payments to Contractor by any combination of the following: (1) making no further payments to Contractor until the Work is substantially complete; (2) paying the Subcontractor costs incurred by Contractor without any overhead, profit, or fee of any kind going to Contractor; and/or (3) collection of liquidated damages as designated in the Contract. Permitting Contractor to continue and finish the Work or any part thereof after the Contract Time has expired shall not waive any of Metro's rights under this Section or the balance of the Contract Documents.

3.6.2 Adjusted Payments Not a Bar to Metro's Right to Other Damages. Payment of adjusted payments shall not release Contractor from obligations in respect to the complete performance of the Work, nor shall the payment of such adjusted payments constitute a waiver of Metro's right to collect any additional adjusted payments that it may sustain by failure of Contractor to fully perform the Work, it being the intent of the Parties that the aforesaid adjusted payments be full and complete payment only for failure of Contractor to complete the Work on time. Metro expressly reserves the right to make claims for any and all other damages that Metro may incur due to Contractor's failure to perform in strict accordance with this Contract.

3.7 Mediation. Both Parties shall endeavor to negotiate resolutions to all disputes arising out of this Contract. Any controversy or claim arising out of or relating to this Contract that remains unresolved after such negotiations shall be submitted to mediation prior to the commencement of litigation.

3.7.1 The mediator shall be an individual mutually acceptable to both Parties. Should the Parties disagree on the selection of a mediator, the Parties shall look to the local circuit court or the Oregon Dispute Resolution Commission. Each Party shall pay its own costs for the time and effort involved in mediation. The cost of the mediator shall be split equally between the two Parties.

3.7.2 Both Parties agree to exercise their best effort in good faith to resolve all disputes in mediation. Participation in mediation is a mandatory requirement on both Metro and Contractor. The schedule and time allowed for mediation shall be mutually acceptable. The mediation process is nonbinding.

3.7.3 Contractor agrees to consolidation of any mediation between Metro and Contractor with any other mediation involving, arising from, or relating to this Contract.

3.8 Litigation. All disputes not resolved by mediation shall be decided exclusively by a court of competent jurisdiction in Multnomah County under the laws of the state of Oregon.

3.9 Work to Continue Notwithstanding Dispute. In no event shall submission of a dispute arising out of this Contract by either Party relieve Contractor of its obligation to fully perform the requirements of the Contract as directed by Metro pending resolution of the dispute pursuant to the procedures set forth in this Article. In the event Contractor, in Metro's opinion, fails to fully perform the requirements of the Contract pending resolution of a dispute, Metro shall be entitled to exercise its rights to impose adjusted payments pursuant to Section 3.6, and/or terminate the Contract pursuant to Article 15 of these General Conditions.

ARTICLE 4
SUBCONTRACTING AND ASSIGNMENT OF THE CONTRACT

4.1 Subcontracting. Contractor shall arrange and delegate its Work in conformance with trade practices and union regulations, if applicable, but shall remain responsible to Metro for performance of all Work required or implied by the Contract Documents. Contractor shall also be responsible for coordinating the efforts of its Subcontractors and Suppliers.

4.2 Objection to Subcontractors or Suppliers. Metro reserves the right to make reasonable objection to any of Contractor's Subcontractors or Suppliers if Metro discovers any data or information at any time during the performance of the Contract that gives Metro a basis for such reasonable objection. Metro will notify Contractor in writing if Metro has any reasonable objection to any of Contractor's Subcontractors or Suppliers. Contractor shall not subcontract with any Subcontractor or Supplier to which Metro has made a reasonable objection. In the event of Metro's reasonable objection to any Subcontractor or Supplier, Contractor shall propose another entity to which Metro has no reasonable objection.

4.3 Substitution, Change, or Addition of Subcontractors or Suppliers. At any time that Contractor intends to substitute, change, or add a Subcontractor or Supplier during the performance of the Contract, Contractor shall give Metro prior written notice of such intention. Contractor shall not substitute, change, or add any such Subcontractor or Supplier if Metro gives Contractor reasonable objection in writing within ten (10) days after Metro receives such notice.

4.4 Removal of Subcontractors at Request of Metro. When any Subcontractor fails to prosecute a portion of the Work in a satisfactory manner, Metro may so notify Contractor. If the Subcontractor fails to cure the unsatisfactory Work promptly, Contractor shall remove such Subcontractor immediately upon written request of Metro

and Contractor shall request approval from Metro of a new Subcontractor to perform this section of the Work at no increase in the Contract Amount, and with no change in the Contract Time.

4.5 Metro Not Obligated to Detect Unsatisfactory Work. Nothing contained in this Contract shall obligate Metro or place on Metro an affirmative duty to detect or discover unsatisfactory Work or materials of Contractor's Subcontractors or Suppliers. Failure of Metro to detect or discover such unsatisfactory Work or materials shall not relieve Contractor of any of its obligations under this Contract.

4.6 No Contractual Relationships Between Metro and Contractor's Subcontractors and Suppliers. Nothing contained in this Contract is intended nor shall be construed to create any contractual or third party beneficiary relationship between Metro and any of Contractor's Subcontractors, Suppliers, or agents, save and except in relation to the Labor and Materials Payment Bond.

4.7 Contractor's Agreements with Subcontractors.

4.7.1 Contractor shall provide in all subcontract and supply agreements that the Subcontractor or Supplier will be bound by the terms and conditions of this Contract to the extent that they relate to the Subcontractor's or Supplier's Work. Contractor shall require each Subcontractor to enter into similar agreements with sub-tier Subcontractors and Suppliers. Contractor shall make available to each proposed Subcontractor and Supplier, prior to the execution of the subcontract or supply agreement, copies of the Contract Documents that apply to the Work and materials to be provided by the Subcontractor or Supplier. Subcontractors and Suppliers shall similarly make copies of applicable portions of such documents available to their respective proposed sub-tier Subcontractors and Suppliers.

4.7.2 All Subcontractor and Supplier agreements shall also provide that they are assignable to Metro at Metro's option, in the event that Metro terminates the Contract. Contractor will provide to Metro a copy of all subcontracts and supply contracts for permanent materials.

4.7.3 The Contractor will provide Metro with copies of all of its subcontracts, purchase orders, and supply agreements relating to the Work upon Metro’s request within three (3) business days of the request.

4.8 Assignment. Contractor shall constantly give its personal attention to the faithful prosecution of the Work. Contractor shall keep the Work under its personal control and shall not assign any or all of Contractor's rights, by power of attorney or otherwise, nor delegate any of its duties except with the prior written approval of the Metro Council.

ARTICLE 5
TIME OF COMPLETION AND SCHEDULE FOR THE WORK

5.1 Prosecution of Work Generally. Contractor shall commence the Work within five (5) days after issuance of written Notice to Proceed from Metro and will diligently prosecute the Work to its Final Completion and Acceptance. The start of Work shall include attendance at preconstruction conferences, preparation and submittal of shop drawings, equipment lists, Schedule of Values, CPM construction schedules, requests for substitutions, and other similar activities, as described by these Contract Documents.

5.2 Time of Completion.

5.2.1 Contractor shall bring the Work to Substantial Completion within the Contract Time as set forth in the Construction Agreement.

5.2.2 The time limits stated in these Contract Documents are of the essence of this Contract. By executing the Construction Agreement, Contractor confirms that the Contract Time is a reasonable period for performing all of the Work.

5.2.3 Failure of Contractor to substantially complete the Work within the Contract Time and according to the provisions of these Contract Documents shall subject Contractor to liquidated damages pursuant to the applicable sections of these Contract Documents.

5.3 Extensions of Time. Extensions of the Contract Time shall be made pursuant to the procedure and according to the provisions and requirements contained in Articles 3 and 8 of these Contract Documents.

5.4 Project Scheduling. Contractor shall submit to Metro a detailed Construction Schedule for completion of the Work pursuant the Specifications following the Critical Path method. The Construction Schedule shall, when approved and as updated and approved by Metro, become a part of the Contract Documents.

5.5 Use of Completed Parts of the Work Before Acceptance.

5.5.1 Metro may decide to use part of the Work that has been completed before completion of all the Work required by the Contract. If that occurs, Metro will notify the Contractor in writing of its intention.

5.5.2 When use of part of the Work by Metro begins, the Contractor is:

5.5.2.1 Relieved of the duty of maintaining and protecting that portion of the Work, provided that it has been completed in accordance with the Contract.

5.5.2.2 Relieved of responsibility for injury or damage to the portion of Work used by Metro from use by public traffic or from the action of the elements of nature or from any other cause, except injury or damage resulting from the Contractor's own operations or from its negligence.

5.5.2.3 Relieved of the responsibility of cleaning up that portion of the Work before final acceptance, unless the Contractor's own operations require such cleanup.

5.5.3 Use by Metro of a part of the Work as described in this Section does not constitute final acceptance of the Work as a whole or in any part.

ARTICLE 6
COORDINATION WITH OTHER METRO CONTRACTORS

6.1 Other Metro Contractors Generally. Metro reserves the right to award other contracts in connection with the Work. Contractor shall allow such Other Metro Contractors reasonable opportunity for storage of their materials and execution of their Work, shall ensure that the execution of Contractor's Work properly connects and coordinates with Work of all Other Metro Contractors, and shall cooperate with Other Metro Contractors to facilitate the Work in such a manner as Metro may direct. Connection between the Work of the Contractor and Other Metro Contractors will be the responsibility of the Party that is last in time to construct, unless otherwise directed in the Contract Documents.

6.2 Duty to Inspect Other Metro Contractors' Work. Where Contractor's Work is associated with that of Other Metro Contractors, or is to interface in any way with such Other Metro Contractors' Work, Contractor shall examine, inspect, and measure the adjacent or in-place Work of such Other Metro Contractors. If Contractor determines that any defect or condition of such adjacent or in-place Work will impede or increase the cost of Contractor's performance or otherwise prevent the proper execution of Contractor's Work, Contractor shall immediately, and before performing any Work affected by the Other Metro Contractors' work, submit an RFI to Metro pursuant to Section 3.3. If Contractor proceeds without examining or inspecting the Work and submitting a Request for Information, Contractor shall be held to have accepted the Other Metro Contractors' Work or material and the existing conditions, shall be responsible for any defects in Contractor's Work resulting therefrom, and shall not be relieved of any obligation or any warranty under this Contract because of any such condition or imperfection. This provision shall be included in any and all of Contractor's subcontracts for Work to be performed.

6.3 Latent Defects in Other Contractor's Work. Section 6.2 does not apply to latent defects. Contractor shall report latent defects in any Other Metro Contractors' Work at any time such defects become known or Contractor should have known, and Metro shall promptly thereafter take such steps as may be appropriate. If Contractor in the exercise of reasonable care should have known of such defects but did not report them, such defects shall not be considered latent.

6.4 Duty to Maintain Schedule. It shall be the responsibility of Contractor to maintain its schedule so as not to delay the progress of the Project or the Work of Other Metro Contractors. Contractor is required to cooperate in every way possible with Other Metro Contractors. Except as otherwise specifically provided in this Contract, no additional compensation will be paid for such cooperation. If Contractor delays the progress of the Project or the progress of Other Metro Contractors, it shall be the responsibility of Contractor to take all of the steps necessary to bring the affected Work into compliance with any affected schedules and to indemnify Metro from all liability for such delays pursuant to Article 11. Metro shall be under no duty to monitor or detect any delays of Contractor or any Other Metro Contractor on the Project or any lack of coordination on the Project. Consequently, the failure of Metro to so monitor or detect shall not be construed as relieving Contractor of its duties to fully perform all of its obligations under the Contract.

6.5 Failure to Maintain Schedule.

6.5.1 If, in the opinion of Metro, Contractor falls behind the Construction Schedule or delays the progress of Other Metro Contractors and is not entitled to an extension of time pursuant to the Contract Documents, Contractor shall perform all steps that are necessary, in the opinion of Metro, to bring Contractor's Work into compliance with the Construction Schedule or to remedy any delay to the progress of Other Metro Contractors. Contractor shall submit operation plans to Metro that shall fully demonstrate the manner of intended compliance with this Section. The steps referred to above shall include but not be limited to:

6.5.1.1 Increased manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

6.5.1.2 Increase, when permitted, the number of working hours per shift, shifts per working day, working days per week, or the amount of equipment or any combination of the foregoing, sufficient to eliminate the backlog of Work.

6.5.1.3 Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.

6.5.1.4 Expedite delivery of materials and equipment, such as use of airfreight.

6.5.2 If Metro directs Contractor to take measures described in this Section, or if Contractor takes such measures without direction from Metro, Contractor shall bear all costs of complying. Metro shall, however, reimburse Contractor for reasonable costs of complying if such directive to accelerate from Metro was issued to overcome delay caused by the acts or omissions of Metro or persons acting for Metro, provided Contractor has complied with all applicable provisions of Articles 3 and 8 of these General Conditions.

6.5.3 Failure to maintain the construction schedule or to take action to regain the schedule or to furnish a schedule as outlined in the Specifications may result in withholding all or part of the monthly progress payments.

6.6 Failure to Coordinate Work. If Contractor fails to coordinate its Work with the Work of Other Metro Contractors as directed by Metro, Metro may, upon written notice to Contractor:

6.6.1 Withhold any payment otherwise due hereunder until Contractor complies with Metro's directions.

6.6.2 Direct others to perform portions of the affected Work and charge the cost of such Work against the Contract Amount or deduct the cost from sums held in Retainage.

6.6.3 Terminate any or all portions of the Work for Contractor's failure to perform in accordance with the Contract.

6.7 Other Metro Contractors' Failure to Coordinate. If Contractor determines that any Other Metro Contractor on this Project is failing to coordinate its Work with the Work of Contractor, Contractor shall notify Metro immediately and before performing any affected Work.

6.8 Conflicts Among Contractors. Any difference or conflict that may arise between Contractor and Other Metro Contractors in regard to their Work shall be adjusted as determined by Metro. If directed by Metro, Contractor shall suspend any part of the Work specified or shall carry on the same in such a manner as may be prescribed by Metro when such suspension or prosecution is necessary to facilitate the Work of Other Metro Contractors.

6.9 Coordination Drawings. Contractor shall prepare coordination drawings as determined necessary by Metro to satisfactorily coordinate and interface its Work with the Work of all Other Metro Contractors, thereby avoiding conflicts that may arise.

6.10 Furnished by Owner, Installed by Contractor ("FOIC") Items.

6.10.1 Owner Responsibilities for FOIC Items. Owner-furnished products/items are indicated on the drawings as FOIC items. Owner's responsibilities include: (1)arrangement for and delivery of necessary shop drawings, product data, and samples to the contractor; (2) arrangement of and payment for Product delivery to the Site; (3) delivery of Suppliers' bill of materials to Contractor; (4) inspection of deliveries jointly with the Contractor and recording shortages of and damaged or defective items; (5) submission of claims for transportation damage; (6) arrangement for replacement of damaged, defective, or missing items; and (7) arrangement for manufacturers' warranties, bonds, service, and inspections as required. Owner is responsible for scheduling all FOIC items in accordance with Contractor's Construction Schedule.

6.10.2 Contractor Responsibilities for FOIC Items. The following outlines the responsibilities of the Contractor for FOIC items: (1) designating a delivery date for each item in the Construction Schedule; (2) reviewing shop drawings, product data, and samples; (3) immediately notifying the Project Manager of any discrepancies or problems anticipated in the use of the product; (4) reviewing and unloading products at the Site; (5) promptly inspecting products jointly with Owner and recording shortages and damaged or defective items; (6) handling products at the Site, including uncrating and storage; (7) protecting products from exposure to elements and damage; (8) assembling, installing, connecting, adjusting, and finishing product as stipulated in the Specifications; and (9) repairing or replacing items damaged by Contractor.

6.11 Conferences. At any time during the progress of the Work, Metro shall have authority to require Contractor to attend any conference of any or all of the Contractors engaged in the Project or related projects.

6.11.1 Project Meetings. The Contractor will schedule and chair meetings and conferences at the Project Site unless otherwise indicated. Contractor will inform participants and other individuals whose presence is required of the date and time of each meeting. The Contractor shall prepare an agenda, distribute to all attendees, and prepare minutes that reflect significant discussions and agreements achieved. Meeting minutes shall be distributed to everyone concerned, including Metro, within three (3) days of the meeting.

6.11.2 Pre-construction Conference. The Contractor will schedule a pre-construction conference prior to start of construction. The meeting will be scheduled at a time convenient to Metro and Architect or Engineer, but no later than five (5) days after execution of the Contract. The conference will be held at the Project Site or another convenient location. The purpose of the meeting is to review responsibilities and personnel assignments. Attendees will include authorized representatives of Metro, Architect or Engineer and its consultants, Contractor and its superintendent, major subcontractors and suppliers, and other concerned parties. All participants shall be familiar with the Project and be authorized to conclude matters relating to the Work. The agenda shall include tentative construction schedule, phasing, critical Work sequencing and long-lead items, designation of key personnel and their duties, procedures for processing field decisions and Change Orders, procedures for RFIs, procedures for testing and inspecting, procedures for processing applications for payment, distribution of Contract Documents, submittal procedures, preparation of record documents, use of premises, Work restrictions, Owner's occupancy requirements, responsibilities for temporary facilities and Site protection, construction waste management and recycling, parking availability, office, Work, and storage areas, equipment deliveries and priorities, first aid, security, progress cleaning, and working hours.

6.11.3 Pre-installation Conferences – Contractor will conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction and includes installation of FOIC items. Contractor is responsible for conducting these meetings, which shall occur on the same date as progress meetings, if possible. Attendees shall include the installers and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination with other materials or installations. Agenda items will include Contract Documents, options, related RFIs, related Change Orders, purchases, deliveries, submittals, review of mock-ups, possible conflicts, compatibility problems, time schedules, weather limitations, manufacturers' written recommendations, warranty requirements, compatibility of materials, acceptability of materials, temporary facilities and controls, space and access limitations, regulations of authorities having jurisdiction, testing and inspecting, installation procedures, coordination with other Work, required performance results, protection of adjacent Work, and protection of the Site and its elements. The Architect or Engineer shall record significant conference discussions, agreements, and disagreements, including corrective action measures and action.

ARTICLE 7
CONTROL AND QUALITY OF WORK AND MATERIAL

7.1 Quality Control.

7.1.1 Generally. Contractor has the primary responsibility for quality control. Contractor will provide continuous superintendence and inspection to insure that the Work is completed in accordance with the plans and Specifications. During the performance of the Work, Metro, the Architect or Engineer, Special Inspectors, and any representatives of federal, state, and local agencies having jurisdiction over the Work may enter the Project Site, the shops where any part of the Work is being prepared, or the factories or sites where any materials for use in the Work are being or will be manufactured or derived. Contractor shall provide proper and safe facilities for such inspections, and shall make arrangements with manufacturers or other suppliers to facilitate inspection of their processes and products to such extent as Metro's interest may require. No claims for extension of the Contract Time or increase in the Contract Amount shall be allowed for any access allowed to Metro under this Section.

7.1.2 Quality Control Plan. Contractor shall prepare and submit a Quality Control Plan to the Project Manager within thirty (30) days following the Notice to Proceed. The Plan will describe the Contractor's procedures for implementing the Quality Control Plan. The Plan shall include without limitation the Quality Control organization, inspection procedures, tests anticipated, materials control, contingency plans related to fire protection and remediation of contaminated releases or other environmental improvement, and reports. Metro reserves the right to accept, reject, or modify the Quality Control Plan. Contractor will submit an interim Quality Control Plan prior to the start of Work to cover the first thirty (30) days of construction.

7.1.3 Quality Control Manager. Prior to initiation of construction, Contractor shall designate in writing a Quality Control Manager who shall be responsible for coordinating Contractor's Quality Control Program. The individual so designated shall be the interface with the Project Manager on matters relating to submittals, inspection, scheduling, unacceptable Work product, and corrective actions. Metro reserves the right to accept or reject the Quality Control Manager designated by Contractor.

7.2 Inspection. Contractor has the primary responsibility for providing inspection and testing, except as otherwise set forth in the Specifications. Metro and its agents will also inspect at their discretion or as outlined in the Specifications.

7.2.1 Generally. At all times during construction of the Work, Contractor shall permit Metro, the Architect or Engineer, and Special Inspectors, or any representatives of federal, state, and local agencies having jurisdiction over the Work, to visit and monitor the progress of the Work for conformance of the Work with the Contract Documents.

7.2.2 Special Inspections.

7.2.2.1 At all times during construction of the Work, Contractor shall permit Metro, the Architect or Engineer, and Special Inspectors, or any representatives of federal, state, and local agencies having jurisdiction over the Work, to visit and inspect the Work, the materials and the manufacture and preparation of such materials, and subject the Work and materials to inspection and testing to determine if the Work conforms to the requirements of the Contract Documents. Contractor shall maintain proper facilities and safe access for all such inspections.

7.2.2.2 The Contractor is responsible for scheduling and coordination of special inspections. Contractor shall be diligent in scheduling special inspections and make every effort to combine special inspections to avoid unnecessary budget impacts.

7.2.2.3 The Contract Documents or regulatory agencies may require that portions of the Work be observed, reviewed, tested, or inspected before they are obscured or covered. Similarly, upon request, the Project Manager is entitled to observe portions of the Work before they are covered or obscured. Contractor shall be solely responsible for notifying Project Manager at least two (2) working days prior to performing such Work so that necessary arrangements for inspection and testing can be made. If the Contractor covers or obscures a portion of the Work that is required or requested to be observed, it will uncover the Work for observation and bear any cost associated with that activity without a change in Contract Time.

7.2.2.4 The Project Manager may request to see a portion of the Work that has been covered regardless of the requirements of the Contract Documents, regulatory agencies, or a prior request. Thereafter the Contractor must comply with Metro's request. If, on inspection by the Project Manager, the portion of the Work that is uncovered is found to be in accordance with the Contract Documents, Metro will bear all costs associated with that activity and provide additional Contract Time if that activity would cause the Contractor to incur liquidated damages. But if, upon inspection by the Project Manager, the portion of the Work that is uncovered is found not to be in accordance with the Contract Documents, the Contractor will correct the Work and bear any cost associated with that activity without a change in Contract Time. Metro retains the right at any time during construction, or at any time during production, fabrication, or preparation of the Work, to test samples to determine whether they meet the requirements of the Contract Documents. Metro may test any sample, regardless of prior certification, and regardless of whether any prior certification was required. Metro may either conduct the test with its own forces or hire other persons to perform this Work.

7.2.2.5 Metro retains the right at any time during construction, or at any time during production, fabrication, or preparation of the Work, to test samples to determine whether they meet the requirements of the Contract Documents. Metro may test any sample, regardless of prior certification, and regardless of whether any prior certification was required. Metro may either conduct the test with its own forces or hire other persons to perform this Work.

7.2.2.6 If a sample is to be tested prior to its incorporation into the Work, the Contractor may not incorporate the material, product, part, or equipment into the Work until testing is completed and Metro gives permission for its use.

7.2.2.7 Metro will bear the costs of testing unless the tests show that the material, product, part, or equipment failed the test and did not conform to the requirements of the Contract, in which case the Contractor will bear the costs of testing.

7.2.2.8 If the sample was previously incorporated into the Work and testing shows that the sample does not meet the requirements of the Contract Documents, the Contractor will pay for the test and for replacing and repairing any equipment, materials, products, or portion of the Work in order to meet the requirements of the Contract Documents.

7.2.3 Notice to Metro for Certain Work Days. Whenever Contractor intends to perform Work on Saturday, Sunday, or any legal holiday, it shall give written notice to Metro of such intention at least two (2) working days prior to performing such Work, or such other period as may be specified by Metro, so that Metro may make the necessary arrangement for testing and inspection.

7.2.4 Correction of Defective Work Before Acceptance. Any defective Work or Work that otherwise fails to conform to the Contract Documents that is discovered before Final Completion and Acceptance of the Work, shall be corrected immediately by Contractor, and any unsatisfactory materials shall be rejected and replaced with

satisfactory materials, notwithstanding that they may have been overlooked by the authorized inspector. The inspection of the Work by Metro, the Architect or Engineer, or any other agency shall not relieve Contractor of any of its obligations to perform fully all of the terms and provisions of the Contract Documents.

7.2.5 Acceptance Not Implied by Failure to Object. Failure or neglect on the part of Metro or any of its authorized representatives to condemn or reject defective, improper, or inferior Work or materials shall not be construed to imply a final acceptance of such Work or materials and shall not be construed as relieving Contractor of its duties to perform fully all requirements of the Contract Documents.

7.2.6 Replacement and correction of defective Work before the Work is completed and accepted is not limited by any warranty period otherwise established by the Contract.

7.3 Unsatisfactory Materials and Workmanship.

7.3.1 Generally. Material, Work, or workmanship that, in the opinion of the Project Manager, does not conform to the Contract Documents, or is not equal to the samples submitted to and approved by the Project Manager, or is in any way unsatisfactory or unsuited to the purpose for which it is intended, will be rejected. Contractor shall bear the cost of correcting or removing, as deemed necessary by Metro, all non-conforming materials, defective Work, or unsatisfactory workmanship. Contractor shall make a close inspection of all materials as delivered, and shall promptly replace all defective materials with conforming materials without waiting for their rejection by Metro.

7.3.2 Removal of Rejected or Non-Conforming Work or Material. All rejected material or Work, and all defective or non-conforming Work or material, shall be removed from the Site without delay. If Contractor fails to do so within forty-eight (48) hours after having been so directed by Metro, the rejected material may be removed by Metro and the cost of removal charged against Contractor and deducted from Retainage held by Metro or offset against payments due Contractor, at Metro's option. If in the judgment of Metro it is undesirable or impracticable to replace any defective or non-conforming Work or materials, the compensation to be paid to Contractor shall be reduced by Change Order or Force Account, as applicable, by such amount as, in the judgment of Metro, shall be equitable.

7.4 General Warranty of Contractor. Contractor warrants to Metro that materials and equipment provided 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 and contaminants not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by Metro, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The warranty made by Contractor under this Section shall be in addition to any other specific warranties and certifications required elsewhere in these Contract Documents.

7.5 Third-Party Warranties.

7.5.1 The Contractor shall obtain from Subcontractors, manufacturers, and suppliers guarantees and warranties according to the Contract Documents with the optimum terms and longest periods reasonably obtainable. The documentation must also include all maintenance and operational documentation required to sustain said warranties.

7.5.2 All guarantees or warranties of materials furnished to the Contractor or Subcontractor by any manufacturer or supplier shall be deemed to run for the benefit of the Owner.

7.5.3 As a condition of Substantial Completion of the Project by the Owner, the Contractor shall deliver to the Owner three (3) bound volumes of all guarantees and warranties on material furnished by all manufacturers and suppliers to the Contractor and all its Subcontractors, with duly executed instruments properly assigning the guarantees and warranties to the Owner. The guarantees and warranties in each bound volume shall be grouped together by trade and properly indexed. The Contractor shall assign to the Owner, and shall deliver to the Owner, all manufacturers' warranties not later than the date of Substantial Completion.

7.6 Subcontractor Warranties. The Contractor shall and does hereby assign to the Owner the benefits of all warranties and guarantees of all Subcontractors, but such assignment shall not relieve the Contractor of its warranty obligations to the Owner under these General Conditions and other Contract Documents.

7.7 Correction of Work by Contractor.

7.7.1 Any portion of the Work that does not conform to the requirements of the Contract is unacceptable or defective and must be removed and corrected by the Contractor, even if it is contended that Project Manager or other assigned personnel knew or should have known of the existence of the unacceptable Work. This obligation includes defective Work discovered during construction and within one (1) year after the date of Substantial Completion.

7.7.1.1 All portions of the Work that do not conform to the requirements of the Contract Documents must be corrected within a reasonable time at the Contractor's sole expense and without an extension of Contract Time.

7.7.1.2 Metro may replace or correct Work within a reasonable time if the Contractor fails to do so and may charge the Contractor with all reasonable costs incurred while performing that Work, as well as the costs of storing any salvageable materials or equipment. If that occurs, Metro is also entitled to deduct such costs from any sums otherwise due the Contractor.

7.7.1.2.1 If salvageable materials, equipment, or both are stored, Metro will notify the Contractor of the storage and give the Contractor ten days to remove the materials. If the Contractor fails to remove them by the end of that time, Metro may sell them in any commercially reasonable manner, whether privately or publicly.

7.7.1.2.2 If sale is made, Metro will keep all proceeds to the extent that the proceeds do not exceed the costs incurred in correcting and replacing the Work and in storing the materials and equipment. The Contractor will pay Metro any difference in costs that may remain after the sale. If the proceeds exceed Metro's cost, however, it will forward those sums to the Contractor.

7.7.2 In the case of equipment manufactured by others and supplied and/or installed by Contractor, the one (1)-year period shall commence upon the date of first beneficial operation of such equipment by Metro. In the case of Work that is corrected or replaced by Contractor, the one (1)-year period shall commence again on the date of acceptance by Metro of such corrected or replaced Work. Testing shall not be construed to mean acceptance.

7.7.3 If Metro does not require correction or replacement of defective Work or Work failing to conform to the Contract Documents, Contractor, if required by Metro, shall repay to Metro such portion of the Contract Amount as is equitable under the circumstances, as determined by Metro.

7.7.4 Contractor's responsibilities under this Section shall not extend to correction or replacement of defects that are attributable to mistreatment by Metro or to normal wear and tear.

7.8 Warranty and Correction Agreements by Subcontractors.

7.8.1 Generally. In addition to any requirements for written warranties required by the Specifications, Contractor shall require all of its Subcontractors and Suppliers of any tier to make the same warranty to Metro as Contractor makes under Section 7.4. Contractor shall also require all of its Subcontractors and Suppliers of any tier to agree to correct or replace defective Work or Work not conforming to the Contract Documents, and to take full responsibility for defective materials in the same manner as Contractor agrees to correct or replace such Work under Section 7.5.

7.8.2 Form of Submissions. Contractor shall require all of its Subcontractors and Suppliers of any tier to sign documents evidencing the promises made pursuant to Section 7.8.1 above and shall submit such documents to Metro with its request for Final Payment. Such documents shall be signed by both Contractor and the applicable Subcontractor or Supplier and shall be in the form attached as Exhibit 1 to these General Conditions.

7.9 Remedies Not Exclusive. The remedies provided for in this Article shall not be exclusive, but are in addition to all other remedies of Metro with respect to latent defects, frauds, or failure to perform all Work as required by the Contract Documents.

7.10 Proof of Compliance with Contract Provisions. For Metro to determine whether Contractor has complied or is complying with the requirements of the Contract that are not readily enforceable by inspection and test of the Work, Contractor shall, upon request, promptly submit to Metro such properly authenticated documents as may be necessary to demonstrate compliance with the Contract or other satisfactory proof of its compliance with such requirements.

7.11 Patents, Copyrights, Trademarks. All fees or costs of claims for any patented invention, article, or arrangement or any copyrights or trademarks that may be used upon or in any manner connected with the performance of the Work or any part thereof, shall be included in the Bid or Proposal for doing the Work. Contractor shall save, keep, hold harmless, and fully indemnify Metro and Architect or Engineer from all damages, claims for damage, lawsuits, costs, expenses, or liabilities of whatever nature in law or equity, including attorney fees and court costs, that may at any time arise or be set up for any infringement of the patent rights, copyrights, or trademarks of any person or persons in consequence of the use by Metro of articles to be supplied under the Contract and of which Contractor is not the patentee or assignee or has not the lawful right to sell the same. This is in addition to all other hold-harmless and indemnification clauses in these Contract Documents.

7.12 Anti-Trust Claims.

7.12.1 By entering into this Contract, Contractor, for consideration paid to Contractor under the Contract, does irrevocably assign to Metro any claim for relief or cause of action that Contractor now has or that may

accrue to Contractor in the future, including at Metro's option, the right to control any such litigation on such claim for relief or cause of action, by reason of any violation of 15 USC Section 1-15, ORS 646.725, or ORS 646.730 in connection with any goods or services that are used, in whole or in part, for the purpose of carrying out Contractor's obligations under this Contract.

7.12.2 Contractor shall require all Subcontractors and Suppliers to irrevocably assign to Metro, as a third-Party beneficiary, any right, title, or interest that has accrued or may accrue to the Subcontractors or Suppliers by reason of any violation of 15 USC Section 1-15, ORS 646.725, or ORS 646.730, including, at Metro's option, the rights to control any litigation arising hereunder, in connection with any goods or services provided to the Subcontractors or Suppliers by any person, in whole or in part, for the purpose of carrying out the Subcontractors' or Suppliers' obligations as agreed to by Contractor in pursuance of the completion of the Contract. Contractor shall require all Subcontractors and Suppliers to Execute the Assignment of Antitrust Claims attached as Exhibit 2 to these General Conditions as part of Contractor's subcontract with Subcontractor or Supplier.

7.12.3 In connection with Contractor's, Subcontractors' or Suppliers' assignment, it is an express obligation of Contractor, Subcontractor, or Supplier that it will take no action that will in any way diminish the value of the rights conveyed or assigned hereunder to Metro. It is an express obligation of Contractor, Subcontractor, or Supplier to advise the Office of Metro Attorney:

7.12.3.1 In advance, of its intention to commence any action on its own behalf regarding such claims for relief or causes of action;

7.12.3.2 Immediately, upon becoming aware of the fact that an action has been commenced on its own behalf by some other person or persons, of the impendency of such action; and

7.12.3.3 The date on which it notified the obligor(s) of any such claims for relief or causes of action of the fact of its assignment to Metro.

7.12.4 In the event that any payment under any such claim is made to Contractor, Subcontractor, or Supplier, it shall promptly pay over to Metro its proportionate share thereof, if any, assigned to Metro under this Section 7.12.

ARTICLE 8
CHANGES IN THE WORK

8.1 Change Orders Generally.

8.1.1 Metro and the Contractor mutually agree that changes in plans, quantities, or details of the Work are inherent in the nature of construction and may be necessary or desirable. Therefore, without impairing the Contract, Metro reserves the right to require changes determined necessary or desirable to complete the proposed construction within the general scope of the Work provided for in the Contract or to order extra Work if that is required. Performance of changed or extra Work will not invalidate the Contract or release the Contractor's surety from its obligations. Changes to the Contract Amount, if any, as a result of the performance of changed or extra Work must be made pursuant to this Article 8.

8.1.2 The only authorized method for increasing or changing the amount of compensation, increasing the amount of Contract Time, or changing the scope of Work to be performed is through the execution of a written Change Order.

8.1.3 Change Orders must be executed in advance when any changed or extra Work for which additional compensation is due will be performed, unless the Work is Force Account Work.

8.1.4 Metro may, at its discretion, also require the signature of Contractor's surety on the Change Order. Prior to the approval of such Change Order, the Architect or Engineer shall have approved any design modifications entailed thereby.

8.1.5 Agreement on any Change Order shall constitute a final settlement of all matters relating to the changes in the Work that are the subject of the Change Order, including without limitation all direct and indirect costs associated with such change, and any and all adjustments to the Contract Sum or Contract Time.

8.2 Procedure for Determining Impact of Change Orders on Contract Amount.

8.2.1 Price before Proceeding. If Metro intends to order changes in the Work, it may request a proposal by Contractor for the proposed added or deleted Work before directing Contractor to commence Work. Within fourteen (14) days after issuance of such request by Metro, Contractor shall furnish three (3) copies of a complete breakdown of costs of both credits and additions directly attributable to the change in the Work proposed, itemizing materials, labor, taxes, effect on Contract Time, if any, and Overhead and Profit on a form approved by Metro and in accordance with the limitations described in the following Section. Subcontract Work shall be so indicated and written proposals from Subcontractors or Suppliers shall be included with similar breakdowns provided. Following

submission of its cost breakdown, Contractor shall meet with Metro to discuss all aspects of scope, costs, scheduling, and construction methods.

8.2.2 Proceed While Pricing. If Metro finds it necessary to make changes in the Work in an expeditious manner, it may direct Contractor to proceed with the change while preparing a proposal for the added or deleted Work. In such an instance, Metro may assign an estimated value to the change that Contractor shall not exceed without further authorization by Metro. Within fourteen (14) days after issuance of such by Metro, Contractor shall furnish three (3) copies of a complete breakdown of costs of both credits and additions directly attributable to the change in the Work proposed, itemizing materials, labor, taxes, effect on Contract Time, if any, and Overhead and Profit on a form approved by Metro and in accordance with the limitations described in the following Section. Subcontract Work shall be so included with similar breakdowns provided. Following submission of its cost breakdown, Contractor shall meet with Metro to discuss all aspects of scope, costs, scheduling, and construction methods.

8.2.3 Unit Prices. If the proposed additional or deleted Work is the subject of Unit Prices stated in the Contract Documents or subsequently agreed upon, such Unit Prices shall be binding upon Contractor in calculating the increase or decrease in the Contract Amount attributable to the proposed additional or deleted Work.

8.3 Limitations when Change Orders Impact Contract Amount. The following limitations shall apply in the calculation of the costs of changes in the Work:

8.3.1 Overhead and Profit.

8.3.1.1 Contractor will be permitted a reasonable allowance for Profit and Overhead on its increased Direct Cost resulting from any changes in the Work ordered by Metro. Likewise, Profit and Overhead will be deducted for any portion of the Work that is deleted. In the case of a change involving both credits and extras, Overhead and Profit shall be applied to the net extra after subtraction of credits.

8.3.1.2 Overhead and Profit for the entity performing the Work with its own crews shall not exceed ten percent (10%) of the Direct Cost of the changed Work.

8.3.1.3 Overhead and Profit for Contractor or Subcontractor who has had the Work performed by a lower tier Subcontractor shall not exceed five percent (5%) of the Direct Cost of the changed Work.

8.3.1.4 If the Work is performed by a second-tier Subcontractor, the total Overhead and Profit for all tiers shall in no event exceed twenty percent (20%) of the Direct Cost of the changed Work. Distribution of this Overhead and Profit among the tiers is the responsibility of Contractor.

8.3.2 Taxes and Insurance. Federal, state, regional, county, and local taxes, including but not limited to income taxes, excise taxes, sales and use taxes, and payroll taxes and insurance shall be shown separately, will be allowed on extras, and shall be credited on credits. No Overhead and Profit will be allowed on taxes and insurance.

8.3.3 Bond Premiums. The actual rate of bond premium as paid on the additional Direct Cost plus the cost of taxes defined in 8.3.2 will be allowed. No Overhead and Profit will be allowed on such premiums.

8.3.4 Equipment Costs. The allowance for equipment costs (both rental and Contractor-owned equipment) shall be limited to those rates in the Rental Rate Bluebook published by Dataquest Incorporated, 1290 Ridder Park Drive, San Jose, California 95131-2398, (800) 227-8444.

8.4 Force Account Work.

8.4.1 If Contractor does not respond to Metro's Request for Proposal with a cost breakdown within the fourteen (14)-day period as required above, or if Metro determines that Contractor's breakdown of costs is unreasonable in consideration of the Work proposed to be added or deleted, or if Metro determines that the proposed Work must be commenced promptly to avoid delay to the Project, Metro may issue an order for Force Account Work and Contractor shall promptly perform or delete the Work described in such order. Change, if any, in the Contract Amount due to such Force Account Work shall be the sum total of the following items:

8.4.1.1 Actual labor cost, including premium on worker’s compensation insurance and charge for social security taxes, and other taxes pertaining to labor.

8.4.1.2 The proportionate cost of premiums of public liability property damage and other insurance applicable to the extra Work involved and required by these Contract Documents.

8.4.1.3 Actual cost of material, including applicable taxes pertaining to materials.

8.4.1.4 Actual cost of plant and equipment rental, at rates to be agreed upon in writing before the Work is begun or at rates per Section 8.3.4 above. No charge for the cost of repairs to plant or equipment will be allowed. Equipment items having a capital cost of under $250.00 are considered small tools and classified as Overhead.

8.4.1.5 Overhead and Profit as provided and limited in Section 8.3.

8.4.1.6 The proportionate actual costs of premiums for bonds required by these Contract Documents.

8.4.2 Whenever any Force Account Work is in progress, each working day Contractor shall furnish to Metro a detailed written report signed by Contractor and Project Manager of the amount and cost of all of the items listed in (1) through (6) above, and no claim for compensation for such extra Work will be allowed unless such report shall have been made. Metro reserves the right to provide such materials as it may deem expedient, and no compensation, overhead, or profit will be allowed to Contractor for such materials.

8.5 Contractor Proposals for Changes in Work.

8.5.1 Generally. At any time during the performance of the Work, Contractor may propose to Metro changes in Work that Contractor believes will result in higher quality Work, improve safety, shorten the Contract Time, decrease the Contract Amount, or otherwise result in better or more efficient Work.

8.5.2 Purpose. Metro encourages Contractor to submit Value Engineering Change Proposals ("VECPs") in order to avail Metro of potential cost savings that may result. Contractor and Metro will share any savings, computed in accordance with this Section 8.5. Contractor is encouraged to submit VECPs whenever it identifies an area that can be improved, using the format described herein.

8.5.3 Application. This clause applies to a Contractor-developed and documented VECP that: (1) requires a change to this Contract to implement the VECP, and (2) reduces the Contract Price without impairing essential functions or characteristics of the Work, provided it is not based solely on a change in specified quantities.

8.5.4 Documentation. At a minimum, the following information shall be submitted by Contractor with each VECP: (1) description of the existing requirements of the Contract Documents that are involved in the proposed change; (2) description of the proposed change; (3) discussion of differences between existing requirements and the proposed change, together with advantages and disadvantages of each changed item; (4) itemization of the requirements that must be changed if the VECP is accepted (e.g., drawing numbers and Specifications); (5) justification for changes in function or characteristics of each such affected item and effect of the change on the performance of the end item; (6) effect of proposed change on life-cycle costs, including operation and maintenance, replacement costs, and life expectancy; (7) date or time by which a Change Order adopting the VECP must be issued in order to obtain the maximum cost reduction, noting any effect on Contract Time or delivery schedule; and (8) cost estimate for existing Contract requirements correlated to its lump sum breakdown and proposed changed requirements. Costs of development and implementation by Contractor shall be identified. Estimated Metro costs (e.g., cost of testing and redesign) shall also be identified.

8.5.5 Submission. Proposals will be processed expeditiously; however, Metro will not be liable for any delay in acting upon any proposal submitted pursuant to this clause. Contractor shall have the right to withdraw, in whole or in part, any VECP at any time prior to acceptance by Metro.

8.5.6 Acceptance. Metro may accept, in whole or in part, by Change Order, any VECP submitted pursuant to this clause. Until a Change Order is issued, Contractor shall remain obligated to perform in accordance with this Contract. The decision as to acceptance or rejection of any VECP will be at the sole discretion of Metro and will be final and not subject to review by mediation or otherwise.

8.5.7 Sharing. If a VECP submitted by Contractor pursuant to this clause is accepted, Contractor shall proceed with the change and the Contract Price will be adjusted in accordance with the following provisions:

8.5.7.1 Definitions:

8.5.7.1.1 Estimated Gross Savings to Contractor ("GS"): The difference between cost of performing the Work according to the existing requirement and the cost if performed according to the proposed change. In each instance, Contractor's profit shall not be considered part of the cost.

8.5.7.1.2 Contractor Costs ("CC"): Reasonable costs incurred by Contractor in preparing the VECP and making the change such as cancellation or restocking charges where required.

8.5.7.1.3 Estimated Net Savings to Contractor ("NS"): GS less CC.

8.5.7.1.4 Metro's Costs ("OC"): Reasonable costs incurred by Metro for evaluating and implementing the VECP, such as testing and redesign, where required.

8.5.7.2 Calculations:

8.5.7.2.1 The Contract Price shall be reduced by an amount equal to 70 percent of NS plus 50 percent of OC.

8.5.7.2.2 Contractor's profit will not be reduced by application of the VECP.

8.5.8 Subcontracts. Contractor shall include appropriate value engineering incentive provisions in all subcontracts of $25,000 or greater. Contractor may include such provisions in any agreement. Subcontracts shall contain a provision that any benefits accruing to Contractor as a result of an accepted VECP initiated by a

Subcontractor shall be shared by Contractor and Subcontractor. To compute any adjustment in the Contract Price under Section 8.5.7.2 above, Contractor's costs of preparation and charge for a VECP shall include any preparation and change costs. Examples are cancellation or restocking charges, when required.

8.6 Impact of Authorized Changes in the Contract. Changes in the Work made pursuant to this Article and extensions of the Contract Time allowed by Metro due to such changes shall not in any way release any warranty or promises given by Contractor pursuant to the provisions of the Contract Documents, nor shall such changes in the Work relieve or release the sureties of bonds executed pursuant to said provisions. The sureties, in executing such bonds, shall be deemed to have expressly agreed to any such change in the Work and to any extension of Contract Time made by reason thereof.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 Scope of Payment. Payment to Contractor of the Contract Amount for performing all Work required under the Contract, as adjusted for any Change Orders approved as hereinbefore specified, shall be full compensation for furnishing all labor, materials, equipment, and tools necessary to the Work, and for performing and completing, in accordance with these Contract Documents, all Work required under the Contract, and for all expenses incurred by Contractor for any purpose in connection with the performance and completion of said Work. Whenever it is specified in the Contract that Contractor is to do Work or provide materials of any class for which no price is fixed in the Contract, Contractor will do such Work or provide such materials without extra charge or allowance or direct payment of any sort, and that the cost of doing such Work or providing such materials is included in its Bid or Proposal.

9.2 Schedule of Values.

9.2.1 Generally. Within fifteen (15) days after the Notice to Proceed, Contractor shall submit a detailed breakdown costs itemized per Construction Specification Institute division format. The format and detail of the breakdown shall be as directed by Metro. This breakdown shall be referred to as the Schedule of Values.

9.2.2 Review of Schedule of Values. Metro will review the Schedule of Values to ascertain that the dollar amounts of the Schedule of Values are in fact fair cost allocations for the Work item listed. Upon concurrence by Metro, a formal approval of this Schedule of Values will be issued. Metro shall be the sole judge of fair cost allocations. Contractor's monthly progress payment requests shall reflect the cost figures included in the approved Schedule of Values and shall be based on completed Work items or percentages of Work items completed prior to the end of the payment period as more fully described below.

9.3 Progress Payment Procedure.

9.3.1 Generally. Subject to the approval of Metro, disbursements shall be made by Metro of progress payments upon written request of Contractor and pursuant to the Contract Documents as specified in Section 9.3.2.

9.3.2 Before the end of each calendar month, Contractor shall file with the Project Manager in duplicate on a form approved by Metro, a proposed payment estimate for the period commencing on the 26th day of the previous month through midnight on the 25th day of the calendar month in question. Metro and the Architect or Engineer shall review Contractor's estimate and shall determine the value of Contractor's Work based on the Schedule of Values and incorporated labor and materials for the payment period. Contractor shall not be paid for any Work that is, in Metro's opinion, defective or improper, or for Work needed to correct Contractor's defective or improper Work. Contractor shall be paid 95 percent (95%) of the determined value of Work accomplished, less any offset or withholding of sums by Metro allowed under the Contract Documents, within thirty (30) days after receipt by Metro of Contractor's payment estimate. Metro will routinely withhold five percent (5%) as Retainage. No inaccuracy or error in any monthly progress payment estimates shall operate to release Contractor or its surety from damages arising from such Work or from the enforcement of each and every provision of the Contract Documents, and Metro shall have the right subsequently to correct any error made in any estimate for progress payments.

9.3.3 Retainage.

9.3.3.1 Metro will withhold Retainage from each payment at a rate of five percent (5%) in accordance with ORS 279C.570.

9.3.3.2 All funds retained by Metro under this Section shall be retained in a fund by Metro and paid in accordance with ORS 279C.550 to 279C.580.

9.3.3.3 Contractor may elect to deposit bonds or securities of the type described below with Metro or in any bank or trust company to be held in lieu of the cash Retainage described above and for the benefit of Metro. In such event, Metro shall reduce the Retainage in an amount equal to the value of the bonds and securities

and shall pay the amount of the reduction to Contractor in accordance with ORS.279C.570. Interest on such bonds or securities shall accrue to Contractor. Bonds and securities deposited or acquired as described above shall be of a character approved by the Metro Director of Finance & Regulatory Services including but not limited to:

9.3.3.3.1 Bills, certificates, notes, or bonds of the United States.

9.3.3.3.2 Other obligations of the United States or its agencies.

9.3.3.3.3 Obligations of any corporation wholly owned by the federal government.

9.3.3.3.4 Indebtedness of the Federal National Mortgage Association.

9.3.3.4 Contractor may elect to require Metro to deposit the accumulated Retainage in an interest bearing account in a bank, savings bank, trust company, or savings association for the benefit of Metro. Interest on such an account shall accrue to Contractor.

9.3.3.5 If Metro incurs additional costs as a result of Contractor's exercise of any of the above-described options, Metro may recover such costs from Contractor by reduction of the Final Payment. Metro shall inform Contractor of all such accrued costs.

9.3.4 Payment for Material Stored Off Site. Payment for material stored off of the Site will not be allowed unless the payment for such material benefits Metro in terms of lead time, scarcity, schedule, etc. Metro has sole discretion as to what materials will be paid for in advance of delivery to or installation on Site. Proof of off-site material purchases (invoice or checks and photo documentation) and appropriate insurance coverage will be required for payment. Title to all equipment and materials shall pass to Metro upon payment therefore or incorporation into the Work, whichever shall first occur, and Contractor shall prepare and execute all documents necessary to effect and perfect such transfer of title. Contractor must provide to Metro written consent from Contractor's surety approving the advanced payment for materials stored off-site. The maximum prepayment allowed by Metro shall be 75 percent of the actual fair market value of the item being considered. Metro shall be the sole judge of fair market value. Contractor shall protect stored materials from damage, and damaged or otherwise unacceptable materials, even though paid for, shall not be incorporated into the Work.

9.3.5 Other Conditions Precedent to Payment.

9.3.5.1 It is a condition precedent to Contractor's rights to any payments under the Contract that all bills for labor and materials, including labor and materials supplied by or to Contractor, shall have been paid in full and, if requested by Metro, Contractor shall submit receipted invoices and/or lien waivers, as evidence of payment in full of all such accounts. As a further condition precedent to Contractor's right to any payments under this Contract, Contractor shall submit a claims release before any payment in the form set forth in Exhibit 3 to these General Conditions, and a final claims release stating Contractor has been paid in full prior to the Final Payment in the form set forth in Exhibit 4 to these General Conditions.

9.3.5.2 Payments to Contractor shall be conditioned upon Contractor complying with all provisions of this Contract regarding scheduling and progress reports submissions and upon Contractor furnishing all other information and data necessary to ascertain actual progress. Metro's determination that Contractor has failed or refused to furnish the required information, data, schedules, or other reports shall constitute a basis for withholding all payments until the required information, data, revised schedules, and diagrams, if necessary, and other reports are furnished.

9.3.6 Payment Does Not Imply Acceptance of Work. The granting of any progress payment, or the receipt thereof by Contractor, shall not constitute acceptance of the Work or any portion thereof, and shall in no way lessen the liability of Contractor to replace unsatisfactory Work or material, though the unsatisfactory character of such Work or material may or may not have been apparent or detected at the time such payment was made.

9.3.7 Offset of Sums Due Metro from Contractor. In addition to any retention rights allowed Metro under this Contract, it is mutually understood and agreed that Metro may, upon prior written notice to Contractor, offset from any payment otherwise due Contractor as much as may be necessary to protect and compensate Metro from any costs or expenses it may incur due to any breach of the Contract by Contractor, including applicable liquidated damages. Any sums so offset shall become the property of Metro.

9.4 Substantial Completion.

9.4.1 Metro is also entitled to occupy or use all or a portion of the Work on Substantial Completion. Occupancy or use on Substantial Completion does not constitute Metro's acceptance of the Work not complying with the requirements of the Contract Documents, nor does it waive rights Metro has to completion of the Contract in accordance with the requirements of the Contract Documents.

9.4.1.1 When Contractor considers the Work to be substantially complete, Contractor shall submit to Metro a written notice that the Work is substantially complete

9.4.2 Within a reasonable time after receipt of such notice, Metro and Architect or Engineer will review the Work, including a physical inspection, to determine the status of completion. Should the Architect or Engineer and Metro determine that the Work is not substantially complete:

9.4.2.1 The Project Manager will promptly notify Contractor in writing, giving the reasons therefore.

9.4.2.2 The Contractor shall remedy the deficiencies in the Work, and thereafter send a second written notice of Substantial Completion to Metro.

9.4.3 The above-described procedure shall be followed until the Work is, in the opinion of Metro and Architect or Engineer, substantially complete. At that point:

9.4.3.1 Metro or the Architect will prepare a Certificate of Substantial Completion on AIA Document G704, accompanied by the approved Punch List of items to be completed or corrected as verified and amended by the Architect or Engineer.

9.4.3.2 Metro shall submit the Certificate of Substantial Completion to Contractor for signature.

9.4.4 Punch List. When the Work is substantially complete, the Contractor shall prepare a Punch List of items to be completed or corrected for review and approval by Metro and the Architect or Engineer. Metro or the Architect shall be responsible for preparing the final Punch List. The Contractor remains responsible to complete the Work in accordance with the Contract Documents regardless of whether an item is omitted from the Punch List.

9.4.4.1 The Contractor is required to proceed promptly to complete the items on the Punch List and any other items that may be discovered to be incomplete or incorrect regardless of whether they are on the Punch List or not. If the Contractor fails to complete the Punch List within 30 days or such other time as Project Manager may allow, Metro may terminate any further services of the Contractor under the Contract and complete the Punch List items remaining to be completed or corrected with Metro's own forces or by hiring another Contractor to perform the Punch List Work. Costs of performing the Punch List Work by Metro will be deducted from any payments otherwise due the Contractor.

9.4.4.2 The Contractor will notify Metro when the Punch List Work is complete, and Final Payment will then be made in accordance with. After receipt of that Notice, Metro will inspect the Work to determine whether the Punch List is complete as provided in Section 9.5 of these General Conditions.

9.4.4.3 If the Work is not complete despite the Contractor's notice that the Punch List items are complete, and Metro has hired an Architect or Engineer to assist it on the Project, the Contractor will pay costs for the Architect's or Engineer's services if more than two inspections of the Work are required because the Punch List remains incomplete.

9.4.4.4 On Substantial Completion, Metro will be responsible for utilities, insurance, security, maintenance, and damage to Work caused by Metro's agents and employees unless otherwise provided in the Certificate of Substantial Completion. The Contractor remains responsible for damage to Work caused by its Subcontractors, agents, and employees during the performance of Punch List Work.

9.5 Final Completion and Acceptance.

9.5.1 When Contractor considers the Work to be finally complete, Contractor shall submit written certification to Metro that:

9.5.1.1 Contract Documents have been reviewed.

9.5.1.2 Work has been inspected for compliance with Contract Documents.

9.5.1.3 Work has been completed in accordance with Contract Documents to include submission of record documents.

9.5.1.4 Equipment systems have been tested in the presence of Metro and are operational.

9.5.1.5 Work is ready for final inspection.

9.5.2 Architect or Engineer and Metro will promptly review the Work and include a physical inspection to verify the status of completion and shall inform Metro of the conclusions. Metro shall, within fifteen (15) days after receipt of Contractor's certification, either accept the Work or notify Contractor of the Work yet to be performed on the Contract as outlined below.

9.5.3 Should the Architect or Engineer and Metro consider that the Work is incomplete or defective:

9.5.3.1 Project Manager or the Architect or Engineer will promptly notify Contractor in writing, listing the incomplete or defective Work.

9.5.3.2 Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to Metro that the Work is complete. Metro will then advise the Architect or Engineer.

9.5.3.3 Architect or Engineer and Metro will review and re-inspect the Work.

9.5.4 The procedure set forth in Section 9.5.3 shall be followed until the Work is, in the opinion of Metro and Architect or Engineer, finally complete. Contractor shall immediately thereafter prepare and submit Closeout Submittals as described below.

9.6 Closeout Submittals. Contractor shall submit the following items, as applicable, with its request for Final Payment:

9.6.1 Evidence of Compliance with Requirements of Governing Authorities.

9.6.2 Project record documents in accordance with the Specifications.

9.6.3 Operation and maintenance data in accordance with the Specifications.

9.6.4 Warranties in accordance with requirements of various Specification sections and these General Conditions.

9.6.5 Extra stock and maintenance materials. Contractor shall submit receipts, signed by Metro, for the various specific items.

9.6.6 Evidence of payment and release of claims in accordance with the following section.

9.6.7 Consent of surety to Final Payment.

9.6.8 Certificates of insurance for products and completed operations in accordance with Article 12 of these General Conditions.

9.6.9 If Contractor is a non-resident bidder or proposer, complete documentation of Contractor's compliance with ORS 279A.120.

9.7 Releases. Contractor and each assignee under any assignment in effect at the time of Final Payment shall execute and deliver, at the time of application for Final Payment, as a condition precedent to Final Payment, discharging and releasing Metro and the Architect or Engineer of and from all liabilities, obligations, and claims arising under this Contract. The Final Release shall be in the form attached as Exhibit 4 to these General Conditions. In addition to the above-described release, Contractor shall:

9.7.1 Submit to Metro an affidavit certifying that Contractor has paid all federal, state and local taxes including excise, use, sales, and employee withholding taxes.

9.7.2 Deliver to Metro written releases of all rights to file claims against Metro or to file claims on any bonds in connection with the Contract, signed by each Subcontractor and Supplier who performed labor or furnished materials in connection with the Work. The release shall be in the form attached as Exhibit 5 to these General Conditions.

9.7.3 Deliver to Metro Contractor's written undertaking, with sureties acceptable to Metro:

9.7.3.1 To promptly pay and obtain a release of claims on any bonds that may in the future affect the premises; and

9.7.3.2 To defend, indemnify, and save Metro harmless from any liability or expense because of any claim on any bond or any other claim related to the Contract or the Work.

9.8 Final Payment. Upon application of Contractor and Contractor's completion of and compliance with all of the provisions of the above Sections and settlement of all claims arising from the Contract, including claims that Metro may have against Contractor, Metro shall pay Contractor the balance of the Contract Amount subject to the availability of monies and less any previous payments, offsets, and withholdings allowed Metro under this Contract, and Retainage that has been returned to Contractor. Acceptance of Final Payment by Contractor shall constitute a waiver of all claims of whatever nature that Contractor may have or allege to have against Metro arising out of or related to Work described in the Contract Documents.

9.9 No Waiver of Rights. Neither the final review by Metro, nor any order or certificate for the payment of money, nor any payment for, nor acceptance of the whole or any part of the Work by Metro, nor any extension of time, nor any position taken by Metro shall operate as a waiver of any provision of this Contract or of any power herein reserved by Metro or any right to damage herein provided, nor shall any waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. All of Metro's remedies provided in this Contract shall be taken and construed as cumulative; that is, in addition to each and every other remedy herein provided; and Metro shall have any and all equitable and legal remedies that it would in any case have.

ARTICLE 10
SAFETY, USE OF SITE, AND PROTECTION OF THE WORK

10.1 Laws and Regulations.

10.1.1 The Contractor must comply with all federal, state, and municipal laws in regard to all matters concerning this Contract. This includes but is not limited to compliance with the ADA. The Contractor must also

comply with the orders, rulings, decrees, and decisions of any administrative or judicial officials that in any manner whatsoever affect the Project, the Work, the safety of persons around the Work Site, or the manner in which the Work is performed.

10.1.2 If the Contractor observes that any portion of the Work is to be performed in a way that violates any law, code, or regulation, it must immediately notify Metro in writing.

10.1.3 Contractor will divert a minimum of 85% of all construction and demolition waste to recycling and reuse markets, and, if the Work is performed in the City of Portland, comply with City of Portland Code 17.102.270 and related administrative rules.

10.2 Safety Requirements.

10.2.1 Safety Generally.

10.2.1.1 Contractor shall be solely and completely responsible for the safety of the Work and the Site, including but not limited to the safety of all persons and property involved in the Work at the Site at any time until Final Completion and Acceptance of the Work.

10.2.1.2 All Work shall be performed in full accordance with all applicable safety codes, laws, ordinances, and requirements including but not limited to the Safety and Health Regulations for Construction promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act as set forth in Title 29 of the Code of Federal Regulations, federal and state OSHA, Metro's insurance standards, and all other applicable safety codes. Where any of these are in conflict, the more stringent requirement shall be followed. Contractor's failure to thoroughly familiarize itself with the aforementioned safety provisions shall not relieve it from any requirements in the Contract Documents to comply with such safety provisions or from any penalties for failure to so comply.

10.2.1.3 Contractor shall inspect the Work and the Site daily and immediately correct any unsafe conditions. All job personnel shall be knowledgeable of and comply with the above safety requirements.

10.2.1.4 Contractor shall take all precautions to prevent the possibility of fire resulting from Contract operations. Contractor shall provide properly maintained emergency fire extinguishing equipment of a readily available type and quantity as necessary to meet potential fire hazards.

10.2.1.5 In an emergency affecting safety of persons or property, the Contractor shall act to prevent the threatened damage, injury, or loss and immediately notify Metro.

10.2.2 Health and Safety Program. Contractor shall develop, publish, and implement the overall Health and Safety Program for the Project. This Program shall conform to all applicable codes. Contractor shall submit the written Health and Safety Program to Metro for review and comment within fourteen (14) days after the receipt of the written Notice To Proceed. Metro's review and comment, if any, and Contractor's changes to the Health and Safety Program, based on Metro's review, if any, shall not constitute an endorsement or approval of same by Metro such that Contractor is relieved of sole responsibility for content of the Health and Safety Program and its implementation. Metro is expressly released of any implied liability therefore. The Health and Safety Program shall subsequently be distributed to and implemented by Contractor's personnel, as well as its Subcontractors and Suppliers. Contractor shall fully implement and comply with the Contractor's Health and Safety Program. Under no circumstance will the contractor commence work prior to submitting and implementing the Health and Safety Program.

10.2.3 Health and Safety Officer. Prior to initiation of construction, Contractor shall designate in writing a Site Health and Safety Officer who shall be responsible for coordinating Contractor's Health and Safety Program. The individual so designated shall be the interface with the Project Manager on matters relating to safety and Contractor's compliance with the approved Safety Program. Metro reserves the right to accept or reject the Health and Safety Officer designated by Contractor.

10.3 First Aid.

10.3.1 Contractor shall maintain on the Site during Work operations, a member of its work force who is qualified in administering first aid to its personnel and shall have available in its job office the first aid equipment as required to meet all applicable safety codes. The names and credentials of qualified personnel will be submitted to the Project Manager.

10.3.2 Contractor shall require or provide adequate clothing and protective gear for all personnel working on the job Site. This includes but is not limited to hard hats, substantial boots or shoes, shirts with sleeves at all times, eye and ear protection, gloves, face masks, welding hoods, and safety belts as required for the type of Work being done.

10.4 Use of Site.

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

10.4.2 Prior to commencement of the Work, the Contractor shall review the Project Site with Metro in detail and identify the area of the Work, staging areas, connections or interfaces with existing structures and operations, and restrictions on the Project Site area. The Contractor will ensure that all forces on the Project Site are instructed about the acceptable working and staging areas and restrictions on use of the Site. The Contractor, with advance consent of Metro, will erect such barriers, signage, and devices as are necessary to restrict access to the Project Site to approved personnel and to prevent unauthorized access by construction personnel to non-Work areas.

10.4.3 The Contractor and its Subcontractors shall receive prior approval from Metro before delivering or storing any materials or tools on Metro's premises. Upon approval, materials and tools will be stored so that they do not hamper the operation of equipment or persons and do not present a fire or safety hazard.

10.4.4 Contractor and its Subcontractors shall not erect on the Project Site any signage intended to advertise or promote their business without the prior written consent of Metro.

10.4.5 If the Contractor removes Metro's property, fixtures, materials, or other equipment to perform the Work, the Contractor shall be responsible for the safekeeping of all such property, fixtures, materials, or other equipment including without limitation assuring that such items are not lost, damaged, or destroyed, and are upon Metro's directive are either returned to their original location, reinstalled, replaced, or repaired as necessary.

10.4.6 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work, as necessary, from damage by any cause

10.4.7 At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus material from and about the Project, and shall return any damage or altered portion of Metro's property to at least its pre-construction condition.

10.5 Protection of Work, Persons, and Property Against Damage.

10.5.1 Contractor shall protect the Work from damage due to construction operations; the action of the elements, including erosion due to normal and extraordinary weather conditions; the carelessness of other contractors; vandalism; or any other cause whatever until Final Completion and acceptance of the Work.

10.5.2 The Contractor will keep the Project Site safe in compliance with applicable law. Safety includes but is not limited to: (1) providing approved types of secured and adequate barricades or fences that are easily visible from a reasonable distance around open excavations; (2) closing up or covering with steel plates all open excavations at the end of each Working Day in all street areas and in all other areas when it is reasonably required for public safety; (3) marking all open Work and obstructions by lights at night; (4) installing and maintaining all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges, and facilities; (5) observing any and all safety instructions received from Project Manager; and (6) following all laws and regulations concerning worker and public safety. If the law requires greater safety obligations than those imposed by Metro, the Contractor must comply with the law.

10.5.3 The Contractor will protect, and take every reasonable precaution to avoid damage to, all public and private property that might be damaged by its operations.

10.5.4 If public or private property, or both, is damaged by the Contractor's operations, the Contractor must either repair the damage or have the damage repaired by others at its own expense, without additional compensation from Metro. The repair must bring the damaged property back to the same condition it was in before the damage occurred. If repair and restoration is not feasible, the Contractor will pay Metro for the full cost of the damage. If the damage has been caused to property of Metro, Metro has the right to determine whether or not the property will be repaired and restored by the Contractor. If Metro elects to have the property repaired with its own forces or by another entity, the Contractor will pay Metro all costs associated with that repair and restoration.

10.5.5 The Contractor must give reasonable Notice to Metro and occupants of property adjacent to the Work to permit them to remove vehicles, trailers, and other possessions, as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the Easement or Right-of-Way that are designated for removal or that might be destroyed or damaged by the Contractor's operations.

10.5.6 All federal, state, and local safety and environmental protection laws, rules, and orders, including fire codes, applicable to the Work to be done under the Contract, shall be obeyed, complied with, and enforced by Contractor.

10.5.7 Contractor shall provide and maintain such guards, fences, barriers, signs, regulatory and warning lights, and other traffic control and safety devices adjacent to and on the Site as may be necessary to prevent

accidents to the public and damage to property. Contractor shall also provide, place, and maintain such lights as may be necessary for illuminating the said signs, guards, fences, barriers, and other traffic and safety control devices.

10.5.8 Upon Final Completion and Acceptance of the Work, Contractor shall remove all temporary signs, lights, barriers, etc., from the Site.

10.5.9 The Contractor must protect worksites and storage and disposal areas from washouts and erosion, and take all necessary precaution to control or abate dust, nuisances, and air pollution arising from the performance of Work by taking necessary actions to prevent this. Such actions include but are not limited to cleaning up, sweeping, sprinkling, covering, enclosing, or sheltering Work areas and stockpiled materials, and removing promptly from paved areas earth or other materials that may become airborne or that may be washed into waterways or drainage systems.

10.6 Utilities.

10.6.1 The Contractor is responsible for locating light and power poles, underground electrical, underground communication, sewer, gas, and water piping, gas/water "shut off" boxes and covers, and all other utility lines. The Contractor will follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in the Oregon Administrative Rules. Copies of these rules may be obtained by contacting the Center. If the Contractor has questions about the rules, it is to contact the Center. The Parties agree that any Project plans or permits issued by Metro are deemed to have this language incorporated by reference.

10.6.2 The Contractor will give Notice to Metro of any intended excavation it may have at least 48 hours in advance of the proposed excavation. If the intended excavation or other work would cause any interruption in utility service, the Contractor will give notice to Metro at least five (5) days in advance. The specific schedule for all interruptions in utility services must be coordinated with the Project Manager.

10.6.3 The Contractor will maintain any markings showing the presence of underground facilities. If the Contractor does not maintain such markings, and Metro is required to reestablish them, the Contractor will pay Metro any and all costs associated with that activity.

10.6.4 The Contractor will exercise special care in executing subsurface work in proximity of known subsurface utilities, improvements, and easements. The Contractor will arrange for and pay the cost of disconnecting, removing, relocating, capping, replacing, or abandoning all public and private utilities impeding construction operations, all in accordance with servicing utilities' regulations and governing codes. The Contractor will cap abandoned utilities. The Contractor will provide maintenance of all on-site active above-grade and below-grade services. Any utilities damaged by Contractor shall be repaired immediately to Owner's satisfaction.

10.7 Hazardous Substances Encountered During Construction and Other Environmental Laws.

10.7.1 With respect to Hazardous Materials to be used during the course of the Work, the Contractor will implement and enforce a program to inventory and properly store and secure all Hazardous Materials that may be used or may be present on the Project Site, maintain available for inspection at the Project Site all material safety data sheets, and comply with all regulations required by law for the storage, use, and disposal of Hazardous Materials. The program must provide for notification of all personnel of potential chemical hazards. Review of these hazards must be included in the Contractor's safety training program. The Contractor will submit to Metro a list of all Hazardous Materials to be brought by the Contractor or its Subcontractors onto Metro's property, including the purpose for their use on the Project.

10.7.2 In the event of a release or discovery of a preexisting release of Hazardous Materials, or if it is foreseeable that injury or death to persons may occur because of any material or substance (including without limitation Hazardous Materials) encountered on the Project Site, the Contractor must **immediately** (1) stop the Work or the portion of the Work affected, (2) notify Metro and the Architect or Engineer orally and in writing, and (3) protect against exposure of persons to the Hazardous Materials. The Contractor is to provide all written warnings, notices, reports, or postings required at law or by contract for the existence, use, release, or discovery of Hazardous Materials.

10.7.3 With respect to any Hazardous Materials or other material or substance reported to Metro under Section 10.7.2 above that were not introduced to the Project Site by the Contractor or its Subcontractors of any tier, Metro will obtain the services of a qualified environmental consultant to verify the presence or absence of the material or substance reported by the Contractor and, if the material or substance is found to be present, to verify that it is rendered harmless. Unless otherwise required by the Contract Documents, Metro will furnish in writing to the Contractor the names and qualifications of persons or entities that are to perform tests verifying the presence or absence of such material or substance, or that are to perform the task of removal or safe containment of such material or substance. The Contractor will promptly reply to Metro in writing, stating whether or not either has reasonable objection to the persons or entities proposed by Metro. If the Contractor has an objection to a person or entity proposed by Metro, Metro will propose another to which the Contractor has no reasonable objection. When the

material or substance has been rendered harmless, Work in the affected area is to resume upon written agreement of Metro and the Contractor. By Change Order, the Contract Time may, subject to agreement by Metro and the Contractor, be extended appropriately and the Contract Amount will be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up, which adjustments are to be accomplished as provided in Article 8.

10.7.4 With respect to any Hazardous Materials or other material or substance reported to Metro under section 10.7.2 above that was introduced to the Project Site by the Contractor or its Subcontractors of any tier, the Contractor will be responsible to carry out the duties of (1) proposing to Metro and the Architect or Engineer a qualified environmental consultant, (2) obtaining and paying for the services of the environmental consultant, and (3) verifying that the material is rendered harmless, as otherwise set forth in Section 10.7.3 above. The Contractor will not be entitled to an increase in the Contract Amount as stated in the last sentence of Section 10.7.3 if the Contractor or its Subcontractors of any tier are responsible for the condition requiring the testing of the material and the stoppage of the Work. Remediation Work must be conducted by properly qualified contractors approved in advance by Metro. Generally, Metro may at its option contract directly with environmental consultants and remediation contractors, regardless of whether the Work will be performed at the Contractor's expense.

10.7.5 To the fullest extent permitted by law, Metro will indemnify the Contractor, Subcontractors, Architect or Engineer, and their consultants and agents, and employees of any of them and hold them harmless from and against claims, damages, losses, and expenses, including without limitation attorney fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance was not introduced to the Project Site by the Contractor or its Subcontractors of any tier, presents the risk of bodily injury or death, and has not been rendered harmless. No indemnification provided by Metro under this Section will be required to indemnify the Contractor, Subcontractors, or their employees or agents to the extent of liability for death or bodily injury to persons or damage to property caused in whole or in part by the Contractor's own negligence, but will require indemnity to the extent of the fault of Metro or its agents or representatives.

10.7.6 To the fullest extent permitted by law, the Contractor will indemnify Metro, the Project Manager, and employees of any of them and hold them harmless from and against claims, damages, losses, and expenses, including without limitation attorney fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance was introduced to the Project Site by the Contractor or its Subcontractors of any tier, presents the risk of bodily injury or death, and has not been rendered harmless. No indemnification provided by the Contractor under this Section will be required to indemnify Metro or its agents or representatives to the extent of liability for death or bodily injury to persons or damage to property caused in whole or in part by Metro's own negligence, but will require indemnity to the extent of the fault of the Contractor or its agents or representatives.

10.8 Additional Requirements for Work at Metro Project Sites. The Contractor will comply with the following requirements in addition to the requirements set forth in this Article 10.

10.8.1 Safety and Health Precautions.

10.8.1.1 Contractor shall take all precautions to prevent the possibility of fire resulting from construction operations. Contractor will provide emergency fire extinguishing equipment of adequate type and quantity, readily available, and properly maintained. Contractor shall provide a fire watch and screening whenever welding is in progress in areas accessible or visible to Metro staff or the general public.

10.8.1.2 All contracted employees are expected to follow established safety procedures in the General Contractor's Safety Plan and report any safety violation or unsafe work practice to a lead worker or project manager. Violation of any safety procedure is a serious offense due to the severe consequences that may result and must be reported immediately. It is most important to report safety violations and unsafe work practices to individuals who can take immediate action to resolve the problem.

10.8.1.3 Vests and hardhats (as well as other personal protection attire as required by the General Contractor) are required to be worn at construction worksites. Contractors shall wear such vests at all times on the Project Site.

10.8.1.4 Any physical, mental, or emotional condition that may affect a Contractor or Subcontractor employee’s ability to work safely, make sound judgments, or compromise their ability to react quickly in the event of an emergency, must be reported to their lead or project manager prior to the start of their shift.

10.8.1.5 For safety reasons, IPods, MP3 players, and other sound devices requiring earphones are prohibited during working hours.

10.8.1.6 The Contractor will provide warning signs, flagger(s), and other safety and health precautions that may become necessary or required for protection of Work or for protection of the public, Owner's

personnel, and construction personnel, including Owner's and Architect's or Engineer's Representatives engaged on the Project. State of Oregon Workmen's Compensation Board Safety Codes for Construction Work and Federal Safety Codes, form a part of these Specifications.

10.8.2 Access to Metro Project Site. Contractor and Subcontractors will comply with the following requirements:

10.8.2.1 Locations for access to the Project Site by Contractor and Subcontractors shall be approved by the Project Manager.

10.8.2.2 The Contractor's representatives must always be on the premises when Subcontractors are working. Identification will be issued and worn for General Contractor's representatives.

10.8.2.3 The Contractor will keep a log of all Subcontractors that are working on-site each day. Subcontractors must always sign in with the Contractor and wear identification issued by the Contractor.

10.8.2.4 Construction on the Project Site is limited to 7 am to 5 pm, Monday through Friday, unless Work at other times is approved in advance by the Project Manager.

10.8.2.5 When Contractor needs access throughout the day to an area that is normally secured and inaccessible to visitors, the Project Manager will provide "contractor locks" and keys, and Contractor must keep said areas secure.

10.8.2.6 Contractor will ensure that all of its and Subcontractors' officers, employees, and agents are aware of and comply with the access requirements in this Section 10.8.2.

10.8.3 Site Protection/Safety.

10.8.3.1 The Project Site may be in operation and open to the public during construction of the Work. Construction Work in and around Owner's buildings occupied by Metro personnel or frequented by the public shall be conducted in such a manner as to permit such operation without jeopardy and with the absolute minimum of inconvenience to occupants and the public.

10.8.3.2 Metro may restrict hours of work to accommodate Metro activities or special events.

10.8.3.3 Construction Work that requires coordination with Metro staff activities will be planned in advance with the Project Manager. A meeting will be held with Metro staff to identify a plan for the activity.

10.8.3.4 The Contractor will take every precaution to minimize noise, spreading of dust and debris, causing undue vibrations or impacts, and other nuisances. The Contractor shall do no structural or other damage to any in-place improvements.

10.8.3.5 Metro-owned tools, vehicles, and other equipment may not be used at any time.

10.8.3.5.1 Tree/Vegetation Protection. The Contractor shall comply with the local government regulations applicable to the Project, and shall consult with the Project Manager prior to doing work that could impact the health of a tree or vegetation not scheduled for removal by contract documents.

10.8.4 Personnel and Subcontractors.

10.8.4.1 Smoking is prohibited in all areas of the Project Site except in designated smoking areas. Contractor and Project Manager to determine a designated smoking area.

10.8.5 Prejudicial remarks, actions, slurs, and jokes in the workplace that are offensive to people relative to their race, color, religion, national origin, sex, age, marital status, veteran status, disability, or sexual orientation are strictly prohibited. Sexual harassment is strictly prohibited. Contractors are expected to use a reasonable person's standard of good judgment in their working relationships. No person shall be subjected to deliberate or repeated unsolicited verbal comments, gestures, or physical contact of a sexual nature, or that which is offensive, hostile, or intimidating.

10.8.6 Restrictions:

10.8.6.1 Contractors are not allowed to bring the following items onto the Project Site:

10.8.6.1.1 Weapons

10.8.6.1.2 Alcohol, narcotics

10.8.6.1.3 Skates/Skateboards/Rollerblades/Wheelies

10.8.6.1.4 Bicycles (if a Contractor employee is commuting to the Project Site via bicycle, arrangements can be made for appropriate parking and use).

10.8.6.1.5 Pets

10.8.7 Prohibited Conduct:

10.8.7.1 The following conduct is strictly prohibited and will result in the immediate ejection of the offending Contractor employee or Subcontractor from Project Site premises:

10.8.7.1.1 Possessing, using, transferring, offering, or being under the influence of any intoxicants or narcotics during working hours.

10.8.7.1.2 Willful deceit, gross negligence, or theft, including of personal or public property.

10.8.7.1.3 Neglect of duty, violation of Metro ordinances, regulations, and directives.

10.8.7.1.4 Willful or repeated negligent violation of established safety policies and procedures.

10.8.7.1.5 Possessing a firearm, illegal weapons, fireworks, or explosive device on Metro property

10.8.7.1.6 Harassment, discourteous treatment of any kind, or discrimination to staff, volunteers, or members of the public. Obscenities, profanity, yelling, shouting, abusive, or maligning tone of voice and/or language is considered discourteous and is prohibited.

10.8.7.1.7 Misuse of Metro property.

ARTICLE 11
INDEMNIFICATION

11.1 Indemnification.

11.1.1 Contractor shall assume all responsibility for the Work and shall bear all losses and damages directly or indirectly resulting to Contractor, Metro, Architect, Engineer, their officers, agents, and employees, or to others on account of the character or performance of the Work or accidents.

11.1.2 Contractor shall defend, indemnify, and hold harmless Metro, its officers, agents, and employees from all claims, liability, loss, damage, consequential or otherwise, and injury of every kind, nature, and description, directly or indirectly resulting from activities in the performance of the Contract, the ownership, maintenance, or use of motor vehicles in connection therewith, or the acts, omissions, operations, or conduct of Contractor or any Subcontractor or Supplier under the Contract in any way arising out of the Contract, irrespective of whether fault is the basis of the liability or claim.

11.1.3 Any specific duty or liability imposed or assumed by Contractor, as may be otherwise set forth in the Contract Documents, shall not be construed as a limitation or restriction of the general liability or duty imposed upon Contractor by this Section.

11.1.4 Such liabilities and losses from which Contractor shall indemnify and hold harmless the above-described indemnities shall include but not be limited to:

11.1.4.1 Special activities by Metro to verify and/or expedite delivery of materials and those losses incurred by Metro as a result of any delays to Other Metro Contractors resulting from acts of Contractor or its failure to act.

11.1.4.2 Acceleration payments to Other Metro Contractors on the Project or related projects resulting from Contractor falling behind the Construction Schedule for causes not entitling it to an extension of Contract Time under any provisions of the Contract Documents that cause other Metro Contractors to fall behind the Construction Schedule so that they must then accelerate the performance of the Work, as directed by Metro, in order to maintain progress.

11.1.4.3 Violations of the ordinances or regulations of Metro, any federal, state, county, or city laws or order of any properly constituted authority in any manner affecting this Contract, in addition to any laws or regulations that might affect this Contract.

11.1.5 Any and all suits, actions, damages, or claims of every name and description to which the above-indemnified may be subjected or put by reason of injury to persons or property arising out of, in connection with, or incident to the execution of the Work, or resulting from acts or omissions on the part of Contractor, its Subcontractors, officers, employees, or agents, and all attorney fees and court costs incident thereto.

11.1.6 No indemnification provided by the Contractor under this Article 11 or insurance provided under Article 12 will be required to indemnify Metro or its employees or agents to the extent of liability for death or bodily injury to persons or damage to property caused in whole or in part by their own negligence, but will require indemnity to the extent of the fault of the Contractor or those entities or persons for whom the Contractor is responsible.

ARTICLE 12
INSURANCE

12.1 General Insurance Requirement. The Contractor will purchase from and maintain in a company or companies lawfully authorized to do business in the State of Oregon such insurance as will protect the Contractor from claims set forth below that may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

12.1.1 Claims under workers' compensation, disability benefit, and other similar employee benefit acts that are applicable to the Work to be performed;

12.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

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

12.1.4 Claims for damages insured by usual personal injury liability coverage and commercial general liability coverage (or its equivalent as approved in advance by the Owner);

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

12.1.6 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;

12.1.7 Claims for bodily injury or property damage arising out of completed operations;

12.1.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Article 12 of the General Conditions;

12.1.9 Claims for third-party injury and property damage (including without limitation clean-up costs) as a result of pollution conditions arising from the Contractor's operations or completed operations; and

12.1.10 Claims involving the Contractor's professional liability, solely to the extent that the Contractor accepts design or design/build responsibilities under the Contract.

12.2 Required Coverage. Without waiver of any other requirement of the Contract Documents, the Contractor will provide, pay for, and maintain in full force and effect at all times during the performance of the Work until final acceptance of the Work or for such further duration as required, the following policies of insurance issued by a responsible carrier. All of the Contractor's insurance carriers will be rated A VII or better by A.M. Best's rating service, unless otherwise approved by the Owner.

12.2.1 Workers' Compensation: Workers' compensation coverage sufficient to meet statutory liability limits.

12.2.2 Employer's Liability: The Contractor will purchase and maintain employer's liability insurance in addition to its workers' compensation coverage with at least the minimum limits in Section I.C below.

12.2.3 Commercial General Liability: The Contractor will purchase and maintain commercial general liability ("CGL") insurance on an occurrence basis, written on ISO Form CG 0001 (12/04 or later) or an equivalent form approved in advance by the Owner. CGL coverage will include all major coverage categories including bodily injury, property damage, and products/completed operations coverage maintained for at least six years following final payment. The CGL insurance will also include the following: (a) separation of insured; (b) incidental medical malpractice; and (c) per-project aggregate for premises operations.

12.2.4 Professional Liability/Errors and Omissions: To the extent that the Contractor accepts design or design/build responsibilities, the Contractor will purchase and maintain professional liability/errors and omissions insurance and cause those Subcontractors providing design services do so.

12.2.5 Automobile Liability: The Contractor will purchase and maintain automobile liability insurance with coverage for owned, hired, and non-owned vehicles on ISO form CA 00 01 or an equivalent form approved in advance by the Owner. The automobile liability insurance will include pollution liability coverage resulting from vehicle overturn and collision.

12.2.6 Pollution Liability: The Contractor will purchase a contractors' pollution liability policy. Coverage will include third-party claims for bodily injury, property damage, and environmental damage resulting from pollution conditions caused during the performance of covered operations for both on-site and migrating from the job site. Such coverage will include pollution conditions arising from covered operations including work performed by its Subcontractors and third-party claims against the Contractor alleging improper supervision of its Subcontractors.

12.2.7 Commercial Umbrella/Excess Coverage: The Contractor will purchase or maintain a commercial umbrella or excess liability policy to meet the minimum limits as described below in Section I.C. Commercial umbrella/excess liability coverage will include: (a) "Pay on behalf of" wording; (b) concurrency of effective dates with primary coverage; (c) punitive damages coverage (where not prohibited by law); (d) application of aggregate (where applicable) in primary coverage; (e) "care, custody, and control" coverage that follows the form for primary coverage; and (f) drop-down feature. Excess/umbrella coverage will be scheduled to the CGL, employer's liability, and automobile liability policies.

12.3 Limits. The insurance required by this Article 12 will be written for at least the limits of liability specified in this Section or required by law, whichever is greatest.

12.3.1	Workers' Compensation	Statutory Limits
12.3.2	Employer's Liability	
	Each Accident	$1,000,000
	Each Bodily Injury/Disease	$1,000,000
	Aggregate Bodily Injury/Disease	$1,000,000
12.3.3	Commercial General Liability	
	Each Occurrence	$2,000,000
	General Aggregate	$2,000,000
	Product/Completed Operations	$2,000,000
	Personal & Advertising Injury	$2,000,000
	Fire Damage Limit	$2,000,000
	Medical Expense Limit	$2,000,000
12.3.4	Automobile Liability	
	Combined Single Limit	$2,000,000
12.3.5	Pollution Liability	
	Single Limit	$2,000,000
	Aggregate	$2,000,000
12.3.6	Commercial Umbrella/Excess Coverage	
	Each Occurrence	$1,000,000

12.4 Additional Insureds. The Contractor's third-party liability insurance policies will include the Owner and its officers, employees, agents, volunteers, partners, successors, and assigns as additional insureds. The policy endorsement must extend premise operations and products/completed operations to the additional insureds. The additional insured endorsement for the CGL insurance must be written on ISO Form CG 2010 (11/85), a CG 2037 (07/04) together with CG 2033 (07/04), or the equivalent, but will not use the following forms: CG 20 10 (10 93) or CG 20 10 (03 94).

12.5 Joint Venture. If the Contractor is a joint venture, the joint venture will be a named insured for the liability insurance policies.

12.6 Primary Coverage. The Contractor's insurance will be primary insurance coverage and may not seek contribution from any insurance or self-insurance carried by the Owner or the Architect or Engineer, including any property damage coverage carried by the Owner. Contractor's insurance will apply separately to each insured against whom a claim is made or suit is brought. The Contractor's insurance will not include any cross-suit exclusion or preclude an additional insured party from asserting a claim as a third party.

12.7 Contractor's Failure to Maintain Insurance. If for any reason the Contractor fails to maintain required insurance coverage, such failure will be deemed a material breach of the Contract and the Owner, at its sole discretion, may suspend or terminate the Contract for cause pursuant to Article 15 of this Contract. The Owner may, but has no obligation to, purchase such required insurance, and without further notice to the Contractor, the Owner may deduct from the Contract Sum any premium costs advanced by the Owner for such insurance. Failure to maintain the insurance coverage required by this Article 12 will not waive the Contractor's obligations to the Owner.

12.8 Certificates of Insurance. The Contractor will supply to the Owner Certificates of Insurance for the insurance policies described in this Article 12 prior to the commencement of the Work and before bringing any equipment or construction personnel onto the Project site. Contractor shall email Certificate of Insurance to submitdocuments@oregonmetro.gov.

12.8.1 Additional Certificates. To the extent that the Contractor's insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage will be submitted with the final application for payment. Information concerning reduction of coverage

because of revised limits or claims paid under the general aggregate, or both, will be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

12.8.2 Prohibition Until Certificates Received. The Owner will have the right, but not the obligation, to prohibit the Contractor and its Subcontractors from entering the Project site until the required certificates (or other competent evidence that insurance has been obtained in complete compliance with this Article 12) are received and approved by the Owner.

12.8.3 Deductibles/Self-Insured Retentions: Payment of deductibles or self-insured retention is a Cost of the Work and does not justify a Change Order. Satisfaction of all self-insured retentions or deductibles will be the sole responsibility of the Contractor.

12.9 Subcontractor Insurance. The Contractor will cause each Subcontractor to purchase and maintain in full force and effect policies of insurance as specified in this Article 12, except that the coverage limits shall be at least $1,000,000 combined single limit for each occurrence and in the aggregate. The Contractor will be responsible for the Subcontractors' coverage if the Subcontractors fail to purchase and maintain the required insurance. When requested by the Owner, the Contractor will furnish copies of Certificates of Insurance establishing coverage for each Subcontractor.

12.10 Limitations on Coverage.

12.10.1 No insurance provided by the Contractor under this Article 12 will be required to indemnify the Owner, the Architect or Engineer, or their employees or agents to the extent of liability for death or bodily injury to persons or damage to property caused in whole or in part by their own negligence, but will require indemnity to the extent of the fault of the Contractor or its agents, representatives, or Subcontractors.

12.10.2 The obligations of the Contractor under this Article 12 will not extend to the liability of the Architect or Engineer or its consultants for (a) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs, or specifications; or (b) the giving or failure to give directions or instructions to the extent that the directions, or failure to provide directions, are the cause of the injury or damage.

12.10.3 By requiring insurance, the Owner does not represent that coverage and limits will necessarily be adequate to protect the Contractor. Insurance in effect or procured by the Contractor will not reduce or limit the Contractor's contractual obligations to indemnify and defend the Owner for claims or suits that result from or are connected with the performance of the Contract.

12.11 Property Insurance

12.11.1 Builders Risk. Contractor, for the life of this Contract, shall effect and maintain Builders All Risk Insurance and fire insurance with extended coverage and malicious mischief coverage upon the structures on which the Work of this Contract is to be done to 100 percent (100%) of the insurable value thereof, protecting (1) Owner's interest; (2) Contractor's interest; and (3) the Subcontractor's interest in the Work. Contractor's interest and Subcontractor's interest, as used herein, means their property interests and the property interests of others for which they are responsible in the Project, in all materials and supplies entering into or used or destined for use therein, and in all expendable items of equipment that are used in or are incidental to but that do not become a part of the finished Project, located at the job Site at the time of loss or damage. Such insurance shall not exclude coverage for landslides, collapse, explosion, or loss due to the result of faulty workmanship. Such insurance will include coverage for soft costs or delay in opening.

12.11.1.1 Contractor and all Subcontractors shall be responsible for any loss or damage to their machinery and apparatus and nonexpendable items of their equipment.

12.11.1.2 Contractor shall provide adequate fire protection equipment and safeguards to protect Metro and Contractor's interests in accordance with Metro's insurance carrier's requirements.

12.11.1.3 Contractor will furnish copies of Certificates of Insurance establishing coverage prior to project start.

12.11.2 Contractor's Responsibility. Contractor must provide insurance for its own machinery, tools, equipment, or supplies that are not to become a part of the Project.

ARTICLE 13
MINORITY/WOMEN/EMERGING SMALL BUSINESS PROGRAM

13.1 Contractor shall comply with all pertinent provisions of Metro's MWESB Business Program that are contained in Metro Code 2.04.100 to 2.04.190 and that are by this reference expressly incorporated herein and made a part of this Contract.

13.2 Contractor shall not replace a minority, women-owned or emerging small business enterprise Subcontractor with another Subcontractor, either before Contract Award or during Contract performance, without prior

written approval of Metro. In replacing a minority, women-owned or emerging small business Subcontractor, Contractor shall replace such minority, women-owned or emerging small business Subcontractor with another certified minority, women-owned or emerging small business Subcontractor or make good faith efforts to do so. Failure to do so shall constitute Contractor's default of this Contract, and Metro, at its option, may terminate this Contract under the procedures set out in Article 15.

13.3 Metro reserves the right, at all times during the period of this Contract, to monitor Contractor's compliance with the terms of the MWESB Business Program and enforce the program if Contractor should fail to so comply. Contractor shall be bound by any and all representations made concerning its compliance with the program prior to Contract Award and any and all representations made by Contractor concerning the replacement of a minority or women-owned business Subcontractor during the performance of this Contract.

13.4 MWESB Participation in the Contract.

13.4.1 It is Metro's policy that Contractor shall take reasonable steps to ensure that Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Emerging Small Businesses (ESB) have the opportunity to participate in the Work.

13.4.2 Termination and Substitution of MWESB. The Contractor shall notify Metro in writing and confer with Metro before terminating or replacing a MWESB that has a signed contract with the Contractor.

13.4.3 Changes in Work Committed to MWESB. Metro will consider the impact on MWESB participation in instances where Metro changes, reduces, or deletes Work contracted to MWESB firms at the time of Contract Award. In such instances, the Contractor shall not be required to replace the Work but is encouraged to do so. If the Contractor proposes any changes that involve a contracted MWESB, the Contractor shall notify the MWESB of the proposed change, reduction, or deletion of any Work committed at the time of Contract Award prior to executing the Change Order. The Contractor can choose to enable the affected MWESB to participate in the Change Order request and is requested to make every effort to maintain the contracted MWESB percentage.

13.4.4 Contractor Payments to Subcontractors. The Contractor shall maintain records of all subcontracts entered into with MWESB firms and records of materials purchased from MWESB suppliers. Such records shall show the name and business address of each MWESB subcontractor or vendor and the total dollar amount actually paid to each MWESB subcontractor or vendor. The Contractor shall pay each subcontractor for satisfactory performance of its contract no later than ten (10) Calendar Days from receipt of each payment the Contractor receives from Metro. The Contractor shall also return Retainage payments to each subcontractor within ten (10) Calendar Days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above-referenced time frame may occur only for good cause following written approval of the Metro Project Manager. The Contractor shall submit a completed, signed original "Metro Monthly Subcontractor Payment and Utilization Report," available from Metro. The Contractor shall submit the form when a progress or final payment has been made to each subcontractor or supplier or when any held retainage is returned to a subcontractor or supplier. Contractor shall submit the form no later than the fifth day of each month. At the completion of the Project, Contractors shall submit a final form indicating the total amounts paid to all subcontractors and suppliers.

ARTICLE 14
MISCELLANEOUS STATUTORY RESPONSIBILITIES OF CONTRACTOR

Contractor shall keep itself fully informed of and shall fully comply with all federal, state, regional, and local laws, rules, regulations, ordinances, and orders pertaining in any manner to this Contract and those rules, regulations, and orders of any agency or authority having jurisdiction over the Work or those persons employed or engaged therein. Contractor shall pay all taxes, including federal, state, regional, county, and city, or taxes of any other governmental entity applicable to the Work performed or materials provided under this Contract.

ARTICLE 15
TERMINATION OR SUSPENSION OF THE WORK

15.1 Default of Contractor.

15.1.1 If Contractor should be adjudged bankrupt, or if Contractor should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of insolvency, or if Contractor should refuse to or fail to supply enough properly skilled workers or proper materials for the efficient prosecution of the Work, disregard laws, ordinances, or the instructions of Metro, or otherwise be in violation of any provision of the Contract, Metro may, without prejudice to any other right or remedy and after giving Contractor and Contractor's surety on the Performance Bond prior written notice, terminate the Contract or any portion of the Contract, which termination shall be effective ten (10) days after service of such notice. Such notice shall contain the reasons for the termination and shall

state that unless, within ten (10) calendar days of service of the termination notice on Contractor, Contractor or its surety on the Performance Bond shall have cured or shall have made, in Metro's opinion, appropriate arrangements for prompt cure of all of the cause(s) for termination cited in the notice of termination, the Contract shall terminate.

15.1.2 Upon termination, Metro may take possession of the premises and of all materials, tools, and appliances thereon, as well as all other materials whether on the premises or not, for which Contractor has received partial payment, and may finish the Work or the portion terminated by whatever method it may deem expedient.

15.1.3 In the event action as above indicated is taken by Metro, Contractor or Contractor's surety shall provide Metro with immediate and peaceful possession of all of the materials, tools, and appliances located on the premises, as well as all other materials whether on the premises or not, for which Contractor has received any progress payment. Upon termination, in the event that the surety does not complete the Contract, at the election of Metro, Contractor shall assign any and all subcontracts and material contracts to Metro or Metro's designee. Further, Contractor shall not be entitled to receive any further payment until the Work is completed. On completion of the Work, determination shall be made by Metro of the total amount Contractor would have been entitled to receive for the Work under the terms of the Contract had Contractor completed the Work. If the difference between said total amount and the sum of all amounts previously paid to Contractor, which difference will hereinafter be called the "unpaid balance," exceeds the expense incurred by Metro in completing the Work, including expense for additional managerial and administrative service, and all other costs, damages, and expenses incurred by Metro due to Contractor's failure to complete the Contract, such excess will be paid to Contractor, with the consent of the surety. If, instead, the described expenses incurred by Metro exceed the unpaid balance, the amount of the excess shall be paid to Metro by Contractor or its surety. If only a portion of the Contract is terminated, this Section shall be deemed to apply to that portion of the Work only.

15.1.4 In addition to the above-mentioned right, Metro shall have the right, at its option, to suspend all or part of Contractor's performance under the Contract should any of the events occur that give Metro the right to terminate the Contract as above described. In such event, Metro shall give Contractor and Contractor's surety prior written notice of such suspension and Contractor shall stop or cause to stop all such Work under the Contract immediately on receipt of such notice and shall not commence such Work under the Contract again unless and until Contractor shall receive written notice from Metro to proceed. Metro shall not be responsible or liable to Contractor or others for any costs or expenses of whatever nature related to Contractor's failure to stop Work as directed by Metro.

15.1.5 After receipt of a notice of termination or suspension, and except as otherwise directed by Metro, Contractor shall as it relates to those portions of the Contract terminated or suspended:

15.1.5.1 Stop Work under the Contract on the date and to the extent specified in the notice of termination or suspension.

15.1.5.2 Place no further orders or subcontracts, or suspend the same, as applicable, for materials, services, or facilities except as necessary to complete the portion of the Work under the Contract that is not terminated or suspended.

15.1.5.3 Terminate or suspend, as applicable, all orders and subcontracts to the extent that they relate to the performance of such Work terminated or suspended.

15.1.6 Metro may, at its discretion, avail itself of any or all of the above rights or remedies and its invoking of any one of the above rights or remedies will not prejudice or preclude Metro from subsequently invoking any other right or remedy set forth above or elsewhere in the Contract.

15.1.7 None of the foregoing provisions shall be construed to require Metro to complete the Work nor to waive or in any way limit or modify the provisions of the Contract relating to the fixed and liquidated damages suffered by Metro on account of failure to complete the Project within the time prescribed.

15.2 Termination in the Public Interest.

15.2.1 Metro may unilaterally terminate the Contract in whole or in part for convenience, when Metro determines it to be in the public interest.

15.2.2 When Metro decides to terminate a Contract for convenience, Metro will notify the Contractor and its sureties in writing of its intention to terminate the Contractor's right to proceed with the Work no less than seven (7) days in advance of the date of the actual termination. The date of termination, which is the date after which no Work is to be performed, must be stated in the notice. Notice will be deemed to have been given if sent to the Contractor's or any surety's last known address provided to Metro by the Contractor and its sureties. For purposes of computing time in this Section, the first day counted is the day that the notice is mailed by Metro.

15.2.3 After receipt of a notice of termination, and except as directed by Metro, the Contractor will immediately proceed with the following obligations:

15.2.3.1 Stop Work by the date as specified in the notice;

15.2.3.2 Award no further subcontracts and place no further orders for materials, services, or facilities, except as necessary to complete the continued portion of the Contract, if any;

15.2.3.3 Terminate all Subcontractors and orders to the extent that they relate to the Work terminated;

15.2.3.4 Assign to Metro, if directed by Project Manager, all right, title, and interest of the Contractor under the subcontracts terminated, in which case Metro will have the right to settle or to pay any termination settlement proposals arising out of those terminations;

15.2.3.5 With approval or ratification to the extent required by Metro, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause;

15.2.3.6 As directed by Metro, transfer title and deliver to Metro (a) the fabricated or unfabricated parts, Work in process, completed Work, supplies, and other materials produced or acquired for the Work terminated, and (b) the completed or partially completed plans, drawings, information, and other property that, if the Contract had been completed, would be required to be furnished to Metro;

15.2.3.7 Take any actions that may be necessary, or that Project Manager may direct, for the protection and preservation of the property related to this Contract that is in the possession of the Contractor and in which Metro has or may acquire an interest; and

15.2.3.8 Use its best efforts to sell, as directed or authorized by Project Manager, any property of the type referred to in Section 14.2.3.6 above, except that the Contractor (a) is not required to extend credit to any purchaser and (b) may acquire the property under the conditions prescribed by, and at prices approved by, the Project Manager. The process of any transfer or disposition will be applied to reduce any payments to be made by Metro under this Contract, credited to the price or cost of the Work, or paid in any other manner directed by Project Manager.

15.2.4 Upon termination, Metro will pay the Contractor the following costs, and no other, as a result of the termination:

15.2.4.1 With regard to the Contract Work performed before the effective date of termination, the total (without duplication of any items) of the following costs:

15.2.4.1.1 The cost of this Work, as determined by the method of payment established by the Contract Documents;

15.2.4.1.2 The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the Contract if such costs are not included in Section 14.2.3.4; and

15.2.4.1.3 A sum as profit on Section 14.2.4.1.1 above, not to exceed ten percent of that amount, unless it appears that the Contractor would have sustained a loss on the entire Contract had it been completed. No profit, however, is permitted on costs compensated under Section 14.2.4.1.2.

15.2.4.2 The reasonable costs of settlement of the Work terminated, including:

15.2.4.2.1 Accounting, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data, except that no allowance will be made for costs incurred as attorney fees;

15.2.4.2.2 The termination and settlement of Subcontractors (excluding the amounts of such settlements); and

15.2.4.2.3 Storage, transportation, and other costs incurred reasonably necessary for the preservation, protection, or disposition of the termination inventory.

15.2.5 No costs other than those allowed in Section 14.2.4 are to be paid. By way of example only, and not by way of limitation, costs that would not be allowed include anticipated profits on unperformed Work, consequential damages, post-termination overhead, Bid or Proposal preparation costs, costs for retraining employees, depreciation on idle equipment, cost of common items reasonably usable on the Contractor's other work, and costs unrelated to the Work performed prior to the date of termination.

15.2.6 Metro may deduct from any sums otherwise due the Contractor under Section 14.2.4 above the cost of advance payments made to the Contractor under the terminated portion of this Contract, any claim that Metro has against the Contractor whether or not arising from this Contract, and the agreed price of, or proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provision of Section 14.2.3.8 and not recovered by or credited to Metro.

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

15.2.7 Payment from Metro is not due until the Contractor has submitted an itemization of its recoverable costs to Metro in writing, together with supporting documentation. The Contractor will supply additional supporting documentation on request by Metro in order to recover its costs.

15.2.8 The Contractor will maintain all records and documents relating to the termination until Metro and the Contractor resolve the amount of costs to be paid by Metro to the Contractor as a result of this termination. Such records must be made available to Metro within thirty (30) days of the request.

END OF SECTION

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. XXXXXX

METRO GENERAL CONDITIONS - EXHIBIT 1

WARRANTY FORM

We the undersigned hereby warrant that the [DESCRIBE WORK PERFORMED OR MATERIALS SUPPLIED].that we have provided for [INSERT PROJECT NAME] has been done in accordance with the Contract Documents and that the Work as provided will fulfill the requirements of the warranty included in Article 7 of the Metro General Conditions.

We agree to correct or remove and replace any or all of our Work, together with any other adjacent Work that may be displaced or affected by so doing, that may be defective in its workmanship or materials, or that may fail to conform to the requirements of the Contract Documents, within a period of one (1) year following the later of the date of substantial completion or the date described in Section 7.7 of the Metro General Conditions, without any expense whatsoever to Metro, normal wear and tear and mistreatment excepted.

In the event of our failure to comply with the above-mentioned conditions within twenty (20) calendar days after Metro notifies Contractor in writing, we collectively and separately do hereby authorize Metro to proceed to have said defects repaired and corrected at our expense, and we will honor and pay the costs to dispose of nonconforming materials and charges therefore upon demand. If Metro is required to enforce payment, it shall be entitled to recover its costs and reasonable attorney fees.

CONTRACTOR

By_____

Print Name_____

Date_____

SUBCONTRACTOR

By_____

Print Name_____

Date_____

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. XXXXXX

METRO GENERAL CONDITIONS - EXHIBIT 2

SUBCONTRACTOR ASSIGNMENT OF ANTITRUST CLAIMS

Project: _____

Owner: Metro

General Contractor: _____

Subcontractor: _____

Release Date: _____

1. By entering into a contract with the General Contractor, subcontractor, for consideration paid to subcontractor under the subcontract, does irrevocably assign to Metro any claim for relief or cause of action that subcontractor now has or that may accrue to Subcontractor in the future, including at Metro's option, the right to control any such litigation on such claim for relief or cause of action, by reason of any violation of 15 USC Section 1 15, ORS 646.725, or ORS 646.730 in connection with any goods or services that are used, in whole or in part, for the purpose of carrying out subcontractor's obligations under its subcontract with the General Contractor.

2. Subcontractors irrevocably assigns to Metro, as a third-Party beneficiary of the subcontract, any right, title, or interest that has accrued or may accrue to the Subcontractor by reason of any violation of 15 USC Section 1 15, ORS 646.725, or ORS 646.730, including, at Metro's option, the rights to control any litigation arising hereunder, in connection with any goods or services provided to the Subcontractors or Suppliers by any person, in whole or in part, for the purpose of carrying out the Subcontractor's obligations as agreed to by Subcontractor in pursuance of the completion of the Contract .

3. It is an express obligation of Subcontractor that it will take no action that will in any way diminish the value of the rights conveyed or assigned hereunder to Metro. It is an express obligation of Subcontractor to advise the Office of Metro Attorney:

a. In advance, of its intention to commence any action on its own behalf regarding such claims for relief or causes of action;

b. Immediately, upon becoming aware of the fact that an action has been commenced on its own behalf by some other person or persons, of the impendency of such action; and

c. the date on which it notified the obligor(s) of any such claims for relief or causes of action of the fact of its assignment to Metro.

4. In the event that any payment under any such claim is made to Subcontractor, it shall promptly pay over to Metro its proportionate share thereof, if any, assigned to Metro herein.

SUBCONTRACTOR

By_____

Print Name_____

Date_____

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. XXXXXX

METRO GENERAL CONDITIONS - EXHIBIT 3

AFFIDAVIT, AGREEMENT FOR INDEMNITY, LIEN WAIVER AND RELEASE

(General Contractor – Progress Payment)

This AFFIDAVIT, AGREEMENT FOR INDEMNITY, LIEN WAIVER AND RELEASE is entered into _____, by and between Metro, a Metropolitan Service District established pursuant to Oregon law and the Metro Charter ("Metro") and _____, (the "Undersigned") in accord with Metro Contract No. ____, dated _____, between Metro and the Undersigned for construction of _____ (the "Contract"). As a condition precedent to Metro's Progress Payment No.___ under the Contract in the amount of $_____, and in consideration thereof, the Undersigned agrees to make the following representations, warranties, covenants, agreements, and indemnities, and to fully and completely waive, release, and discharge Metro from all liabilities, obligations, and claims arising under the Contract, as follows:

1. The Undersigned hereby certifies, represents, and warrants as follows:

1.1 It has supplied labor, services, equipment, materials, and materials provided or transported to the construction of the _____ as General Contractor under the Contract (the "Project"), and has subcontracted with other persons and entities to so provide.

1.2 It has complied with all federal, state, and local laws, including social security laws, unemployment compensation laws, workers' compensation laws, and tax laws, insofar as applicable to the performance of the Contract work, and has paid all federal, state, and local taxes including excise, use, sales, and withholding taxes.

1.3 All subcontractors, laborers, service providers, equipment suppliers and material suppliers, and transporters for work, services, equipment, or materials supplied to the Project or to the Undersigned and used in the Project have been paid in full by the Undersigned through the period covered by previous progress payments made by Metro.

1.4 It either has paid in full, or within ten (10) business days of receipt of the above set forth Progress Payment, will pay in full all subcontractors, laborers, service providers, equipment suppliers and material suppliers, and transporters for work, services, equipment, or materials supplied to the Project or to the Undersigned connected with or used in the Project, through the period covered by said progress payment made by Metro.

1.5 It has delivered to Metro written releases of all rights to file claims on any bonds in connection with the Contract, signed by each subcontractor, service provider, and supplier who performed work or services, or furnished or transported materials or equipment in connection with the Contract, in accord with Article 9 of the Metro General Conditions to the Contract.

2. The Undersigned acknowledges and agrees that Progress Payments made by Metro up to the date hereof, in the sum of_____, plus Progress Payment No. _____, when paid, constitute payment in full of all amounts due to Undersigned for all labor, services, equipment, and materials provided or transported in connection with the Project up to and through _____, _____, as set forth in the Undersigned's payment application No. _____. The Undersigned agrees that, ***upon receipt of the above set forth progress payment,*** which is the full payment due and owing to Undersigned up to and through the date set forth in section 2, Undersigned will be paid in full for all labor (including contributions and benefits), services, equipment, supplies, and materials provided or transported in connection with the Project without exceptions, and that there are no other unsettled claims or demands therefore. The Undersigned agrees that, ***conditioned upon receipt of Payment of the above set forth progress payment,*** and in consideration thereof, the Undersigned hereby fully and unconditionally waives and releases Metro from all liability for payment, liens or claims of lien, rights to lien, bond claim rights, and any other claim for payment it now has or asserts or may have or assert for labor, services, equipment, materials, and materials provided or transported in connection with the Project through and up to said date, and further releases Metro, the Project land and improvements from any claim, cause of action, or demand whatsoever, arising out of or relating to the Project that arose on or before said date.

3. The Undersigned hereby agrees to promptly pay and obtain a release of claims on any bonds that may in the future affect the Project, and defend, indemnify, and save Metro harmless from any liability or expense because of any claim on any bond or any other claim related to the work under the Contract through and up to the date set forth in section 2.

4. The affiant signing below does hereby swear and attest that he/she has the full authority to sign this document on behalf of the Undersigned and that Metro may rely on this Affidavit, Agreement for Lien Waiver and Release in connection with remitting Progress Payment No. _____ to Undersigned.

Dated:_____ Affiant:_____Its:_____

STATE OF OREGON)
County of _____)
This instrument was acknowledged before me on _____ by _____ as _____
_____of_____

_____
Notary Public - State of Oregon

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. XXXXXX

METRO GENERAL CONDITIONS - EXHIBIT 4

AFFIDAVIT, AGREEMENT FOR INDEMNITY, LIEN WAIVER AND RELEASE
(General Contractor – Final Closeout)

This AFFIDAVIT, AGREEMENT FOR INDEMNITY, LIEN WAIVER AND RELEASE is entered into _____, by and between Metro, a Metropolitan Service District established pursuant to Oregon law and the Metro Charter ("METRO") _____, (the "Undersigned") in accord with Metro Contract No. ____, dated _____, between Metro and the Undersigned for construction of the _____(the "Contract"). As a condition precedent to Metro's final payment under the Contract, in the amount of _____ (the "Final Payment"), and in consideration thereof, the Undersigned agrees to make the following representations, warranties, covenants, agreements and indemnities, and to fully and completely waive, release and discharge Metro from all liabilities, obligations, and claims arising under the Contract, as follows:

1. The Undersigned hereby certifies, represents and warrants as follows:

1.1 It has supplied labor, services, equipment, materials or materials transported to the construction of the _____ as General Contractor under Metro Contract No._____ (the "Project"), and has subcontracted with other persons and entities to so provide.

1.2 It has complied with all federal, state and local laws, including social security laws, unemployment compensation laws, workers' compensation laws, and tax laws, insofar as applicable to the performance of the Contract work, and has paid all federal, state and local taxes including excise, use, sales and withholding taxes.

1.3 All subcontractors, laborers, service providers, equipment suppliers and material suppliers and transporters for work, services, equipment or materials supplied to the Project or to the Undersigned and used in the Project have been paid in full by the Undersigned through the period covered by previous progress payments made by Metro.

1.4 It either has paid in full, or within ten (10) business days of receipt of the Final Payment, will pay in full all subcontractors, laborers, service providers, equipment suppliers and material suppliers and transporters for work, services, equipment or materials supplied to the Project or to the Undersigned connected with or used in the Project.

1.5 It has delivered to Metro written releases of all rights to file claims on any bonds in connection with the Contract, signed by each subcontractor, service provider and supplier who performed work, services or furnished or transported materials or equipment in connection with the Contract, in accord with Article 9 of the General Conditions to the Contract.

2. The Undersigned covenants and agrees that progress payments made by Metro up to the date hereof, in the sum of **$**_____, plus the Final Payment in the amount of **_____,** constitute full and final payment of all amounts due to Undersigned for all labor, services, equipment, and materials provided or transported in connection with the Project. The Undersigned agrees that, ***conditioned upon receipt of the Final Payment,*** and in consideration thereof, the Undersigned hereby fully and unconditionally waives, discharges and releases Metro from all liabilities, obligations and claims, including all liens, claims of lien, rights to lien, bond claim rights and any other claim for payment it now has or asserts or may have or assert for labor, services, equipment, materials provided or transported in connection with the Contract, and further releases Metro, the Project land and improvements from any claim, cause of action, or demand whatsoever arising out of or relating to the Project.

3. The Undersigned hereby agrees to defend, indemnify and hold Metro harmless from any liability or expense resulting from any claim on any bond or any other claim related to the Contract or work there under, in accord with Articles 9 and 1 of the General Conditions to the Contract.

4. The affiant signing below does hereby swear and attest that he/she has the full authority to sign this document on behalf of the Undersigned and that, ***except for the Final Payment,*** which is the full and final payment due and owing to Undersigned, that Undersigned has been paid in full for all labor (including contributions and benefits), services, equipment, supplies and materials provided or transported in connection with the Project without exceptions, and that there are no other unsettled claims or demands therefore. The Undersigned affiant further acknowledges that Metro may rely on this Affidavit, Agreement for Indemnity, Lien Waiver and Release in connection with remitting the Final Payment to Undersigned.

Dated: _____ Undersigned:_____

By:_____Its:_____

STATE OF OREGON)
) *ss.*
County of _____)

This instrument was acknowledged before me on _____ by _____ as _____
_____of_____

_____
Notary Public - State of Oregon

Metro
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1700

MERC CONTRACT NO. XXXXXX

METRO GENERAL CONDITIONS - EXHIBIT 5

AFFIDAVIT, LIEN WAIVER AND RELEASE – CONDITIONAL FINAL
(Subcontractor - Closeout)

1. The undersigned, _____ ("Undersigned"), has provided labor, services, equipment, materials or materials transport to the construction of the improvements at _____ known as _____, as a Subcontractor to _____("Contractor"), Metro Contract No._____ (the "Project").

2. The Undersigned acknowledges and agrees that the sum of **$**_____ constitutes full and final payment of all amounts due to Undersigned for all labor, services, equipment, and materials provided or transported in connection with the Project (the "Final Payment"). The Undersigned agrees that, ***conditioned upon receipt of the Final Payment,*** and in consideration thereof, the Undersigned hereby fully and unconditionally waives and releases all liens, claims of lien, rights to lien, bond claim rights and any other claim for payment it now has or asserts or may have or assert for labor, services, equipment, materials provided or transported in connection with the Project, and further releases Metro, the Project land and improvements, and the Contractor from any claim, cause of action, or demand whatsoever arising out of or relating to the Project.

3. The Undersigned hereby certifies as follows:

3.1 It has complied with all federal, state and local laws, including tax laws, social security laws, unemployment compensation laws and workers' compensation laws, insofar is applicable to the performance of the subcontract work.

3.2 Its laborers, equipment suppliers and material suppliers have been fully paid through the period covered by previous progress payments made by Contractor except as explicitly noted in writing and attached hereto.

3.3 It either has paid in full, or within five (5) business days of receipt of the Final Payment, will pay in full for all labor, materials and equipment used in or furnished in connection with Project.

4. The affiant signing below does hereby swear and attest that he/she has the full authority to sign this document on behalf of the Undersigned and that, ***conditioned upon receipt of the Final Payment,*** which is the full and Final Payment due and owing to Undersigned, that Undersigned has been paid in full for all labor (including contributions and benefits), services, equipment, supplies and materials provided or transported in connection with the Project without exceptions, and that there are no other unsettled claims or demands therefore. The Undersigned affiant and further acknowledges that Metro and Contractor are relying on this Affidavit, Lien Waiver and Release in connection with processing the Final Payment.

Dated: _____ Undersigned | Subcontractor: _____

By: _____

Print Name: _____

Its: _____

STATE OF OREGON)
) *ss.*
County of Multnomah)

This instrument was acknowledged before me on _____ by _____ as _____ _____ of _____.

_____
Notary Public - State of Oregon

ATTACHMENT A

"Portland" Sign Refurbishment
at the
Arlene Schnitzer Concert Hall
SUPPLEMENTAL GENERAL CONDITIONS

SECTION S.1 - ALTERNATES

PART 1 - GENERAL

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

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

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

4. PROCEDURES
   A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
      A. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

   B. Execute accepted alternates under the same conditions as other work of the Contract.

   C. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

1. SCHEDULE OF ALTERNATES
   A. Add Alternate No. 01 Provide price for new upper structural support beam for sign frame

END OF SECTION S.1

SECTION S.2 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a) Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b) Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c) Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d) Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e) Samples, where applicable or requested.
f) Certificates and qualification data, where applicable or requested.
g) List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i) Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j) Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k) Cost information, including a proposal of change, if any, in the Contract Sum.

l) Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m) Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a) Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b) Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 14 days prior to time required for preparation and review of related submittals.

Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution is consistent with the Contract Documents and will produce indicated results.
2. Substitution request is fully documented and properly submitted.
3. Requested substitution will not adversely affect Contractor's construction schedule.
4. Requested substitution has received necessary approvals of authorities having jurisdiction.
5. Requested substitution is compatible with other portions of the Work.
6. Requested substitution has been coordinated with other portions of the Work.
7. Requested substitution provides specified warranty.
8. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 14 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's construction schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION S.2

SECTION S.3 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Site condition reports.
3. Special reports.

B. Related Sections include the following:

1. Section S.4 "Submittal Procedures" for submitting schedules and reports.

1.3 SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Electronic file.
2. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
3. Field Condition Reports: Submit at time of discovery of differing conditions.
4. Special Reports: Submit at time of unusual event.

1.4 COORDINATION

A. Coordinate dates and locations of noise generating work with Owner. Schedule noise generating work locations to minimize disruption of Owner's scheduled activities and events in areas below. Prepare work schedule that coordinates with Owners schedule, indicating work zones and work activities and dates work areas will be occupied by construction personnel.

PART 2 -PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for Notice to Proceed to date of final completion.

2.2 REPORTS

A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.3 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

END OF SECTION S.3

SECTION S.4 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

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

2. SUMMARY
   Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

   Related Sections include the following:
   A. Title sheet "for deferred submittals

   B. Section S.6 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

3. DEFINITIONS
   Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

   Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

   File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

   Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

4. SUBMITTALS
   Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

   A. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

   B. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

   C. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
   Submit revised submittal schedule to reflect changes in current status and timing for submittals.

   D. Format: Arrange the following information in a tabular format:
      Scheduled date for first submittal.
      Specification Section number and title.
      Submittal category: Action; informational.
      Name of subcontractor.
      Description of the Work covered.
      Scheduled date for Architect's final release or approval.

Scheduled date of fabrication.
Scheduled dates for purchasing.
Scheduled dates for installation.

5. SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawing and Project record drawings.

2. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

3. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2009 format for Microsoft Windows

4. Contractor shall execute a data licensing agreement in the form of AIA Document C106, digital Data Licensing Agreement.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.

1. Initial Review: Allow ten (10) working days for initial review of each submittal. Alllow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow ten (10) working days for review of each re-submittal.

4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow fifteen (15) working days for initial review of each submittal

2. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Form of Submittal: If approved by the Owner and the Architect, materials may be submitted electronically using procedures outlined. Architect may request paper submittals for items unable to be reviewed electronically.

Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

3. Include the following information for processing and recording action taken:
   Project name.
   Date.
   Name of Architect.
   Name of Contractor.
   Name of subcontractor.
   Name of supplier.
   Name of manufacturer.
   Submittal number or other unique identifier, including revision identifier.
   a) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
   Number and title of appropriate Specification Section.
   Drawing number and detail references, as appropriate.
   Location(s) where product is to be installed, as appropriate.
   Other necessary identification.

4. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.

   Transmittal Form for Paper Submittals: Provide locations on form for the following information:
   Project name.
   Date.
   Destination (To:).
   Source (From:).
   Name and address of Architect.
   Name of Contractor.
   Name of firm or entity that prepared submittal.
   Names of subcontractor, manufacturer, and supplier.
   Category and type of submittal.
   Submittal purpose and description.
   Specification Section number and title.
   Drawing number and detail references, as appropriate.
   Indication of full or partial submittal.
   Transmittal number, numbered consecutively.
   Submittal and transmittal distribution record.
   Remarks.
   Signature of transmitter.

5. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

6. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

7. Name file with submittal number or other unique identifier, including revision identifier.
   File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

8. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

9. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
   Project name.
   Date.
   Name and address of Architect.
   Name of Construction Manager.
   Name of Contractor.
   Name of firm or entity that prepared submittal.
   Names of subcontractor, manufacturer, and supplier.
   Category and type of submittal.
   Submittal purpose and description.
   Specification Section number and title.
   Drawing number and detail references, as appropriate.
   Location(s) where product is to be installed, as appropriate.
   Related physical samples submitted directly.
   Indication of full or partial submittal.
   Transmittal number, numbered consecutively.
   Submittal and transmittal distribution record.
   Other necessary identification.
   Remarks.

10. Metadata: Include the following information as keywords in the electronic submittal file metadata:
    Project name.
    Number and title of appropriate Specification Section.
    Manufacturer name.
    Product name.

11. Options: Identify options requiring selection by Architect.

12. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

13. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.
    a. Note date and content of previous submittal.
    b. Note date and content of revision in label or title block and clearly indicate extent of revision.
    c. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

IMPORTANT NOTE: The submittal process is not a means to change the requirements of the Contract Documents. Approval of a submittal does not constitute a change order, change directive or acceptance of a substitution. Every submittal is assumed to and required to comply fully with the Contract Documents (including prior modifications). Installed work found later not to be in compliance with Contract Documents must be

removed and replaced with work that is in compliance. If deviations are required due to field conditions, product availability, coordination limitations, etc., obtain Architect's approval through Contract Modification procedures prior to preparing and submitting submittal.

General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

A. Submit electronic submittals via email as PDF electronic files.
Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Submittals: Submit four (4) paper copies and (1) PDF electronic copies of each submittal unless otherwise indicated. Architect will return three (3) copies.

C. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section S.5 "Closeout Procedures."

D. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
1. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
2. Provide a notarized statement on original paper copy certificates and certifications where indicated.

E. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

F. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

G. Mark each copy of each submittal to show which products and options are applicable.

H. Include the following information, as applicable:
1. Manufacturer's catalog cuts.
2. Manufacturer's product specifications.
3. Standard color charts.
4. Statement of compliance with specified referenced standards.
5. Testing by recognized testing agency.
6. Application of testing agency labels and seals.
7. Notation of coordination requirements.
8. Availability and delivery time information.

I. Submit Product Data before or concurrent with Samples.

J. Submit Product Data in the following format:
1. Four (4) paper copies and (1) PDF electronic copies of Product Data unless otherwise indicated. Architect will return three (3) paper copies.

Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

K. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
1. Identification of products.
2. Schedules.
3. Compliance with specified standards.
4. Notation of coordination requirements.

5. Notation of dimensions established by field measurement.
6. Relationship and attachment to adjoining construction clearly indicated.
7. Seal and signature of professional engineer if specified.

L. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches**, but no larger than **30 by 42 inches**.

M. Submit Shop Drawings in the following format:
1. Four (4) opaque (bond) copies and (1) PDF electronic copies of each submittal. Architect will return three (3) paper copies.

Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

N. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

O. Identification: Attach label on unexposed side of Samples that includes the following:
1. Generic description of Sample.
2. Product name and name of manufacturer.
3. Sample source.
4. Number and title of applicable Specification Section.
5. Specification paragraph number and generic name of each item.

P. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

Q. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
1. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
2. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

R. Samples : Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
1. Number of Samples: Submit two (2) sets of Samples. Architect will retain one (1) Sample set; remainder will be returned.
a) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
b) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

S. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

T. Manufacturer and product name, and model number if applicable.

U. Number and name of room or space.

V. Location within room or space.

W. Submit product schedule in the following format:
   1. Four (4) paper copies and (1) PDF electronic copies of product schedule or list unless otherwise indicated. Architect, will return three (3) paper copies.

Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:

X. Name, address, and telephone number of entity performing subcontract or supplying products.

Y. Number and title of related Specification Section(s) covered by subcontract.

Z. Submit subcontract list in the following format:
   1. Four (4) paper copies and (1) PDF electronic copies.

Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

FM Global Approval: Submit to FM Global for review prior to installation, a RoofNav Contractor Package or submit the RoofNav Assembly Number along with an "Application for Acceptance of Roofing System (FM Global form X2688) with detailed installation plans and materials submittals. Provide evidence of this review process showing FM Approval with other required action submittals.

2.2 DELEGATED-DESIGN SERVICES

Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

A. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file or three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

A. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

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

Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

A. "No Exception Taken": That part of the Work covered by the submittal may proceed provided that it complies with the requirements of the contract Documents; final acceptance will depend upon compliance**.**

B. "Make Corrections Noted": That part of the Work covered by the submittal may proceed provided it complies with the notations or correction on the submittal and requirements of the Contract Documents.

C. "Revise and Resubmit": Do not proceed with that part of the Work covered by the submittal. Revise or prepare a new submittal in accordance with the notations, resubmit for re-review with delay.

D. "Rejected": Do not proceed with that part of the Work covered by the submittal. Revise or prepare a new submittal in accordance with the Contract Documents; resubmit for re-review without delay.

E. "Submit Specified Item": Do not proceed with that part of the Work covered by the submittal. This mark indicates that a non-specified item was submitted without proper approval of a substitution request, or that information on a specified item has not been submitted as required by that part of the Work covered by the submittal. Prepare a new submittal that utilizes specified item or an approved substitution.

Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

Incomplete and unstamped submittals are unacceptable, will be considered non-responsive, and will be returned for re-submittal without review.

Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION S.4

SECTION S.5 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

B. Related Sections include the following:
   1. Section S.6 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number where applicable.
   a) Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Instruct Owner's personnel in maintenance of products
3. Participate with Owner in conducting inspection and walkthrough with designated personnel.
4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
5. Complete final cleaning requirements, including touchup painting.
6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment.
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reviews: Submit a written request for final review to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final review and tests. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-review: Request re-review when the Work identified in previous inspections as incomplete is completed or corrected.
2. Extra-review: Where the Architect performs more than two reviews for Substantial Completion or for the Final Review due to failure of the Work to comply with claims of completeness or correctness made by the Contractor, all costs (including additional Architect and Owner services made necessary by such failure) shall be reimbursed by Contractor.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A or approved..

1. Include the following information at the top of each page:
   a) Project name.
   b) Date.
   c) Name of Architect and Owner
   d) Name of Contractor.
   e) Page number.

2. Submit list of incomplete items in the following format:
   a) MS Excel, PDF electronic files, or three paper copies. Architect will return annotated list.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 10 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
   a) Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b) Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c) Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d) Remove tools, construction equipment, machinery, and surplus material from Project site.
   e) Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   f) Remove debris and surface dust from limited access spaces, including roofs.
   g) Sweep concrete floors broom clean in unoccupied spaces.
   h) Remove labels that are not permanent.
   i) Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
   j) Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   2. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION S.5

SECTION S.6 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:
   1. Section 01 77 00 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of Record Drawings as follows:
      a) Submit one (1) paper-copy set and two (2) CD's containing PDF files of marked-up record prints.
      b) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

B Record Specifications: Submit one (1) paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C Record Product Data: Submit one (1) paper copy and annotated PDF electronic files and directories of each submittal.

Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one (1) and annotated PDF electronic files and directories of each submittal.

E Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
      a) Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b) Accurately record information in an acceptable drawing technique.
      c) Record data as soon as possible after obtaining it.
      d) Record and check the markup before enclosing concealed installations.

e) Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:
   a) Dimensional changes to Drawings.
   b) Revisions to details shown on Drawings.
   c) Revisions to routing of piping and conduits.
   d) Revisions to electrical circuitry.
   e) Actual equipment locations.
   f) Locations of concealed internal utilities.
   g) Changes made by Change Order or Change Directive.
   h) Changes made following Architect's written orders.
   i) Details not on the original Contract Drawings.
   j) Field records for variable and concealed conditions.
   k) Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
   1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.

   2. Format: DWG, Version , Microsoft Windows operating system.

   3. Format: Annotated PDF electronic file with comment function enabled.

   4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.

   5. Refer instances of uncertainty to Architect for resolution.

   6. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
      a) See Section 01 33 00 "Submittal Procedures" for requirements related to use of Architect's digital data files.
      b) Architect will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
   1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

   2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
   1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

   2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

4. Identification: As follows:
   a) Project name.
   b) Date.
   c) Designation "PROJECT RECORD DRAWINGS."
   d) Name of Architect.
   e) Name of Contractor.

2.2 RECORD SPECIFICATIONS

A Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.

5. Note related Change Order, record Product Data, and record Drawings where applicable.

B Format: Submit record Specifications as one (1) paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B Format: Submit record Product Data as one (1) paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as one (1) paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION S.6

PORTLAND SIGN AND MARQUEES RESTORATION

ARLENE SCHNITZER CONCERT HALL

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PORTLAND, OREGON

PORTLAND SIGN

PACKAGE 1

100% CONSTRUCTION DOCUMENTS

PROJECT TEAM

OWNER

METRO
600 NE GRAND AVENUE
PORTLAND, OR 97232–2736

ARCHITECT

ARCHITECTURAL RESOURCES GROUP, INC.
111 SW FIFTH AVENUE, 24TH FLOOR
PORTLAND, OR 97204

STRUCTURAL ENGINEER

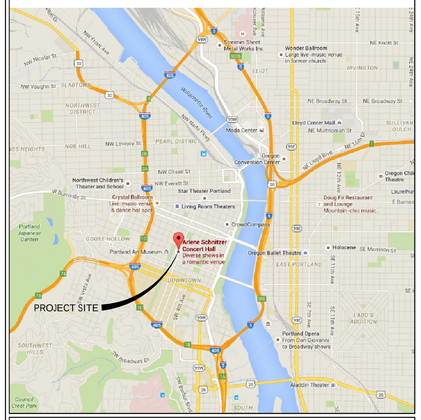
KPFF CONSULTING ENGINEERS, INC.
111 SW FIFTH AVENUE, 25TH FLOOR
PORTLAND, OR 97204

ELECTRICAL ENGINEER

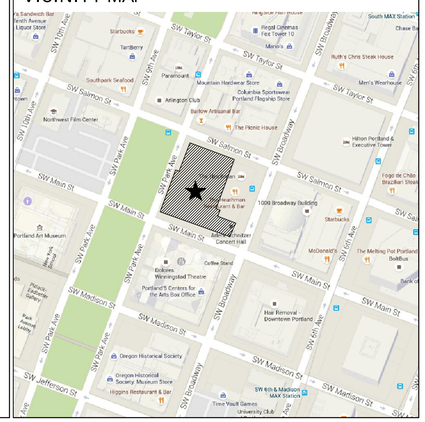
SAZAN GROUP, INC.
111 SW FIFTH AVENUE, SUITE 2120
PORTLAND, OR 97204

INDEX OF DRAWINGS

PROJECT LOCATION



VICINITY MAP



1.1.00

NO.	DESCRIPTION	DATE
	REVISIONS	

Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

"PORTLAND" SIGN COVER SHEET

ISSUANCE
100% CONSTRUCTION DOCUMENTS

DATE
04/22/2016

PROJ. NO.
15023

DRAWN
KG

CHECKED
SD

DRAWING NO.

T0.1

SHEET 1 OF 00

ARCHITECTURAL RESOURCES GROUP, Inc.
Architects, Planners, & Conservators
Pier 9, The Embarcadero . San Francisco, California
415.421.7680 fax 415.421.0237

30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.

ABBREVIATIONS

&	AND	(E)	EXISTING	MFR	MANUFACTURER		DRAWINGS
∠	ANGLE	EA	EACH	MIN	MINIMUM	SLR	SEALER
@	AT	ELEC	ELECTRICAL	MISC	MISCELLANEOUS	SMD	SEE MECHANICAL
℄	CENTERLINE	ELEV	ELEVATOR	MO	MASONRY OPENING		DRAWINGS
ø	DIAMETER/ ROUND	EQ	EQUAL			SND	SANITARY NAPKIN
#	POUND OR NUMBER	EXIST	EXISTING	N	NORTH		DISPENSER
	PERPENDICULAR	EXT	EXTERIOR	(N)	NEW	SNR	SANITARY NAPKIN
⊥				NIC	NOT IN CONTRACT		RECEPTACLE
ADJ	ADJUSTABLE/ ADJACENT	FIN	FINISH	NOM	NOMINAL	SPEC	SPECIFICATION
		FLR	FLOOR	NTS	NOT TO SCALE	SQ	SQUARE
AFF	ABOVE FINISHED FLOOR	FO	FACE OF			SSD	SEE STRUCTURAL
		FOC	FACE OF CONCRETE	OC	ON CENTER		DRAWINGS
APPROX	APPROXIMATE	FOF	FACE OF FINISH	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED	SST	STAINLESS STEEL
ARCH	ARCHITECTURAL	FOM	FACE OF MASONRY			STD	STANDARD
				OFOI	OWNER FURNISHED, OWNER INSTALLED	STL	STEEL
BD	BOARD	FOS	FACE OF STUD			STOR	STORAGE
BITUM	BITUMINOUS	FOW	FACE OF WALL	OPNG	OPENING	STRUC	STRUCTURAL
BLDG	BUILDING	FT	FOOT OR FEET	OPP	OPPOSITE		
BLK	BLOCK	FTG	FOOTING			T	TREAD
		FURR	FURRING	PL	PLATE	THK	THICK
CLR	CLEAR			PLYWD	PLYWOOD	TO	TOP OF
CMU	CONCRETE MASONRY UNIT	GA	GAUGE	PT	PAINT	TOC	TOP OF CURB
		GALV	GALVANIZED			TOP	TOP OF PAVING
COL	COLUMN	GL	GLASS	R	RISER	TOW	TOP OF WALL
CONC	CONCRETE	GYP	GYPSUM	RD	ROOF DRAIN	TYP	TYPICAL
CONT	CONTINUOUS			REF	REFERENCE	UON	UNLESS
CTR	CENTER	HGT	HEIGHT	REHAB	REHABILITATE		OTHERWISE NOTED
				REINF	REINFORCED		
DEMO	DEMOLITION	HORIZ	HORIZONTAL	REQ'D	REQUIRED	VERT	VERTICAL
DEPT	DEPARTMENT			RM	ROOM	VIF	VERIFY IN FIELD
DIA	DIAMETER	INSUL	INSULATION	RO	ROUGH OPENING		
DIM	DIMENSION	INT	INTERIOR			W	WEST
DN	DOWN			S	SOUTH	W/	WITH
DTL	DETAIL	MAX	MAXIMUM	SECT	SECTION	WD	WOOD
		MECH	MECHANICAL	SIM	SIMILAR	W/O	WITHOUT
E	EAST	MTL	METAL	SLD	SEE LANDSCAPE	WT	WEIGHT

SYMBOL LEGEND

DOOR SYMBOL
20 — DOOR NUMBER

WINDOW SYMBOL
20 — WINDOW NUMBER

ALIGN SURFACES

ROOM TITLE SYMBOL
ENTRY 112 — ROOM NAME; ROOM NUMBER

WALL TYPE SYMBOL
D — WALL TYPE

SHEET NOTE SYMBOL
20 — SHEET NOTE NUMBER

INTERIOR ELEVATION OR PHOTO DETAIL SYMBOL
1 / A3.1 — ELEVATION OR PHOTO DETAIL NUMBER; SHEET WHERE ELEVATION OR PHOTO DETAIL OCCURS

DETAIL SYMBOL
2 / A8.1 — DETAIL NUMBER; SHEET WHERE DETAIL OCCURS

SECTION SYMBOL
A / A4.1 — SECTION NUMBER; SHEET WHERE SECTION OCCURS

NEW CONSTRUCTION
EXISTING CONSTRUCTION TO BE REMOVED
EXISTING CONSTRUCTION TO REMAIN

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY THAT (E) CONDITIONS ARE AS INDICATED ON THE DRAWINGS. NOTIFY THE ARCHITECT IMMEDIATELY OF VARIATIONS OR DISCREPENCIES. DO NOT PROCEED WITH AFFECTED WORK UNTIL THE VARIATIONS OR DISCREPENCIES ARE RESOLVED BY THE ARCHITECT.
2. ALL CONSTRUCTION AND INSTALLATION WORK SHOWN ON DRAWINGS SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES. USE METHODS AS REQUIRED TO COMPLETE WORK WITHIN LIMITATIONS OF ALL PREVAILING LAWS AND CODES.
3. DO NOT SCALE DRAWINGS: USE DIMENSIONS SHOWN. ALL DIMENSIONS SHALL BE VERIFIED IN THE FIELD. DIMENSIONS SHOWN AT (E) CONDITIONS ARE TO FACE OF (E) FINISH. U.O.N. DIMENSIONS AT NEW WORK ARE TO FACE OF FRAMING, U.O.N. DIMENSIONS OF (E) CONDITIONS ARE FOR REFERENCE ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD. WHERE NO DIMENSION IS PROVIDED CONSULT WITH THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH AFFECTED WORK.
4. SAFETY MEASURES: AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONDITIONS AT THE JOB SITE, INCLUDING SAFETY OF PEOPLE AND PROPERTY. ARCHITECT SITE VISITS ARE NOT INTENDED TO REVIEW THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.
5. INSTALL MANUFACTURED MATERIALS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS, UNLESS OTHERWISE INSTRUCTED.
6. ALL WASTE AND REFUSE CAUSED IN CONNECTION WITH THE WORK SHALL BE REMOVED FROM THE PREMISES AND DISPOSED OF BY THE CONTRACTOR. THE PREMISES SHALL BE LEFT CLEAR AND CLEAN TO THE SATISFACTION OF THE ARCHITECT.
7. APPLICATION OF FINISH: SURFACES PREVIOUSLY PREPARED OR INSTALLED BY ANOTHER TRADE SHALL BE INSPECTED CAREFULLY BY THE CONTRACTOR BEFORE APPLYING SUBSEQUENT MATERIALS OR FINISHES. IF SURFACES ARE NOT ACCEPTABLE, THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY IN ORDER THAT CORRECTIONS MAY BE MADE. APPLICATIONS OF FINISHES WILL BE CONSTRUED AS ACCEPTANCE OF RESPONSIBILITY BY THE SUBCONTRACTOR FOR THE BASE UPON WHICH IT IS APPLIED.
8. INSTALL ALL WORK PLUMB, LEVEL AND STRAIGHT, OR AS REQUIRED TO ALIGN WITH (E) ADJACENT SURFACES.
9. CONTRACTOR SHALL DESIGN AND INSTALL SHORING AS REQUIRED TO PERFORM WORK. RESPONSIBILITY FOR ENGINEERING, CONSTRUCTION, AND SAFETY OF THE SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE COMPLEMENTARY. CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE DRAWINGS, SPECIFICATIONS, NOTES AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND RESOLVED BEFORE PROCEEDING WITH WORK.
11. DETAILS SHOWN SHALL BE INCORPORATED INTO THE PROJECT AT ALL APPROPRIATE LOCATIONS WHETHER SPECIFICALLY CALLED OUT OR NOT.
12. THE CONTRACTOR MUST SUBMIT IN WRITING ANY REQUESTS FOR MODIFICATIONS TO THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SUBMITTED TO THE ARCHITECT FOR REVIEW DO NOT CONSTITUTE "IN WRITING" UNLESS IT IS CLEARLY NOTED ON THE SUBMITTAL THAT SPECIFIC CHANGES ARE BEING REQUESTED WITH THE PHRASE "REQUESTED CHANGE".
13. FINAL AS-BUILT RECORD DOCUMENTS SHOWING ALL REVISIONS INCORPORATED DURING CONSTRUCTION SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO PROJECT CLOSE-OUT.
14. THROUGHOUT THE CONSTRUCTION DOCUMENTS, ITEMS THAT ARE EXISTING ARE INDICATED AS "EXISTING" OR "(E)", ITEMS WITHOUT THIS INDICATION ARE NEW CONSTRUCTION. WHERE REQUIRED FOR PURPOSES OF CLARITY, SOME ITEMS MAY BE INDICATED AS "NEW OR "(N)".

HAZARDOUS MATERIALS

ARCHITECTURAL RESOURCES GROUP ASSUMES NO RESPONSIBILITY FOR THE MANAGEMENT OF HAZARDOUS MATERIALS THAT MAY BE ON THIS SITE.

A. NO KNOWN HAZARDOUS MATERIALS ARE LOCATED ON THIS SITE.

B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT PERSONNEL WITHIN THE WORK AREA ARE PROTECTED FROM EXPOSURE TO ANY HAZARDOUS MATERIALS ENCOUNTERED. IF MATERIALS ARE DISCOVERED THAT MAY BE HAZARDOUS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND CEASE WORK UNTIL CONDITIONS CAN BE MAINTAINED IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS.

PROJECT DATA

DESCRIPTION:: REPAIR AND RESTORATION OF THE EXISTING "PORTLAND" SIGN AT THE ARLENE SCHNITZER CONCERT HALL. SCOPE INCLUDES REPAIR AND STRENGTHENING TO (E) STRUCTURAL SUPPORTS, RE-CLADDING OF THE BLADE SIGNS TO MATCH THE CURRENT EXISTING HISTORIC DESIGN, AND NEW ELECTRICAL COMPONENTS AT THE BLADE SIGNS. ALTERNATE 1: REPLACEMENT OF UPPER STEEL SUPPORT BEAM AND ASSOCIATED FLASHING

LOT / LOCATION: 1037 SW BROADWAY STREET
PORTLAND, OREGON
MULTNOMAH COUNTY

PROPERTY ID: R246425

BUILT: 1928 (ORIGINAL), 1984 (BLADE SIGN REPLACEMENT)

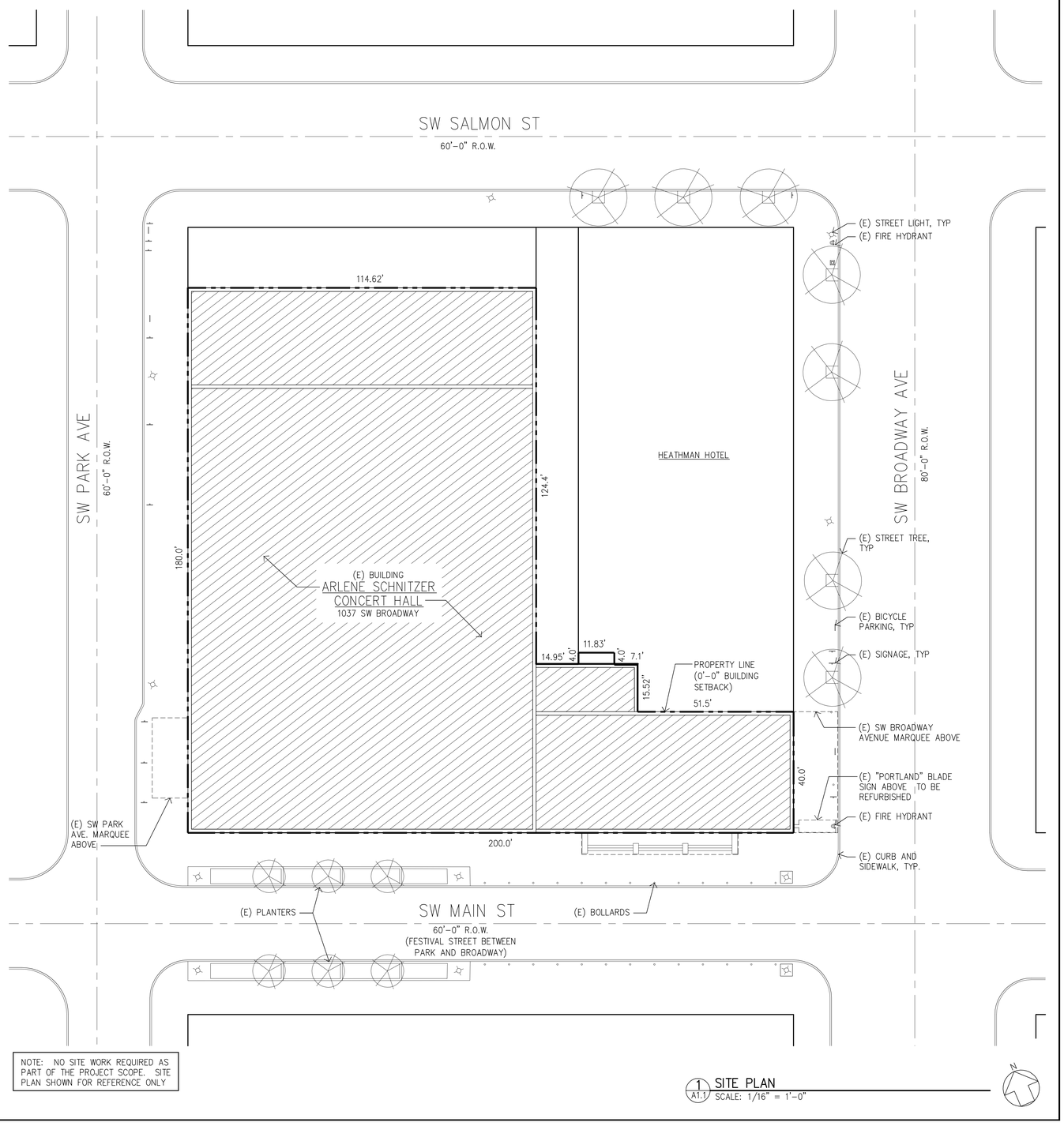
ZONING: CXd
"PORTLAND" SIGN IS NONCONFORMING

APPLICABLE BUILDING CODES

2014 OREGON STRUCTURAL SPECIALTY CODE
2014 OREGON MECHANICAL SPECIALTY CODE
2014 OREGON ELECTRICAL SPECIALTY CODE

APPLICABLE ZONING

TITLE 32 – SIGNS AND RELATED REGULATIONS



NOTE: NO SITE WORK REQUIRED AS PART OF THE PROJECT SCOPE. SITE PLAN SHOWN FOR REFERENCE ONLY

1 / A1.1 SITE PLAN
SCALE: 1/16" = 1'-0"

ARCHITECTURAL RESOURCES GROUP, Inc.
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Pier 9, The Embarcadero . San Francisco, California
415.421.7680 fax 415.421.0127

REGISTERED ARCHITECT
NAOMI G. MIYASHIRO
SAN FRANCISCO, CA
6247
STATE OF OREGON

1.1.00

NO.	DESCRIPTION	DATE
REVISIONS		

Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

"PORTLAND" SIGN GENERAL NOTES, ABBREVIATIONS, & SITE PLAN

ISSUANCE
100% CONSTRUCTION DOCUMENTS

DATE
04/22/2016

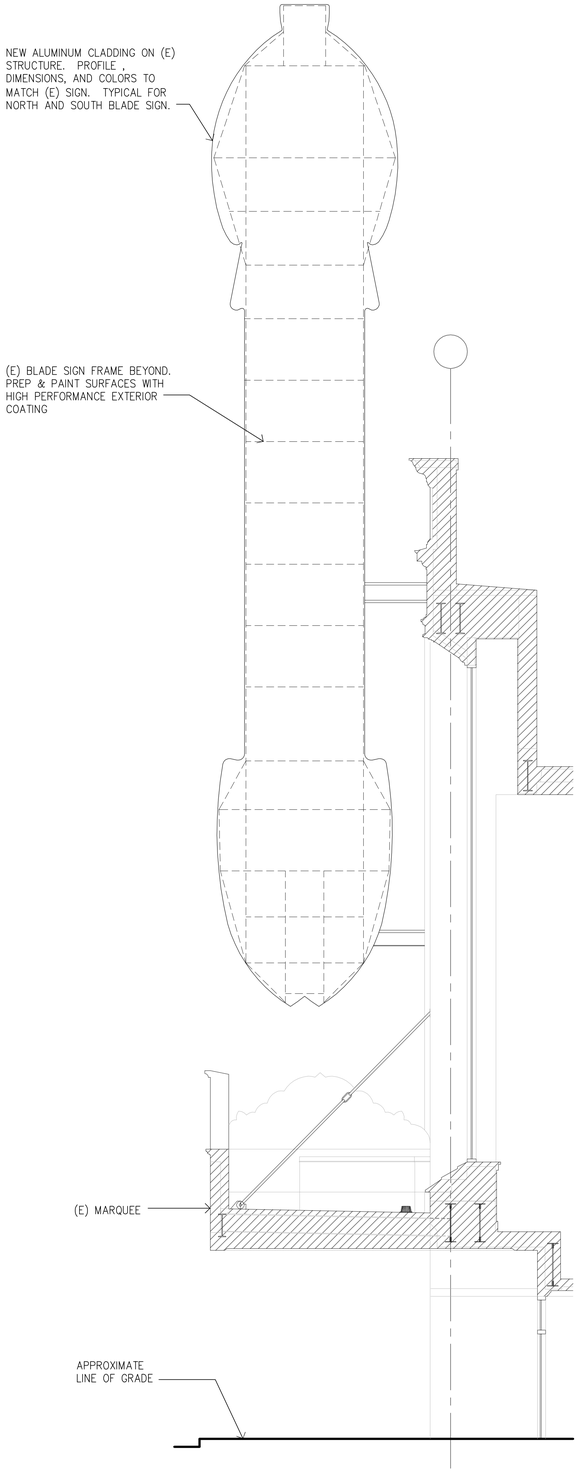
PROJ. NO. 15023
DRAWN KG
CHECKED SD

DRAWING NO.

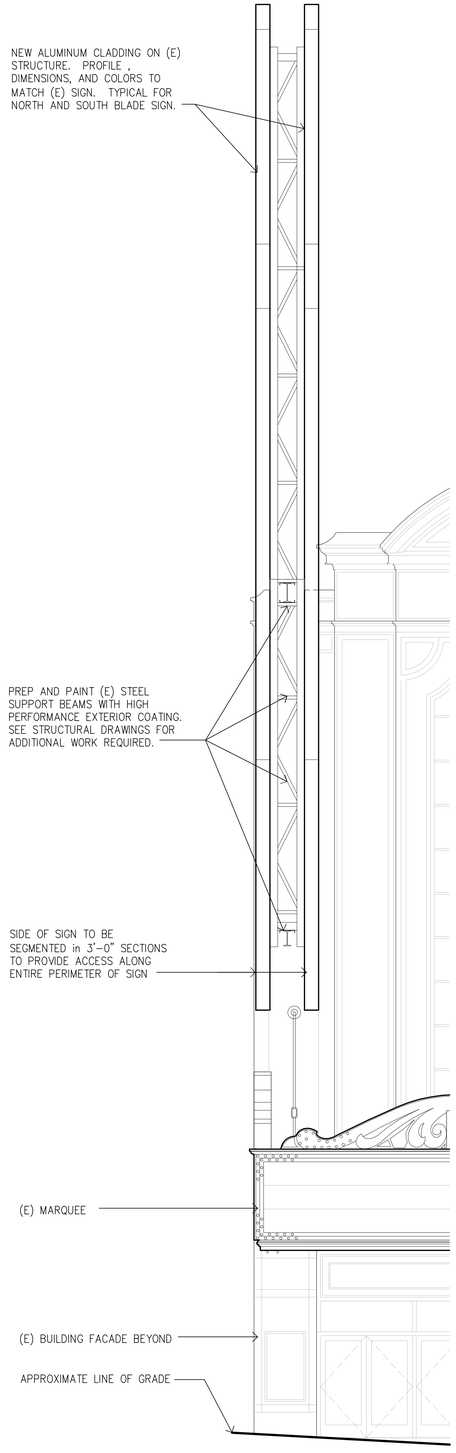
A0.1

SHEET 2 OF 3 00

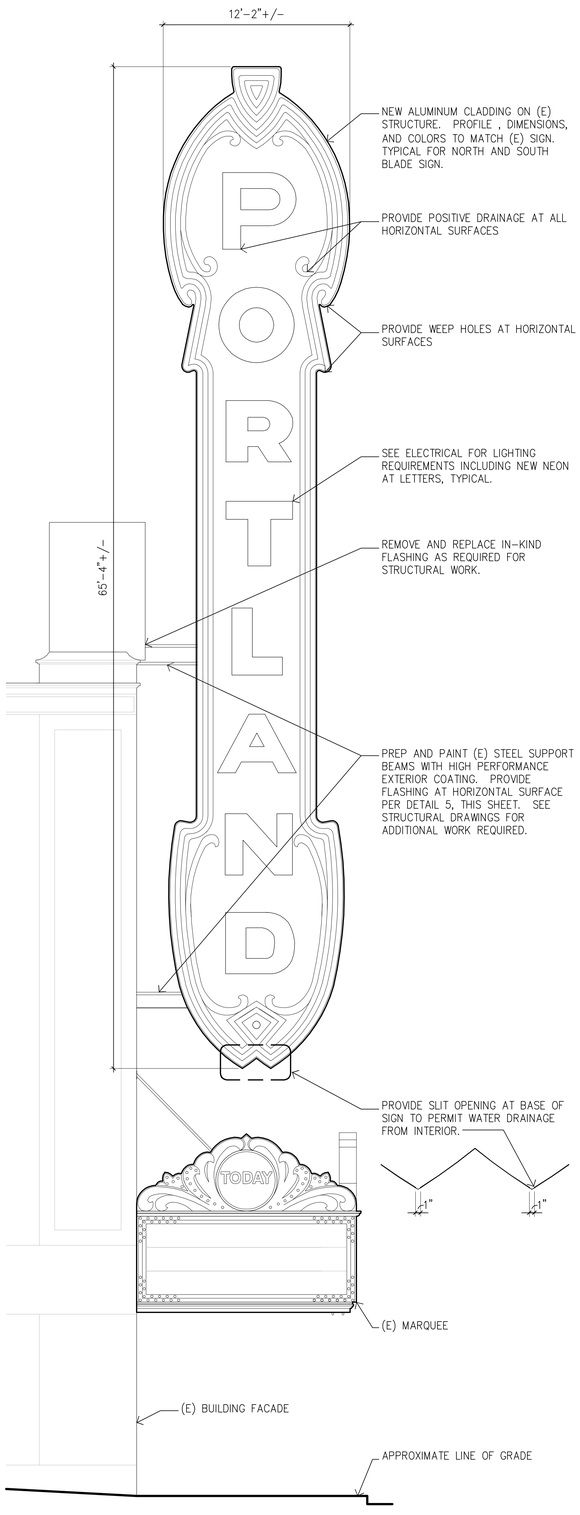
30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.



4 A1.1 SIGN SECTION
SCALE: 1/4" = 1'-0"



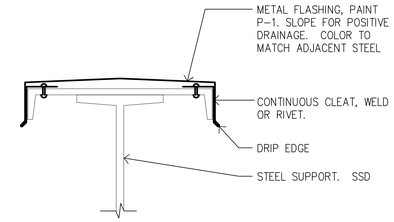
3 A1.1 SIGN ELEVATION – EAST
SCALE: 1/8" = 1'-0"



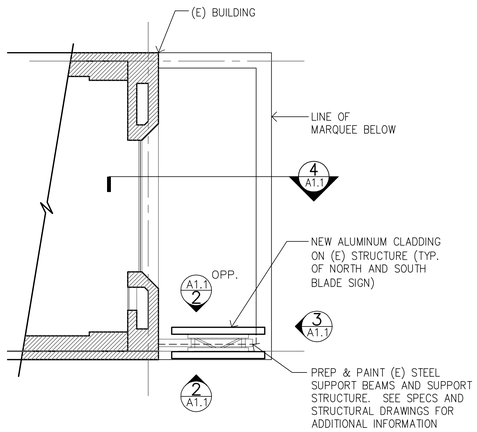
2 A1.1 SIGN ELEVATION – SOUTH
SCALE: 1/8" = 1'-0"
NORTH ELEVATION IS THE SAME UNLESS NOTED OTHERWISE

GENERAL NOTES:

1. BASIC SEQUENCING FOR CONSTRUCTION:
   1.1. EXISTING NORTH AND SOUTH BLADE SIGNS TO BE REMOVED TO PROVIDE ACCESS TO EXISTING SUPPORT BEAMS THAT REQUIRE REPAIR WORK PER STRUCTURAL DRAWINGS.
   1.2. CHASE LIGHTS ON (E) BLADE SIGNS TO BE SALVAGED, STORED, AND PROTECTED FOR INSTALLATION ON NEW BLADE SIGNS AT THIS TIME.
   1.3. ONE OF THE BLADE SIGNS TO BE SENT TO SIGN FABRICATION SHOP TO PROVIDE TEMPLATE FOR NEW BLADE SIGNS AND FOR WORK REQUIRED TO (E) BLADE SIGN FRAME INCLUDING PREP AND COATING OF SURFACES WITH A HIGH PERFORMANCE EXTERIOR PAINT.
   1.4. WORK TO (2) EXISTING SUPPORT BEAMS TO BE COMPLETED PER STRUCTURAL DRAWINGS. SUPPORT BEAMS AND SIGN SUPPORT FRAMES TO BE PREPPED AND PAINTED WITH A HIGH PERFORMANCE COATING ON ALL SURFACES.
   1.5. REPLACE (E) ELECTRICAL JUNCTION BOX WITH NEW.
   1.6. REMAINING (E) BLADE SIGN TO BE REINSTALLED. CLIENT TO CONFIRM WHICH SIDE OF SIGN TO BE INSTALLED. (NOTE: MAIN STREET JUST SOUTH OF THE PROJECT MAY BE CLOSED TO PROVIDE ON-SITE STAGING FOR THE SIGNAGE WORK).
   1.7. AFTER FABRICATION OF NEW ALUMINUM BLADE SIGN CLADDING AND RESTORATION TO (E) FRAMING IS COMPLETE, THE SIGN SHALL BE RE-INSTALLED.
   1.8. THE (E) BLADE SIGN WILL THEN BE REMOVED AT THIS TIME TO HAVE RESTORATION WORK COMPLETED ON THE FRAME AND TO BE RE-CLAD IN THE NEW ALUMINUM CLADDING.
   1.9. RE-CLAD ALUMINUM BLADE SIGN TO BE RE-INSTALLED.
2. SEE SHEET A1.2 ALT FOR ADDITIONAL FLASHING DETAILS FOR ALTERNATE SCOPE OF REPLACING UPPER SUPPORT BEAM OF THE "PORTLAND" SIGN.



5 A1.1 SIGN SUPPORT FLASHING
SCALE: 3" = 1'-0"



1 A1.1 SIGN FLOOR PLAN
SCALE: 1/8" = 1'-0"

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REVISIONS		

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1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

PORTLAND SIGN PLAN, ELEVATIONS, & SECTION

ISSUANCE
100% CONSTRUCTION DOCUMENTS

DATE
04/22/2016

PROJ. NO.	
15023	
DRAWN	
KG	
CHECKED	
SD	

DRAWING NO.

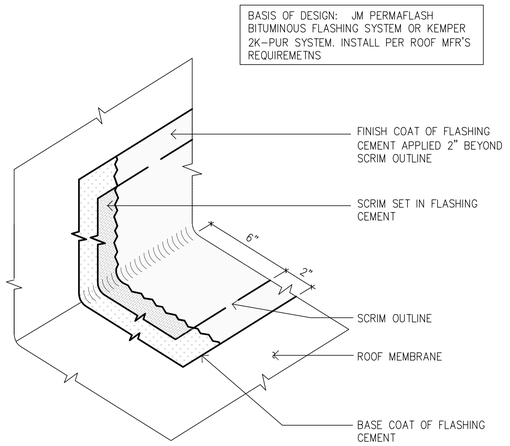
A1.1

SHEET 1 OF 00

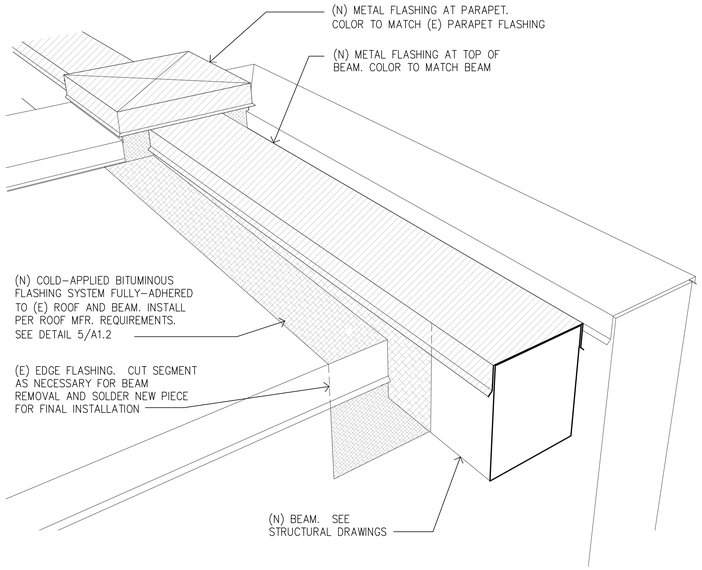
30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.

GENERAL NOTES:

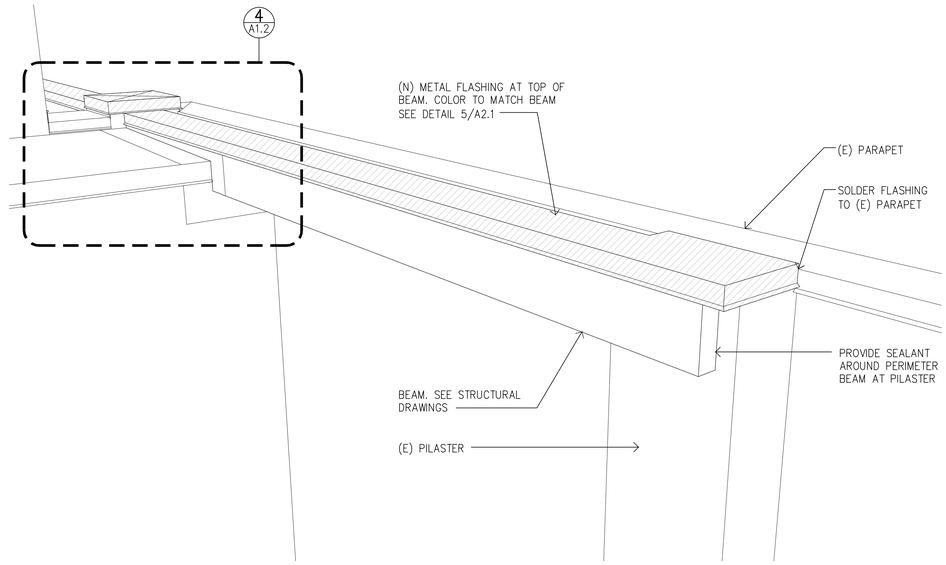
1. ALTERNATE SCOPE IS IN ADDITION TO BASE BID ITEMS.



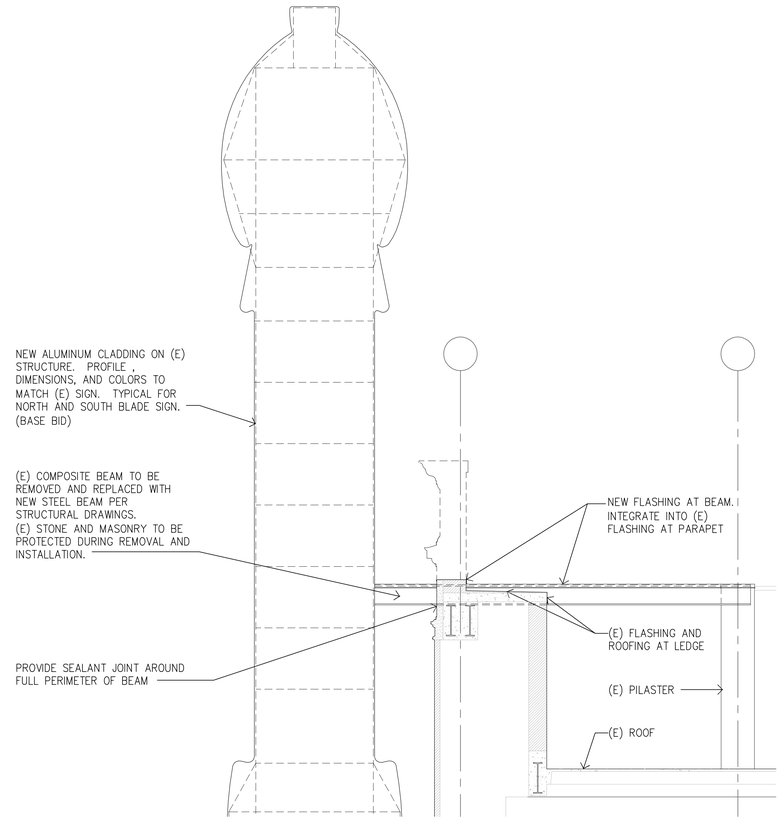
5 A1.2 FLASHING MEMBRANE – TYP. ASSEMBLY
SCALE: 3" = 1'–0"



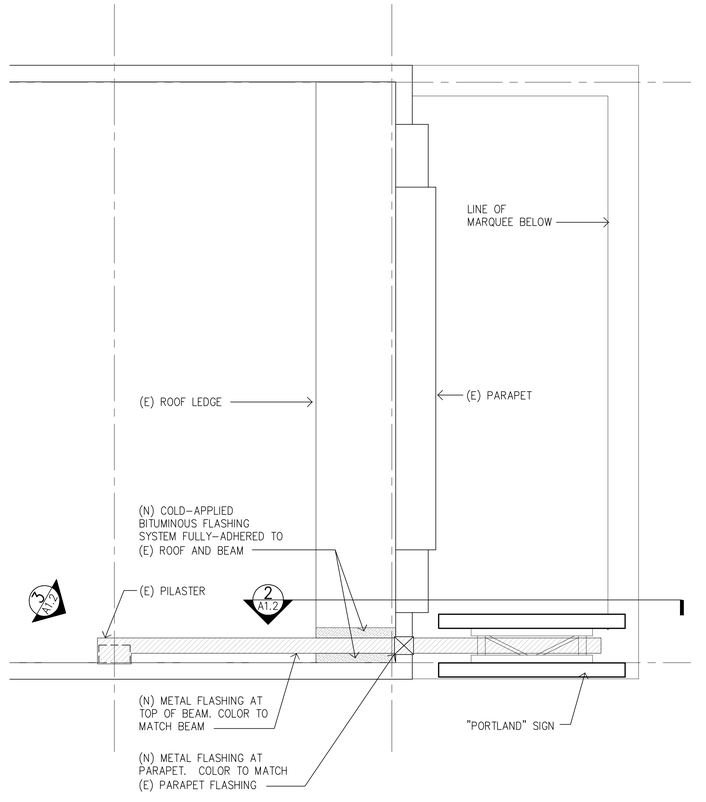
4 A1.2 ALTERNATE 1 – PERSPECTIVE DETAIL
SCALE: NTS



3 A1.2 ALTERNATE 1 – PERSPECTIVE
SCALE: NTS



2 A1.2 ALTERNATE 1 – SIGN SECTION
SCALE: 1/4" = 1'–0"



1 A1.2 ALTERNATE 1 – ROOF PLAN
SCALE: 1/4" = 1'–0"

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REGISTERED ARCHITECT
NAOMI O. HIROSHI
Naomi Miyake
SAN FRANCISCO, CA
6247
STATE OF OREGON

1.1.00

NO.	DESCRIPTION	DATE
REVISIONS		

Portland Sign and Marquees Restoration

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1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

PORTLAND SIGN ALTERNATE 1 DETAILS

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DATE	04/22/2016
PROJ. NO.	15023
DRAWN	KG
CHECKED	SD

DRAWING NO.

A1.2 ALT

SHEET 1 OF 00

GENERAL STRUCTURAL NOTES

STRUCTURAL DRAWINGS ARE A PORTION OF THE CONTRACT DOCUMENTS AND ARE INTENDED TO BE USED WITH ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE REQUIREMENTS FROM THESE DRAWINGS INTO THEIR SHOP DRAWINGS AND WORK.

THESE GENERAL NOTES SUPPLEMENT THE PROJECT SPECIFICATIONS. REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. NOTES AND DETAILS ON THE STRUCTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER THE GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK.

CODE REQUIREMENTS:

CONFORM TO THE 2014 OREGON STRUCTURAL SPECIALTY CODE (OSSC), BASED ON THE 2012 INTERNATIONAL BUILDING CODE (IBC).

TEMPORARY CONDITIONS:

THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.

CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.

EXISTING CONDITIONS:

ALL EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS SHALL BE FIELD VERIFIED. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY SIGNIFICANT DISCREPANCIES FROM CONDITIONS SHOWN ON THE DRAWINGS.

DESIGN CRITERIA:

DESIGN WAS BASED ON THE STRENGTH AND DEFLECTION CRITERIA OF THE OSSC. IN ADDITION TO THE DEAD LOADS, THE FOLLOWING LOADS AND ALLOWABLES WERE USED FOR DESIGN, WITH LIVE LOADS (L.L.) REDUCED PER OSSC:

DESIGN CRITERIA		
GRAVITY SYSTEM CRITERIA		
ROOF LIVE/SNOW LOAD	**25 PSF L.L. (ALSO SEE SNOW LOAD CRITERIA BELOW)**	
SNOW CRITERIA		
DESIGN ROOF SNOW LOAD	25 PSF MINIMUM IN ACCORDANCE WITH OSSC	
SNOW DRIFT	PER OSSC AS SHOWN ON PLANS	
GROUND SNOW LOAD	Pg= 10 PSF IN ACCORDANCE WITH 2007 SNOW LOAD ANALYSIS FOR OREGON	
FLAT ROOF SNOW LOAD	Pf = 11 PSF	
SNOW EXPOSURE FACTOR	Ce = 1.0	
SNOW LOAD IMPORTANCE FACTOR	Is = 1.0	
THERMAL FACTOR	Ct = 1.2	
WIND CRITERIA		
RISK CATEGORY	II	
OTHER STRUCTURES AND BUILDING APPURTENANCES	Vult = 120 MPH ULTIMATE DESIGN WIND SPEED (3-SECOND GUST)	
COMPONENTS AND CLADDINGS	Vult = 120 MPH ULTIMATE DESIGN WIND SPEED (3-SECOND GUST)	
EXPOSURE CATEGORY	B	
GUST EFFECT FACTOR	G = 0.85	
GUST/INTERNAL PRESSURE	GCpi = +/- 0.18	
	X DIRECTION (E / W)	Y DIRECTION (N / S)
F	8.2 KIPS	17.1 KIPS
SEISMIC CRITERIA		
RISK CATEGORY	II	
SEISMIC DESIGN CATEGORY	D	
SITE CLASS	D	
IMPORTANCE FACTOR	IE = 1.0	
MCE SPECTRAL ACCELERATION	Ss = 0.99	S1 = 0.42
SITE COEFFICIENT	Fa = 1.11	Fv = 1.58
DESIGN SPECTRAL ACCELERATION	SDS = 0.727	SD1 = 0.446
ANALYSIS PROCEDURE	COMPONENT LATERAL FORCE PER ASCE 7-10, SECTION 13.3	
	X DIRECTION (E / W)	Y DIRECTION (N / S)
COMPONENT RESPONSE MODIFICATION FACTOR	Rp = 3.0	Rp = 3.0
COMPONENT AMPLIFICATION FACTOR	ap = 2.5	ap = 2.5
Fp	15.7 KIPS	15.7 KIPS

SEISMIC LOAD RESISTING SYSTEM:

THE SEISMIC FORCE RESISTING SYSTEM (SFRS) FOR THE COMPLETED STRUCTURE IS AS FOLLOWS:

SIGN: CANTILEVER BEAMS OFF BUILDING STRUCTURE.

DESIGN AND DETAILING WAS BASED ON CRITERIA FOR SEISMIC DESIGN CATEGORY D

STRUCTURAL OBSERVATION:

THE STRUCTURAL ENGINEER OF RECORD (SER) WILL PERFORM STRUCTURAL OBSERVATION BASED ON THE REQUIREMENTS OF THE OSSC AT THE STAGES OF CONSTRUCTION LISTED BELOW. CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE AND ACCESS FOR THE SER TO PERFORM THESE OBSERVATIONS.

STRUCTURAL OBSERVATIONS

ITEM	OBSERVED BY (2)		COMMENTS
	AOR	SER	
PRIOR TO FIRST CONCRETE POUR		X	REF. NOTES 1,3,4
PRIOR TO SIGN ERECTION		X	REF. NOTES 1,3,4
AS REQUIRED TO ADDRESS STRUCTURAL ISSUES		X	REF. NOTES 1,3,4

FOOTNOTES:

1. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE SER IN ADVANCE.
2. SER - STRUCTURAL ENGINEER OF RECORD.
   AOR - ARCHITECT OF RECORD.
3. A FIELD REPORT WILL BE SUBMITTED TO THE BUILDING DEPARTMENT FOLLOWING EACH SITE VISIT.
4. STRUCTURAL OBSERVATION IS FOR THE GENERAL CONFORMANCE OF THE STRUCTURAL DRAWING, SPECIAL INSPECTION IS STILL REQUIRED.

SPECIAL INSPECTION AND TESTING:

SPECIAL INSPECTION WILL BE PROVIDED BY THE OWNER BASED ON THE REQUIREMENTS OF THE OSSC AS SUMMARIZED IN THE SPECIAL INSPECTION AND TESTING PROGRAM ON SHEET S0.2. CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE AND ACCESS FOR THE SPECIAL INSPECTOR TO PERFORM THESE INSPECTIONS.

SUBMITTALS:

SHOP DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION AND CONSTRUCTION OF ALL STRUCTURAL ITEMS, INCLUDING THE FOLLOWING:

SUBMITTALS

ITEM	SUBMITTAL (1,4)	DEFERRED SUBMITTAL (2,4)	COMMENTS
STRUCTURAL STEEL	X		
STEEL WELDING PROCEDURES	X		TEST EXISTING STEEL TO COMPLETE WPS, WHERE OCCURS
STEEL DECKING	X		
STEEL FASTENERS	X		
EXTERIOR LIGHT GAUGE METAL FRAMING	X	X	
SIGN FACING, MARQUEE FACING	X	X	
MEP EQUIPMENT ANCHORAGE AND BRACING	X	X	REF. NOTES
SIGN TEMPORARY SHORING	X	X	ONLY IF SIGN NOT REMOVED TO COMPLETE WORK

FOOTNOTES:

1. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION AND CONSTRUCTION OF STRUCTURAL ITEMS. IF THE SHOP DRAWINGS DIFFER FROM OR ADD TO THE DESIGN OF THE STRUCTURAL DRAWINGS, THEY SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF OREGON. ANY CHANGES TO THE STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT AND ARE SUBJECT TO REVIEW AND ACCEPTANCE OF THE STRUCTURAL ENGINEER.
2. DESIGN DRAWINGS, SHOP DRAWINGS, AND CALCULATIONS FOR THE DESIGN AND FABRICATION OF ITEMS THAT ARE DESIGNED BY OTHERS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF OREGON, AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION. CALCULATIONS SHALL BE INCLUDED FOR ALL CONNECTIONS TO THE STRUCTURE, CONSIDERING LOCALIZED EFFECTS ON STRUCTURAL ELEMENTS INDUCED BY THE CONNECTION LOADS. DESIGN SHALL BE BASED ON THE REQUIREMENTS OF THE OSSC AND AS NOTED UNDER "DESIGN CRITERIA".
3. THE CONTRACTOR SHALL COORDINATE SEISMIC RESTRAINTS OF MECHANICAL, PLUMBING, AND ELECTRICAL EQUIPMENT, MACHINERY, AND ASSOCIATED PIPING WITH THE STRUCTURE. CONNECTIONS TO STRUCTURE SHALL CONFORM TO ASCE 7-10 CHAPTER 13, BE DESIGNED BY AN ENGINEER REGISTERED IN THE STATE OF OREGON, AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION.
4. FIELD ENGINEERED DETAILS DEVELOPED BY THE CONTRACTOR THAT DIFFER FROM OR ADD TO THE STRUCTURAL DRAWINGS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF OREGON AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO CONSTRUCTION.

STRUCTURAL STEEL:

STRUCTURAL STEEL SHALL BE:

STRUCTURAL STEEL	
MATERIAL GRADE	**SHAPE**
ASTM A992, GRADE 50	WIDE FLANGE SHAPES
ASTM A572, GRADE 50	PLATES WHERE NOTED
ASTM A36	CHANNELS, PLATES AND ANGLES, EXCEPT AS NOTED
ASTM A500, GRADE B (FY=46KSI)	HOLLOW STRUCTURAL SECTIONS (TUBES)
ASTM A53, GRADE B (FY=35 KSI)	PIPES

DESIGN, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" WITH "COMMENTARY" AND THE "CODE OF STANDARD PRACTICE", WITH EXCEPTIONS NOTED IN SPECIFICATIONS. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR MEMBERS PART OF THE SEISMIC FORCE RESISTING SYSTEM (SFRS).

BOLTS SHALL CONFORM TO THE ASTM AND RCSC SPECIFICATIONS FOR JOINTS USING A325 OR A490 HIGH STRENGTH BOLTS. BOLTS SHALL BE SNUG-TIGHT UNLESS NOTED OTHERWISE.

WELDING SHALL CONFORM TO THE AWS CODES FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION. WELDING SHALL BE PERFORMED IN ACCORDANCE WITH A WELDED PROCEDURE SPECIFICATION (WPS) AS REQUIRED IN AWS D1.1 AND APPROVED BY THE STRUCTURAL ENGINEER. THE WPS VARIABLES SHALL BE WITHIN THE PARAMETERS ESTABLISHED BY THE FILLER-METAL MANUFACTURER. FOR MEMBERS INCLUDED IN THE SEISMIC FORCE RESISTING SYSTEM (SFRS), REQUIREMENTS OF AWS D1.8 (SEISMIC SUPPLEMENT) SHALL APPLY

ALL WELDS USED IN MEMBERS AND CONNECTIONS THAT ARE PART OF THE SEISMIC FORCE RESISTING SYSTEM (SFRS) SHALL BE MADE WITH A FILLER METAL THAT HAS A MINIMUM CHARPY V-NOTCH (CVN) TOUGHNESS OF 20 FT-LBS AT 0 DEGREES F, AS DETERMINED BY AWS CLASSIFICATION OR MANUFACTURER CERTIFICATION. ALL COMPLETE JOINT PENETRATION WELDS DESIGNATED AS DEMAND CRITICAL SHALL BE MADE WITH FILLER METAL THAT HAS A MINIMUM CVN TOUGHNESS OF 20 FT-LBS AT MINUS 20 DEGREES F, AND 40 FT-LBS AT 70 DEGREES F. FOR COMPLETE JOINT PENETRATION WELDS ASSOCIATED WITH MEMBER SPLICES AND CONNECTIONS NOT PART OF THE SFRS, WELDS SHALL BE MADE WITH FILLER METAL THAT HAS A MINIMUM CVN TOUGHNESS OF 20 FT-LBS AT 40 DEGREES F.

FOR MEMBERS AND CONNECTIONS THAT ARE PART OF THE SEISMIC FORCE RESISTING SYSTEM, DISCONTINUITIES CREATED BY ERRORS OR BY FABRICATION OR ERECTION OPERATIONS, SUCH AS TACK WELDS, ERECTION AIDS, AIR-ARC GOUGING, AND FLAME CUTTING, SHALL BE REPAIRED AS REQUIRED BY THE STRUCTURAL ENGINEER.

WELDS SHALL BE MADE USING E70XX ELECTRODES AND SHALL BE 3/16" MINIMUM, UNLESS OTHERWISE NOTED. WELDING SHALL BE BY AWS CERTIFIED WELDERS MEETING CITY OF PORTLAND STANDARDS.

PROVIDE WEEP HOLES AT EXTERIOR CLOSED SECTIONS WHERE MOISTURE MAY ACCUMULATE.

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PACKAGE #1
PORTLAND SIGN

SHEET TITLE

GENERAL STRUCTURAL NOTES

ISSUANCE
100% Construction Document Set

DATE
4/22/2016

PROJ. NO. 15023
DRAWN LKN
CHECKED NK

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON JULY 10, 2002 NATHAN A. INGRAHAM
EXPIRES 06-30-17

DRAWING NO.
S0.1
00

STATEMENT OF SPECIAL INSPECTIONS

TABLE 1 - REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY (NOTE 5)		
			CONTINUOUS	PERIODIC	
STEEL					
MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD FORMED STEEL DECK	1704.3 2203.1	ASTM A6 AISC 360 A3.1 AISC 360 M5, 5		X	CERTIFIED MILL TEST REPORTS
MATERIAL VERIFICATION OF HIGH STRENGTH BOLTS, NUTS, AND WASHERS	1704.3.3	AISC 360 A3.3		X	MANUFACTURER'S CERTIFIED TEST REPORTS
MATERIAL VERIFICATION OF ANCHOR BOLTS AND THREADED RODS	1704.3	AISC 360 A3.4		X	MANUFACTURER'S CERTIFIED TEST REPORTS
MATERIAL VERIFICATION OF WELD FILLER METALS	1704.3.1	AISC 360 A3.5		X	MANUFACTURER'S CERTIFIED TEST REPORTS
VERIFYING USE OF PROPER WPS'S				X	COPY OF WELDING PROCEDURE SPECIFICATIONS
VERIFYING WELDER QUALIFICATIONS				X	COPY OF QUALIFICATION CARDS
COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS	1704.3.1 1704.4	AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
MULTIPASS FILLET WELDS			X		
SINGLE PASS FILLET WELDS GREATER THAN 5/16"			X		
PLUG AND SLOT WELDS			X		
SINGLE PASS FILLET WELDS LESS THAN OR EQUAL TO 5/16"				X	
INSTALLATION OF COMPOSITE SLAB DECKING	1704.3 1704.15	ICC EVALUATION REPORT ASCE 9 CHAPTER 3		X	SPECIAL INSPECTIONS APPLY TO DECKING TYPE, DEPTH, GAUGE, AND FASTENING
INSTALLATION OF ROOF DECKING	1704.3 1704.15	ICC EVALUATION REPORT		X	SPECIAL INSPECTIONS APPLY TO DECKING TYPE, DEPTH AND GAGE, POWER ACTUATED FASTENERS, SCREWS, PROPRIETARY SIDE SEAM ATTACHMENTS, AND BUTTON PUNCHES AND SHEAR CONNECTORS
FLOOR AND ROOF DECK WELDS	1704.3	AWS D1.3 SECTION 7		X	ALL WELDS INSPECTED PER AWS D1.3 7.1
SNUG-TIGHT HIGH STRENGTH BOLT INSTALLATION	1704.3	RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS SECTION 9 AISC 360 M2.5		X	ALL CONNECTIONS VISUALLY INSPECTED

TESTING

TABLE 2 - REQUIRED TESTING for SPECIAL INSPECTIONS					
SYSTEM OR MATERIAL	TESTING				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
STEEL					
MAGNETIC PARTICLE (MT) AND ULTRASONIC (UT) TESTING OF WELDS		MT - AWS D1.1 6.14.4 UT - AWS D1.1 6.13 & 6.14.3	PER DRAWINGS		ALL C.J.P. WELDS REQUIRE UT TESTING

STATEMENT OF SPECIAL INSPECTION NOTES:

1. SPECIAL INSPECTIONS SHALL CONFORM TO SECTION 1704 OF THE 2014 OSSC. REFER TO TABLE 1 FOR SPECIAL INSPECTION AND TABLE 2 FOR TESTING REQUIREMENTS.

2. SPECIAL INSPECTIONS AND ASSOCIATED TESTING SHALL BE PERFORMED BY AN APPROVED ACCREDITED INDEPENDENT AGENCY MEETING THE REQUIREMENTS OF ASTM E329 (MATERIALS), ASTM D3740 (SOILS), ASTM C1077 (CONCRETE), ASTM A880 (STEEL), AND ASTM E543 (NON-DESTRUCTIVE). THE INSPECTION AND TESTING AGENCY SHALL FURNISH TO THE ENGINEER, ARCHITECT A COPY OF THEIR SCOPE OF ACCREDITATION. SPECIAL INSPECTORS SHALL BE CERTIFIED BY THE BUILDING OFFICIAL. WELDING INSPECTORS SHALL BE QUALIFIED PER SECTION 6.1.4.1.1 OF AWS D1.1.

3. THE SPECIAL INSPECTOR SHALL OBSERVE THE INDICATED WORK FOR COMPLIANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION AND NOTED IN THE INSPECTION REPORTS.

4. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS FOR EACH INSPECTION TO THE BUILDING OFFICIAL, [STRUCTURAL] [ENGINEER] [ARCHITECT], CONTRACTOR, AND OWNER. THE SPECIAL INSPECTION AGENCY SHALL SUBMIT A FINAL REPORT STATING THAT THE WORK REQUIRING SPECIAL INSPECTION WAS INSPECTED AND IS IN CONFORMANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THAT ALL DISCREPANCIES NOTED IN THE INSPECTION REPORTS HAVE BEEN CORRECTED.

5. CONTINUOUS INSPECTION: THE FULL-TIME OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED.

PERIODIC INSPECTION: THE PART-TIME OR INTERMITTENT OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK HAS BEEN OR IS BEING PERFORMED AND AT THE COMPLETION OF THE WORK.

6. WHERE PERIODIC INSPECTION IS ALLOWED IN ACCORDANCE WITH AN EXPANSION ANCHOR'S ICC EVALUATION REPORT, INSPECTIONS SHALL BE AS FOLLOWS:

FOR ALL ANCHORS, PRIOR TO CONCEALMENT, VERIFY: ANCHOR TYPE, ANCHOR DIMENSIONS, ANCHOR SPACING AND EDGE DISTANCES.

- FOR EACH ANCHOR TYPE AND SIZE, INSPECTOR SHALL BE ONSITE TO CONTINUOUSLY INSPECT A MINIMUM OF THE FIRST 10 ANCHORS INSTALLED BY EACH INSTALLER FOR CONFORMANCE WITH ICC EVALUATION REPORT. PROVIDED ALL ANCHORS ARE INSTALLED CORRECTLY PER MANUFACTURER'S INSTRUCTIONS, PROVIDE PERIODIC INSPECTION ON A MINIMUM OF 10% OF THE NEXT 1000 ANCHORS BY EACH INSTALLER AND A MINIMUM OF 5% OF THE REMAINING ANCHORS BY EACH INSTALLER. INSPECTIONS SHALL OCCUR A MINIMUM OF ONCE PER WEEK AT A RANDOM TIME WHILE ANCHOR INSTALLATION IS ONGOING. ANY NON-COMPLIANCE ISSUES SHALL RESET THE INSPECTION REQUIREMENTS TO TEN (10) CONTINUOUS INSPECTIONS. NON-COMPLIANT ANCHORS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD FOR REVIEW AND SHALL BE BROUGHT INTO COMPLIANCE BY EITHER TESTING OR RE-INSTALLATION.
- INSPECTION REPORTS SHALL IDENTIFY NAMES OF INSTALLERS.
- SPECIAL INSPECTOR SHALL PROVIDE DOCUMENTATION AT THE END OF ANCHOR INSTALLATIONS STATING THAT THE MINIMUM NUMBER OF ANCHORS WERE INSPECTED.

ABBREVIATIONS

A.B. — ANCHOR BOLT
ACI — AMERICAN CONCRETE INSTITUTE
ADD'L. — ADDITIONAL
AESS — ARCHITECTURAL EXPOSED STRUCTURAL STEEL
AISC — AMERICAN INSTITUTE OF STEEL CONSTRUCTION INCORPORATED
ALT. — ALTERNATE
ALUM. — ALUMINUM
ARCH. — ARCHITECT
ASCE — AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM — AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS — AMERICAN WELDING SOCIETY
BLDG. — BUILDING
BOT. — BOTTOM
C.G. — CENTER OF GRAVITY
C.I.P. — CAST IN PLACE
C.J. — CONTROL JOINT
C.J.P. — COMPLETE JOINT PENETRATION
CL — CENTERLINE
CLR. — CLEAR
CMU — CONCRETE MASONRY UNIT
COL. — COLUMN
CONC. — CONCRETE
CONN. — CONNECTION
CONST. — CONSTRUCTION
CONT. — CONTINUOUS
db — BAR DIAMETER
DBA — DEFORMED BAR ANCHOR
DET. — DETAIL
DIA., Ø — DIAMETER
DIAG. — DIAGONAL
D.L. — DEAD LOAD
DWG. — DRAWING
ELEC. — ELECTRICAL
EL. — ELEVATION
EQ. — EQUAL
EXIST., (E) — EXISTING
EXP. — EXPANSION
EXT. — EXTERIOR
FDN. — FOUNDATION
FIN. — FINISH
FLR. — FLOOR
FT. — FOOT
FTG. — FOOTING
GA. — GAUGE
GALV. — GALVANIZED
HORIZ. — HORIZONTAL
HSS — HOLLOW STRUCTURAL SECTION
IBC — INTERNATIONAL BUILDING CODE
ICBO — INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS
ICC — INTERNATIONAL CODE COUNCIL
I.D. — INSIDE DIAMETER
IN. — INCH
INT. — INTERIOR
K — KIPS
KSF — KIPS PER SQUARE FOOT
KSI — KIPS PER SQUARE INCH
LBS. — POUND
L.L. — LIVE LOAD
LLH — LONG LEG HORIZONTAL
LLV — LONG LEG VERTICAL
LOC. — LOCATION
LONG. — LONGITUDINAL
LVF — LOW VELOCITY FASTENER
MAX. — MAXIMUM
MBMA — METAL BUILDING MANUFACTURERS ASSOCIATION
MECH. — MECHANICAL
MFR. — MANUFACTURER
MIN. — MINIMUM
MISC. — MISCELLANEOUS
MPH — MILES PER HOUR
MT — MAGNETIC PARTICLE TESTING
(N) — NEW
N.I.C. — NOT IN CONTRACT
NOM. — NOMINAL
NO. — NUMBER
N.T.S. — NOT TO SCALE
o.c. — ON CENTER
O.D. — OUTSIDE DIAMETER
OPP. — OPPOSITE
PAF — POWDER ACTUATED FASTENER
PART. — PARTITION
P/C — PRECAST
PCF — POUNDS PER CUBIC FOOT
PL — PLATE
P.P. — PARTIAL PENETRATION
PSI — POUNDS PER SQUARE INCH
P/T — POST-TENSIONED
P.T. — PRESSURE TREATED
PVC — POLYVINYL CHLORIDE
R, RAD. — RADIUS
RCSC — RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS
REF. — REFERENCE
RET. — RETURN
REINF. — REINFORCING
REQ'D. — REQUIRED
REQ'MTS. — REQUIREMENTS
SCHED. — SCHEDULE
S.C. — SLIP CRITICAL
SIM. — SIMILAR
SLRS — SEISMIC LOAD RESISTING SYSTEM
S.O.G. — SLAB ON GRADE
SPEC. — SPECIFICATION
SQ. — SQUARE
SS — STAINLESS STEEL
SSMA — STEEL STUD MANUFACTURERS ASSOCIATION
STD. — STANDARD
STRUCT. — STRUCTURAL
SYM. — SYMMETRICAL
THRU — THROUGH
TRANS. — TRANSVERSE
TS — LIGHT GAUGE TUBE STEEL
TYP. — TYPICAL
U.N.O. — UNLESS NOTED OTHERWISE
UT — ULTRASONIC TESTING
VERT. — VERTICAL
V.I.F. — VERIFY IN FIELD
w/ — WITH
WF — WIDE FLANGE
w/o — WITHOUT
W.P. — WORK POINT
WPS — WELDING PROCEDURE SPECIFICATION
WWF — WELDED WIRE FABRIC

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PACKAGE #1
PORTLAND SIGN

SHEET TITLE

SPECIAL INSPECTIONS AND ABBREVIATIONS

ISSUANCE
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DATE
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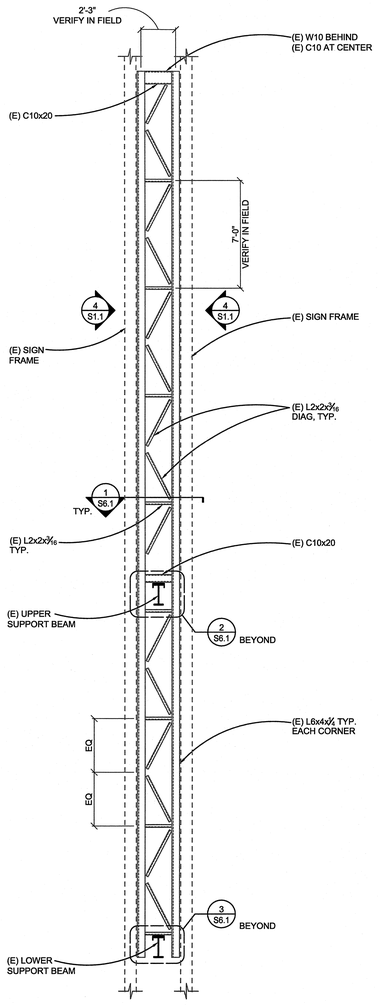
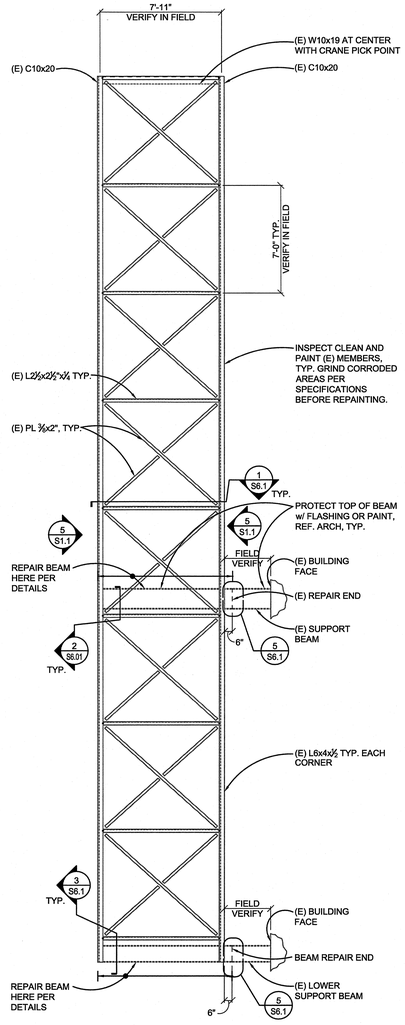
30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.



NOTE:
1. REF. 4/S1.1 FOR NOTES.

5 SUPPORT FRAME SIDE ELEVATION
1/4"=1'-0"



NOTE:
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2. THE DETAILS ON S1.1 AND S6.1 ASSUME THE SIGN WILL BE REMOVED TO COMPLETE THE WORK PER NOTE 1. THE CONTRACTOR MAY COMPLETE THE WORK WITH THE SIGN IN PLACE PROVIDED THAT TEMPORARY SHORING IS INSTALLED TO FULLY SUPPORT THE SIGN DURING WORK. SHORING DRAWINGS AND CALCULATIONS MUST SUBMITTED FOR REVIEW IF THAT OPTION IS USED.
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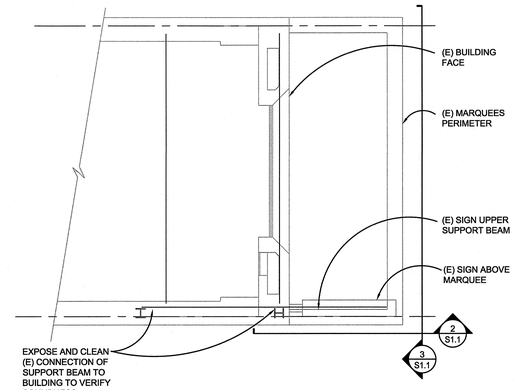
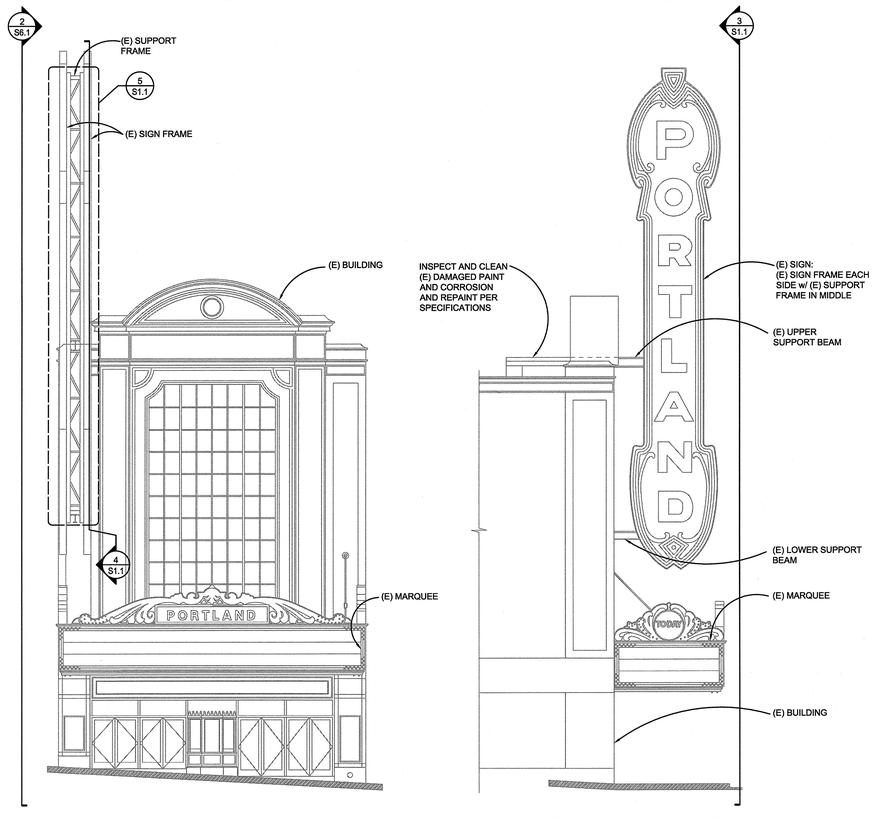
5. NOTIFY ARCHITECT OF ANY DISCREPANCIES

4 SUPPORT FRAME FRONT AND BACK ELEVATION
1/4"=1'-0"



1 PARTIAL PLAN VIEW
1/8"= 1'-0"



3 SIGN SIDE VIEW
1/8"=1'-0"

2 SIGN FRONT VIEW
1/8"=1'-0"

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SIGN PLANS AND SECTIONS

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REGISTERED PROFESSIONAL ENGINEER
OREGON
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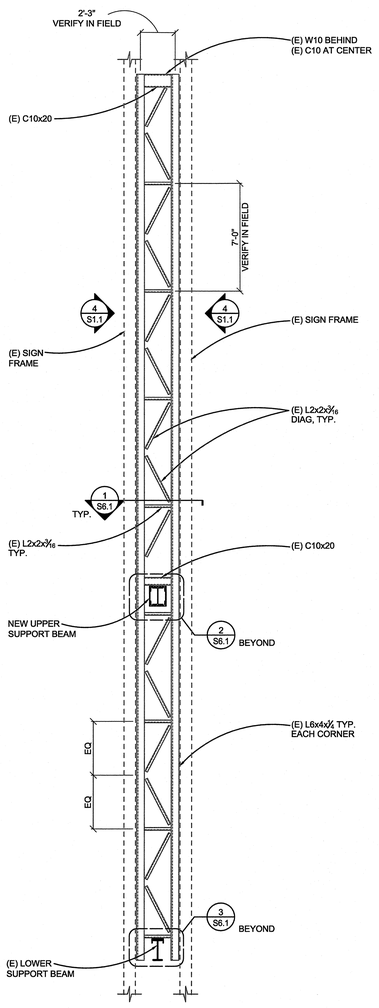

NOTE:
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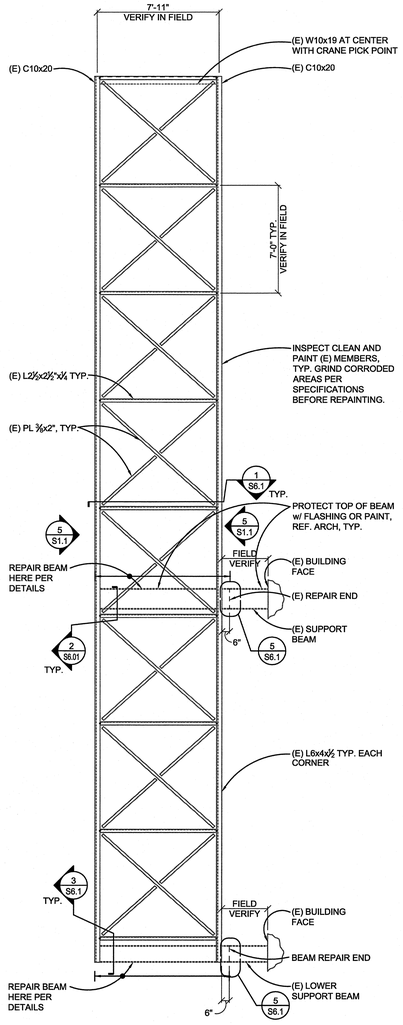

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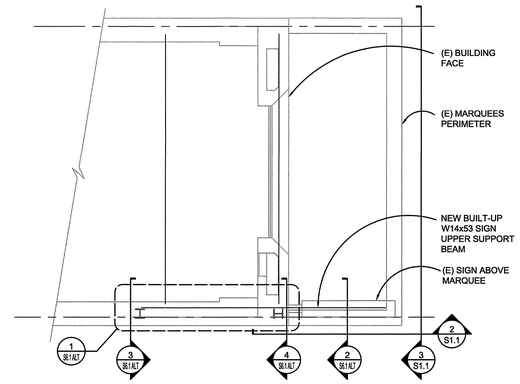

1 PARTIAL PLAN VIEW

1/8"= 1'-0"

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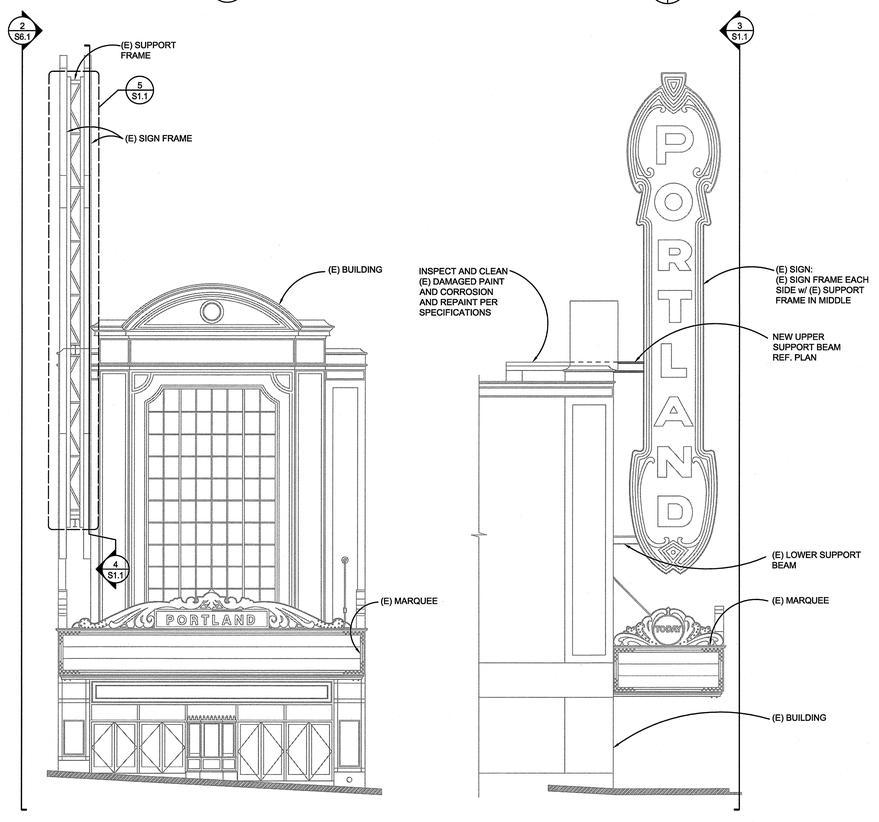

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NO.	DESCRIPTION	DATE
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Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

SIGN PLANS AND SECTIONS

ISSUANCE
100% Construction Document Set

DATE
4/22/2016

PROJ. NO.
15023

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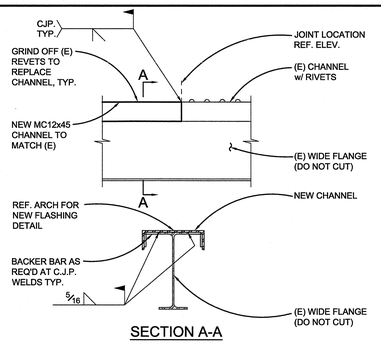
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 10, 2012
NATHAN A. INGRAFFEA
EXPIRES 06-30-17

DRAWING NO.

S1.1 ALT

00

30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.

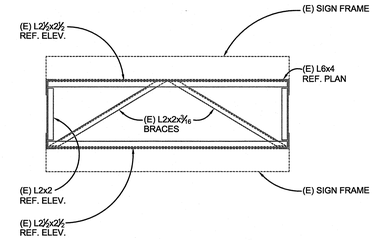


SECTION A-A

NOTE:
TEST (E) STEEL TO DETERMINE PROPER WPS PRIOR TO C.J.P. WELDING.

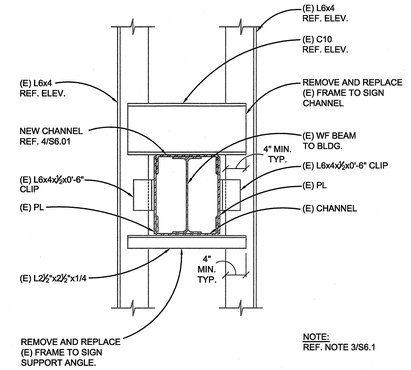
5 LOWER SUPPORT BEAM SPLICE REPAIR

1"=1'-0"



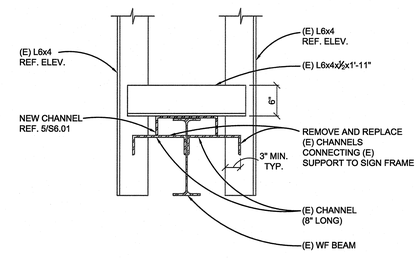
1 TYPICAL (E) SUPPORT FRAME SECTION

1/2'=1'-0"



2 TOP SIGN CONNECTION SECTION

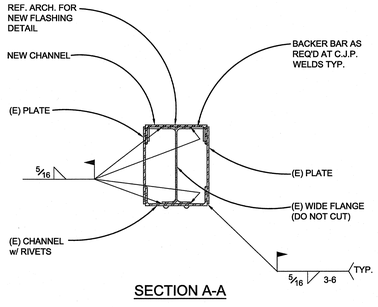
1"=1'-0"



NOTE:
CHECK ALL EXISTING MEMBERS FOR CORROSION, CLEAN AND PAINT AS REQ'D. WHERE SECTION LOSS HAS OCCURED, REPLACE MEMBER TO MATCH EXISTING.

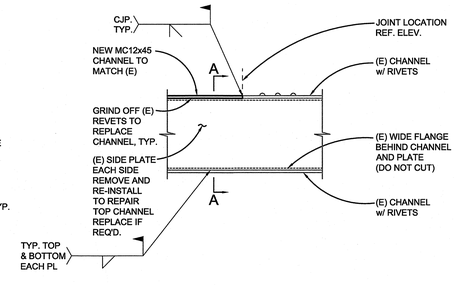
3 BOTTOM SIGN CONNECTION SECTION

1"=1'-0"



SECTION A-A

NOTE:
TEST (E) STEEL TO DETERMINE PROPER WPS PRIOR TO C.J.P. AND FILLET WELDING.



4 UPPER SUPPORT BEAM SPLICE REPAIR

1"=1'-0"

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kpff job no. 215220-sign

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Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

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PORTLAND, OREGON

PACKAGE #1
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OREGON
NOV. 15, 2005
NATHAN A. INGRAFFEA
EXPIRES 06-30-17

DRAWING NO.

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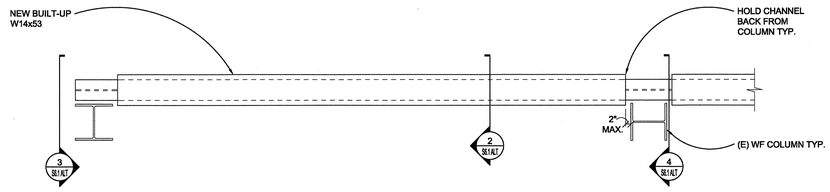
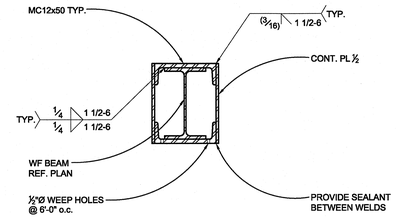
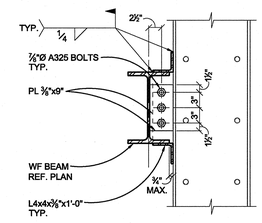
30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.



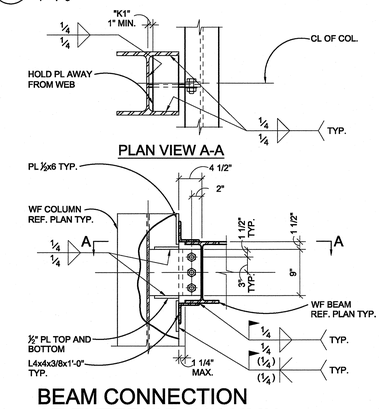
1 NEW BEAM ENLARGED PLAN
1/2"=1'-0"



2 REPLACEMENT BEAM ALTERNATIVE
1"=1'-0"



3 BEAM CONNECTION AT INTERIOR COLUMN
1"=1'-0"



4 BEAM CONNECTION AT EXTERIOR COLUMN
1"=1'-0"

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STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 78425PE OREGON NOV. 19, 1993 NATHAN A. INGRAFFEA
EXPIRES 06-30-17

DRAWING NO.

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GENERAL NOTES

1. SCHEDULE WORK IN EXISTING BUILDINGS WITH THE OWNER. MINIMIZE DISRUPTION OF NORMAL OPERATIONS.
2. PROVIDE EQUIPMENT GROUNDING CONDUCTOR (GREEN WIRE) IN ALL RACEWAYS.
3. PROVIDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH PHASE CONDUCTOR. DO NOT SHARE NEUTRALS.
4. MINIMUM CONDUCTOR SIZE IS #12 AWG AND MINIMUM CONDUIT SIZE IS 1/2"C UNLESS NOTED OTHERWISE.
5. IN GENERAL, WIRE COUNTS ARE NOT INDICATED ON PLANS. FOR EACH 20 AMP 120 VOLT OR 277 VOLT CIRCUIT, PROVIDE 1 #12 CONDUCTOR, 1 #12 NEUTRAL CONDUCTOR, AND 1 #12 GROUNDING CONDUCTOR. ALL WORK SHALL COMPLY WITH NEC 300-17. GROUND WIRE SHALL BE GREEN SHEATHED. WHERE WIRE SIZES/COUNTS ARE INDICATED ON THE DRAWINGS, PROVIDE THESE CIRCUIT CONDUCTORS (INCLUDING NEUTRAL AND GROUNDING CONDUCTORS FOR THE PORTION OF THE CIRCUIT IN WHICH THEY SHARE A COMMON CONDUIT).
6. VISIT THE SITE BEFORE SUBMITTING A BID TO OBSERVE EXISTING CONDUITS.
7. PROVIDE ADDITIONAL SUPPORTS FOR SWITCHES, STARTERS, RACEWAYS AND OTHER ELECTRICAL EQUIPMENT WHERE THE BUILDING STRUCTURE IS NOT SUITABLE FOR DIRECT MOUNTING.
8. SYMBOLS IN THE LEGENDS ARE APPLICABLE GENERALLY. FOR EXACT REQUIREMENTS REFER TO THE SCHEDULES, LAYOUTS, DETAILS AND SPECIFICATIONS.

DEMOLITION GENERAL NOTES

D1 REMOVE WIRING DEVICES, FIXTURES, COMPONENTS, ELECTRICAL EQUIPMENT, AND BOXES NOT REQUIRED TO REMAIN IN SERVICE IN REMODELED AREAS WHEN THIS PROJECT IS COMPLETE, UNLESS OTHERWISE NOTED.

a. REMOVE WIRE, CONDUITS, AND BOXES FOR SUCH DEVICES BACK TO SOURCE, WHERE A CIRCUIT IS INTERRUPTED BY SUCH REMOVAL OF A DEVICE OR FIXTURE FROM THAT CIRCUIT, INSTALL WIRE AND CONDUIT AS REQUIRED TO RESTORE SERVICE TO THE REMAINING DEVICES AND FIXTURES ON THAT CIRCUIT.

b. WHERE ELECTRICAL CIRCUITS, FEEDERS, OR WIRING RUNS THROUGH A SPACE TO BE DEMOLISHED, MAINTAIN THEM. REPAIR ANY DAMAGE CAUSED BY DEMOLITION OR CONSTRUCTION PERFORMED UNDER THIS CONTRACT.

D2 ALL CIRCUITS TO EXISTING ELECTRICAL DEVICES AND EQUIPMENT TO REMAIN IN WORK AREAS, SHALL BE MAINTAINED.

ABBREVIATIONS

A (AMP)	AMPERE
AHJ	LOCAL AUTHORITY HAVING JURISDICTION
AIC	AMPERES INTERRUPTING
ALT	ALTERNATE
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLR	CLEAR
COM	COMMUNICATION
CU	COPPER
DISC SW	DISCONNECT SWITCH
DISC	DISCONNECT
DN	DOWN
DWG	DRAWING
(E)	EXISTING TO REMAIN
ELEC	ELECTRIC(AL)
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EXT	EXTERIOR
EXIST	EXISTING
FDR	FEEDER
IMC	INTERMEDIATE METAL CONDUIT
JB or J-BOX	JUNCTION BOX
KVA	KILOVOLT AMPERES
KW	KILOWATT
LF	LINEAR FEET (FEET)
LTG	LIGHTING
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MIN	MINIMUM
MISC	MISCELLANEOUS
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTG	MOUNTING
(N)	NEW
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION AGENCY
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
P	POLE; PHASE; PRIMARY
PB	PULL BOX
PE	PHOTO ELECTRIC
PH	PHASE
PNL	PANEL
POC	POINT OF CONNECTION
PWR	POWER
QTY	QUANTITY
SPEC	SPECIFICATION
SQ	SQUARE
SW	SWITCH
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
V	VOLT
W	WATT, WEST
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
(X)	DEMOLISH
&	AND
I.E.:	THAT IS
I.G.:	FOR EXAMPLE
#	NUMBER

SYMBOLS LEGEND - GENERAL

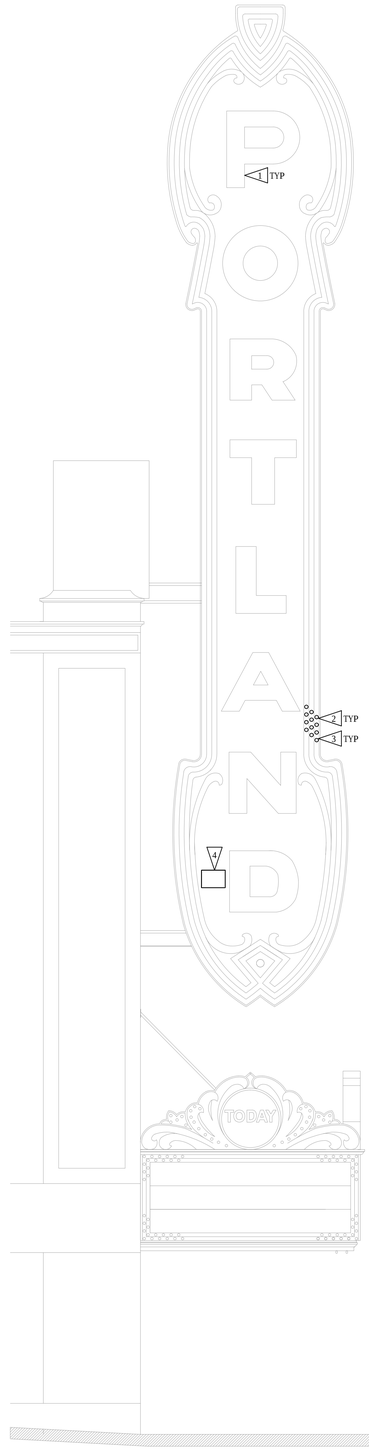
SYMBOL	DESCRIPTION
	EXISTING TO BE REMOVED
	HEAVY LINEWEIGHT INDICATES NEW WORK
	LIGHT LINEWEIGHT INDICATES EXISTING INFORMATION
	POINT OF CONNECTION (POC) BETWEEN NEW AND EXISTING
XX / XDN	EQUIPMENT IDENTIFIER XX = ABBREVIATION Y = EQUIPMENT SCHEDULE NUMBER
1	DRAWING CONSTRUCTION ("FLAG") NOTE
X-XX	EQUIPMENT IDENTIFIER
XXX	RACEWAY/CABLE/CONDUCTOR ROUTING IDENTIFIER-REFER TO RACEWAY/CABLE/CONDUCTOR SCHEDULE
	MATCHLINE
	REVISION CLOUD (ENCIRCLES DRAWING CHANGES MADE SINCE THE PREVIOUS RELEASE)
1	REVISION REFERENCE
X / XX.XX	DETAIL REFERENCE DETAIL IDENTIFICATION NUMBER SHEET WHERE DETAIL IS DRAWN
X / XX.XX	ELEVATION REFERENCE ELEVATION IDENTIFICATION NUMBER SHEET WHERE ELEVATION IS DRAWN
X / XX.XX	SECTION REFERENCE SECTION IDENTIFICATION NUMBER SHEET WHERE SECTION IS DRAWN
N	NORTH REFERENCE

SYMBOLS LEGEND - GROUNDING

SYMBOL	DESCRIPTION
	GROUND CONNECTION

SYMBOLS LEGEND - LIGHTING

SYMBOL	DESCRIPTION
A1	FIXTURE TYPE DESIGNATION
a	SWITCH LEG DESIGNTION
	DOWNLIGHT FIXTURE
	WALL MOUNTED LIGHT FIXTURE
	DECORATIVE PENDENT LIGHT FIXTURE



PORTLAND SIGN
SOUTH ELEVATION - ELECTRICAL 1
SCALE: 1/4" - 1'-0"

SHEET NOTES

1. WORK SHOWN ON SOUTH BLADE OF PORTLAND SIGN. SAME SCOPE OF WORK APPLIES TO NORTH BLADE OF SIGN UNLESS OTHERWISE NOTED.
2. REPORT TO THE OWNER THE NUMBER OF BROKEN E-19 LAMPS PRIOR TO REMOVAL.
3. DISCONNECT POWER TO SIGN PRIOR TO REMOVAL. TURN OFF AND ;LOCK OUT CIRCUIT BREAKERS AND SAFE OFF CONDUCTORS. RECONNECT POWER TO SIGN AFTER RE-INSTALLATION.

FLAG NOTES

1. REPLACE EXISTING NEON LIGHTING FOR LETTERS AND TRANSFORMERS, MATCH EXISTING LAYOUT. FOUR ROWS OF NEON FOR EACH LETTER. TYPICAL.
2. REMOVE, PROTECT AND STORE EXISTING E-19 LED LAMP FOR REINSTALLATION AFTER SIGN IS REINSTALLED.
3. REPLACE EXISTING SOCKETS AND WIRING FOR LED LAMPS. EACH CIRCUIT IS TO ALTERNATE LAMP TO MATCH EXISTING LAYOUT. SOCKETS TO BE PORCELAIN TYPE WITH SCREW TERMINAL WIRE CONNECTIONS.
4. REPLACE EXISTING JUNCTION BOX WITH NEW 8"x12"x12" NEMA 12 STAINLESS STEEL BOX. PAINT BOX FLAT BLACK. ONLY ONE NEEDED FOR SIGN.

1' 4'
0' 2' 8'
SCALE 1/4" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER 90651PE SEPT 8, 2015 BRADLEY W. MEDSKER
Expires: 12/31/16

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Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE
PORTLAND SIGN ELEVATIONS

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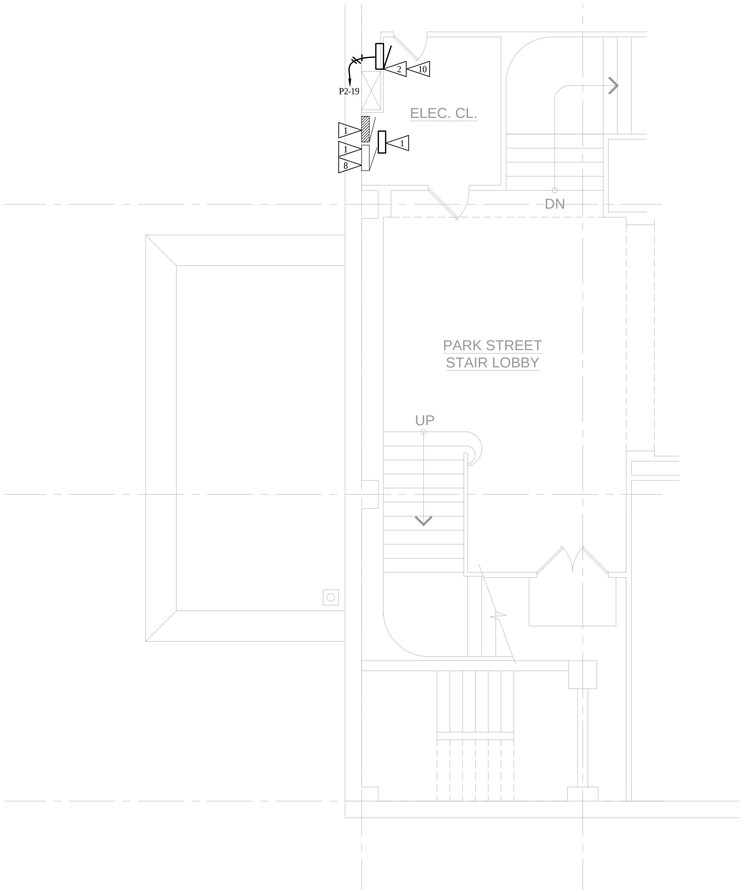
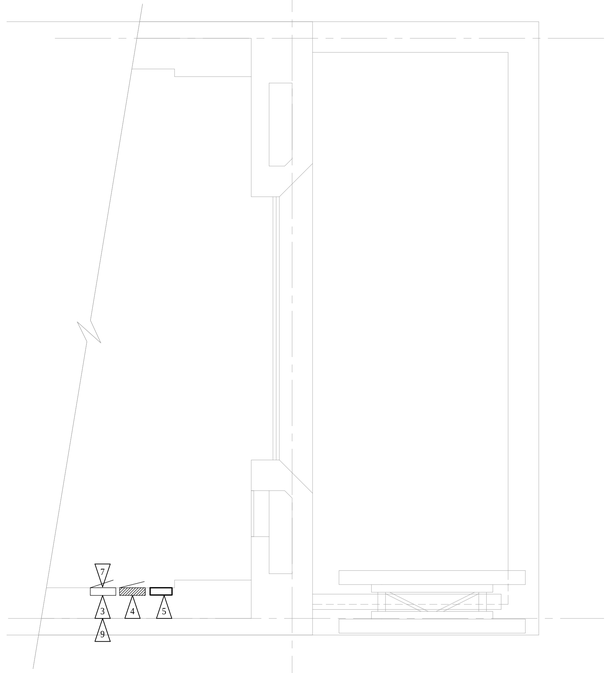


LOWER TUNNEL PARTIAL PLAN - WEST SIDE ELECTRICAL — 1

SCALE: 1/4" - 1'-0"

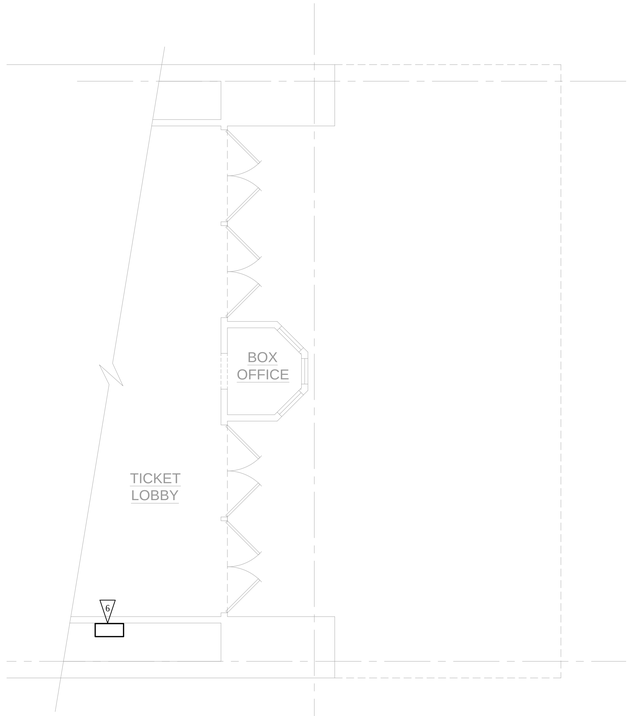


MEZZANINE PARTIAL PLAN - EAST SIDE ELECTRICAL — 2

SCALE: 1/4" - 1'-0"

FLAG NOTES

1. EXISTING PARK STREET LIGHTING CONTROL PANEL AND PANEL BOARD. SEE DETAIL 1/E5.0.
2. NEW LIGHTING CONTROL PANEL SEE DETAIL 2/E5.0.
3. EXISTING BROADWAY LIGHTING CONTROL PANEL.
4. EXISTING PANEL BOARD.
5. EXISTING READER BOARD TIME CLOCK, TO BE REPLACED WITH NEW RELAY AND CONTROLLED FORM LIGHITNG CONTROL PANEL. RELAY TO BE IDEC RSSDN-25A MOUNT IN 6"X6"X4" DEEP JUNCTION BOX.
6. NEW CONTROL SWITCH FOR RCP LIGHTS AND READER BOARD. MOUNT NEXT TO EXISTING SWITCHES. SWITCHES TO BE SIMILAR TO SQUARE CXB 5AD SERIES OR EQUAL. PROVIDE LAMINATED ACRYLIC LABEL FOR SWITCH FUNCTION AND ON/OFF POSITION.
7. PROVIDE TWO NEW SELECTOR SWITCHES IN COVER OF EXISTING LIGHTING CONTOL PANEL. ONE TO CONTROL RCP ON FUNCTION AND THE OTHER TO CONTROL READER BOARD. CONNECT IN PARALLEL WITH SWITCHES ON 1ST FLOOR. REPROGRAM PLC SO THAT THE RCP SWITCH MANUALLY CONTROLS THE UNDERSIDE LIGHTS OF THE MARQUEE ON OR OFF AND THE READER BOARD SWITCH TO MANUALLY CONTROL THE READER BOARD LIGHTS ON OR OFF.
8. PROVIDE NEW 20A/1P CIRCUIT BREAKER IN EXISTING PANEL#2 AT POLE #19. PROVIDE (2)#12, #12GND, 1/2"C FROM CIRCUIT BREAKER TO NEW LIGHTING CONTROL PANEL.
9. REFER TO DETAIL 3/E5.1 AND 3/E5.1 FOR ADDITIONAL INFORMATION.
10. REFER TO DETAIL 1/E5.1 AND 2/E5.1 FOR ADDITIONAL INFORMATION.



FIRST FLOOR PARTIAL PLAN - EAST SIDE ELECTRICAL — 3

SCALE: 1/4" - 1'-0"

N

1' 4'
0' 2' 8'
SCALE 1/4" = 1'-0"

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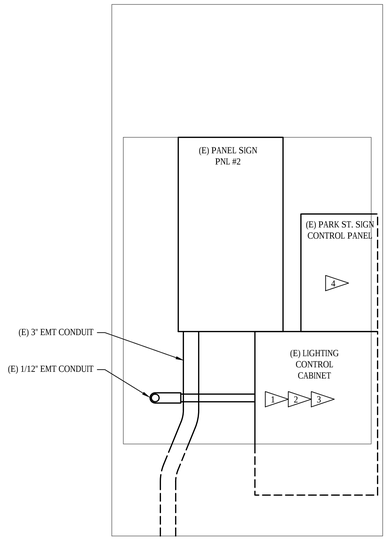
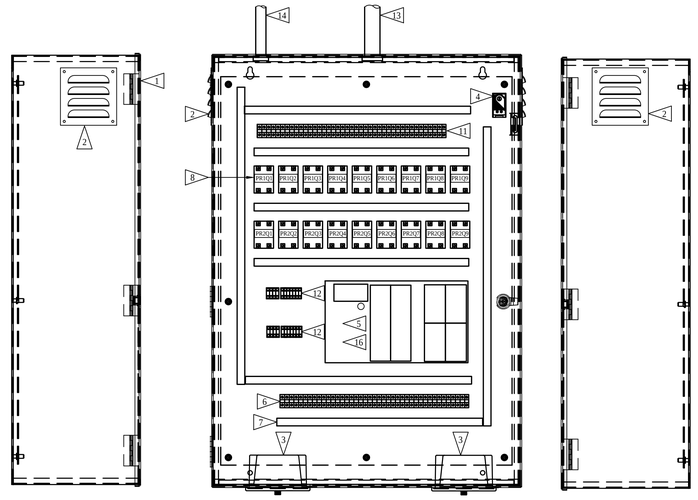


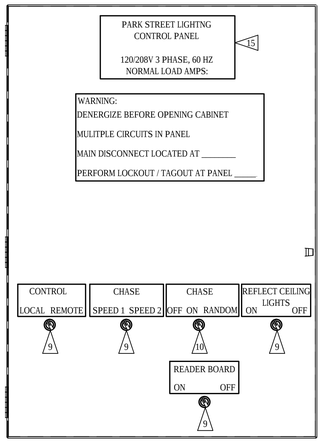
FLAG NOTES THIS DETAIL

1. REMOVE EXISTING ELECTRIAL COMPNANTS IN LIGHITNG CONTROL CABINET. INCLUDING RELAY, CONTACTORS, REMOVE WIRING FROM CABINET TO CIRCUIT BREAKERS. CONDUCTORS FROM MARQUEE TO REMAIN FOR REUSE. CLEAN INSIDE OF CABINET, REMOVE RUST AND REPAINT INSIDE WHITE.
2. PROVIDE NEW TERMINAL BLOCKS IN CABINET TO EXTEND EXISTING WIRING FROM MARQUEE TO NEW LIGHTING CONTROL PANEL. PROVIDE NEW CONDUCTORS FROM PANEL BOARD TO NEW LIGHTING CONTROL PANEL.
3. LABEL CABINET "LIGHTING JUNCTION BOX".
4. EXTEND EXISTING LIGHTING CIRCUITS FROM CIRCUIT BREAKERS IN THIS PANEL TO RELAYS IN NEW LIGHTING CONTROL PANEL.

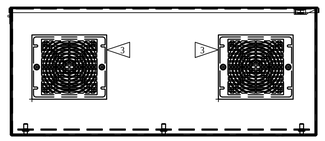
PARK AVENUE ELECTRICAL CLOSET ELEVATION — 1

SCALE: NTS





FRONT COVER



BOTTOM VIEW

FLAG NOTES THIS DETAIL

1. 42" TALL X 30" WIDE X 9" DEEP SINGLE DOOR NEMA 1 ENCLOSURE. HOFFMAN A42N30 OR APPROVED. PROVIDE WITH T-HANDLE LATCH KIT #AL7A.
2. STAINLESS STEEL LOUVER WITH FILTER. HOFFMAN AVK66SS6 & AFLT66.
3. 140 CFM COOLING FAN WITH FILTER AND STAINLESS STEEL GRILLE. HOFFMAN TFP61SS OR APPROVED.
4. TEMPERATURE CONTROL SWITCH FOR COOLING FAN. HOFFMAN ATEMNO OR APPROVED.
5. MODICON M340 SERIES PLC WITH I/O, POWER SUPPLY AND CPU.
6. TERMINAL BLOCK FOR RELAY INPUTS.
7. WIRING DUCT - 1" X 3" WIDE SLOT.
8. RELAY - IDEC RSSDN-25A.
9. TWO POSITION SWITCH .
10. THREE POSITION SWITCH.
11. TERMINAL BLOCK FOR RELAY OUTPUTS.
12. TERMINAL CLOCKS FOR INCOMING POWER FOR PLC AND FANS.
13. RACEWAY TO LIGHTING CONTROL JUNCTION BOX.
14. RACEWAY TO PANELBOARD.
15. PROVIDE LABEL AS INDICATED.
16. PROGRAM PLC TO MATCH BROADWAY STREET FUNCTIONS FOR CONTROL: REMOTE/LOCAL, CHASE: ON/OFF/RANDOM, CHASE: SPEED 1/SPEED 2/, REFLECTED CEILING LIGHTS: ON/OFF, READER BOARD: ON/OFF. ADJUST FOR NUMBER OUTPUTS AS REQUIRED.

LIGHTING CONTROL PANEL DETAIL — 2

SCALE: NTS

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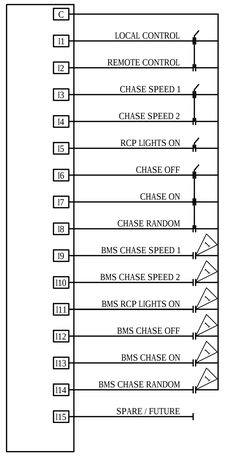
E5.0

SHEET 1 OF 00

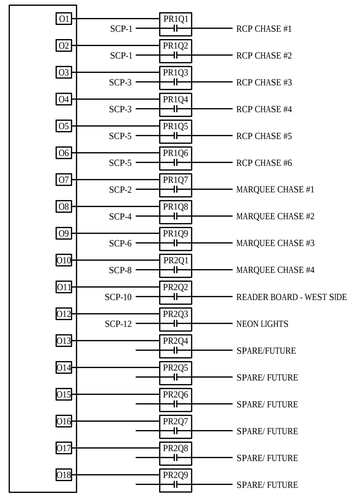


FLAG NOTES THIS DETAIL

1 CONTACTS CLOSURES BY OTHERS. TERMINATE CONDUCTOR AT TERMINAL STRIP.

PARK STREET PLC - INPUTS DETAIL 1

SCALE: NTS



PARK STREET PLC - OUTPUTS DETAIL 2

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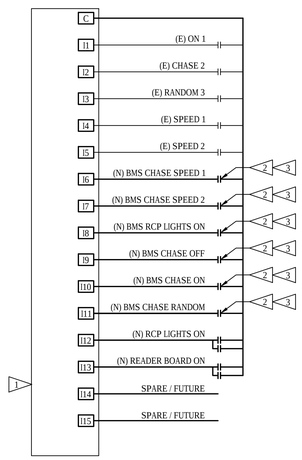


FLAG NOTES THIS DETAIL

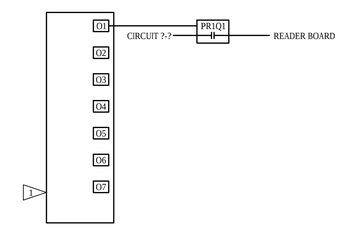
1 CONNECT NEW INPUTS FROM BMS SYSTEM TO EXISTING INPUT CARD.

2 CONTACTS CLOSURES BY OTHERS. TERMINATE CONDUCTOR AT TERMINAL STRIP.

3 REPROGRAM PLC AS REQUIRED FOR ADDED INPUTS.

BROADWAY PLC - INPUTS DETAIL 3

SCALE: NTS



FLAG NOTES THIS DETAIL

1 PROVIDE NEW OUTPUT CARD FOR EXISTING PLC, MODICOM TSX D5Z 08T2M 8 PROTECTED CURRENT SOURCING OUTPUTS. RATED FOR 24 D.C. 0.5A.

BROADWAY PLC - OUTPUTS DETAIL 4

SCALE: NTS

30"x42" SHEET SIZE. IF SHEET SIZE IS SMALLER, THEN DRAWING HAS BEEN REDUCED.

ARCHITECTURAL RESOURCES GROUP, Inc.
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REGISTERED PROFESSIONAL ENGINEER 90651PE SEPT 8, 2015 BRADLEY W. MEEKER

Expires: 12/31/16

11.00

NO.	DESCRIPTION	DATE
REVISIONS		

Portland Sign and Marquees Restoration

ARLENE SCHNITZER CONCERT HALL

1037 SW BROADWAY
PORTLAND, OREGON

PACKAGE #1
PORTLAND SIGN

SHEET TITLE

ELECTRICAL DETAILS

ISSUANCE
100% CONSTRUCTION DOCUMENTS

DATE
04/22/2016

PROJ. NO.
15023

DRAWN
AS

CHECKED
BM

DRAWING NO.

E5.1

SHEET 1 OF 00

Portland Sign and Marquees Restoration

100% Construction Documents

Project Manual

April 22, 2016

Project Team

Property Owner:
Metro
600 NE Grand Avenue
Portland, OR 97204

Architect:
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111 SW Fifth Avenue, 24th Floor
Portland, Oregon 97204

Structral Engineer:
KPFF Consulting Engineers
111 SW Fifth Avenue, 25th Floor
Portland, Oregon 97204

Electrical Engineer:
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111 SW Fifth Avenue, Suite 2120
Portland, Oregon 97204

PORTLAND SIGN AND MARQUEES
TECHNICAL SPECIFICATIONS DIVISIONS 2 - 26

TABLE OF CONTENTS

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:
   1. Section 013591 "Historic Treatment Procedures" for historic removal and dismantling.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.04 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

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

1.05 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.06 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property , for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Submit before Work begins.

1.07 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.08 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 PRODUCTS

2.01 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
   1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage. Notify Owner within 48 hours of any disruption to existing services/ systems.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
   2. Arrange to shut off indicated utilities with utility companies.
   3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.03 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.

3.04 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain[fire watch and] portable fire-suppression devices during flame-cutting operations.
   5. Maintain adequate ventilation when using cutting torches.

6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Employ means and methods as required to control dust and debris during demolition and material removal activities. These can include, but are not limited to, closed material chutes or containers for debris, wet cutting methods or vacuum attachments, etc.

B. Removed and Salvaged Items:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition[and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.05 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

D. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 07 14 16 "Cold Fluid-applied waterproofing " for new roofing requirements.
1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be[recycled,] reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Burning: Burning of demolished materials will be permitted[only at designated areas on Owner's property,] provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Transport demolished materials and dispose of at designated spoil areas on Owner's property.

E. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.07 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes for the following:
   1. Concrete toppings.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.04 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.
   2. Include substantiating substantial test data to show compliance with ACI 318 Chapter 5.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. The steel reinforcement detailer shall generate all shop drawing bending and installation details from the structural and architectural drawings and specifications. The use of reproductions or photocopies of the contract drawings shall not be permitted.
   1. Provide details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include special reinforcement required for openings through concrete structures.
      a. Heavy ink clouded outlines (revision clouds) shall be drawn around revised areas of individual sheets.
      b. Architect/Engineer will not review information outside of revision clouds on resubmitted drawings.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Location of construction joints is subject to approval of the Architect.

E. Welding certificates.

F. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Curing compounds.
   6. Bonding agents.
   7. Adhesives.
   8. Repair materials.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM 94/C94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities.

C. Testing Agency Qualifications: An independent agency, [acceptable to], qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade 1. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specification for Structural "Concrete", [Sections 1 through 5,]
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.07 SYSTEM DESCRIPTION

A. Redesign or Departures from Requirements of the Contract Documents Initiated by Contractor:
   1. Obtain written acceptance from the Architect and Architect's consultants.
   2. Bear costs for Contractor-initiated or construction error due to changes in type, form, system, or details of construction from those indicated by the contract documents.
   3. Costs of review of such changes by Architect and Architect's consultants will be deducted from the Contract Sum by Change Order.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Products: Subject to compliance with requirements, provide one of the products specified.
   3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to manufacturers specified.

4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.03 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed. Refer to General Structural Notes.

2.04 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice" of greater compressive strength than concrete, and as follows:
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.05 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I/IIIII
      a. Fly Ash: ASTM C 618, Class C or F. <Refer to General Structural Notes>.
      b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregate: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source.
   1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm).
   2. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 (0.3-mm) sieve, and less than 8 percent may be retained on sieves finer than No. 50 (0.3 mm).

D. Water: ASTM C 94/C94-M [and potable].

2.06 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/ C494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
   1. Products:
      a. Axim Italcementi Group, Inc.; CATEXOL CN-CI.
      b. BASF Construction Chemicals - Building Systems; Rheocrete CNI.
      c. Euclid Chemical Company (The); Eucon, CIA.
      d. Grace Construction Products, W.R. Grace & Co.; DCI.
      e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. Products:
      a. BASF Construction Chemicals - Building Systems; Rheocrete 222+.
      b. Cortec Corporation; MCI [2000] [2005NS].
      c. Grace Construction Products, W.R. Grace & Co.; DCI-S.
      d. Sika Corporation; FerroGard-901.

2.07 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Products:
      a. Axim Concrete Technologies; Cimfilm.
      b. BASF Construction Chemicals - Building Systems; Confilm.
      c. Burke by Edoco; BurkeFilm
      d. ChemMasters; Spray-Film
      e. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
      f. Dayton Superior Corporation; Sure Film.
      g. Euclid Chemical Company (the); Eucobar.
      h. Kaufman Products, Inc.; Vapor Aid.
      i. Lambert Corporation; Lambco Skin.
      j. L&M Construction Chemicals, Inc.; E-Con.
      k. MBT Protection and Repair, Div. of ChemRex; Confilm.
      l. Meadows, W.R., Inc.; Sealtight Evapre.
      m. Metalcrete Industries; Waterhold.
      n. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
      o. Sika Corporation, Inc.; SikaFilm.
      p. Symons Corporation, a Dayton Superior Company; Finishing Aid.
      q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
      r. Unitex; Pro-Film.
      s. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 309, Type 1, Class B, dissipating.
   1. Products:
      a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
      b. BASF Construction Chemicals - Building Systems; Kure 200.
      c. ChemMasters; Safe-Cure Clear.
      d. Conspec by Dayton Superior; W.B. Resin Cure.
      e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
      f. Edoco by Dayton Superior; Res X Cure WB.
      g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
      h. Kaufman Products, Inc.; Thinfilm 420.
      i. Lambert Corporation; AQUA KURE - CLEAR.
      j. L&M Construction Chemicals, Inc.; L&M Cure R.
      k. Meadows, W. R., Inc.; 1100-CLEAR.
      l. Nox-Crete Products Group; Resin Cure E.
      m. Right Pointe; Clear Water Resin.
      n. SpecChem, LLC; Spec Rez Clear.
      o. Symons by Dayton Superior; Resi-Chem Clear.
      p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
      q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.08 RELATED MATERIALS

A. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.09 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi (34.5MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 and in accordance with the following:

1. Compressive Strength: Refer to General Structural Notes.
2. Maximum Water-Cementitious Materials Ratio: Refer to General Structural Notes.
3. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having the air content specified in the General Structural Notes.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 20 percent.
2. Combined Fly Ash and Pozzolan: 20 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 20 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 30 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent portland cement minimum, with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd. (0.90 kg/cu. m).

E. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use [water-reducing]] admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.

3.03 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.04 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
   3. Locate joints for slabs in the middle third of spans.
   4. Use a bonding agent or roughen interface to ¼" (6mm) amplitude at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
   2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

D. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.05 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

C. Adjust mix as required to maintain specified air content at the point of discharge.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.06 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

3.07 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.08 PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1 by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of a floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.09 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a [qualified testing and inspecting agency] to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified independent testing and inspecting agency to perform tests, and inspections and to submit test reports.

C. Inspections: As indicated in the General Structural Notes.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. (114 cu. m) or fraction thereof of each concrete mix placed each day and at least one composite sample for each 5000 square feet of surface area of slabs or walls.
    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Field-cured specimens in subparagraph below may be required to verify adequacy of curing and protection of concrete, to verify strength for tilt-up concrete and post-tensioning concrete, or to verify strength for removal of shoring and reshoring in multistory construction. Revise number of test specimens if required.
   c. Cast and field cure [two] sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days, two at 28 days, and hold one for later testing.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, Structural Engineer, concrete manufacturer, Building Official, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, type of break for both 7- and 28-day tests, and air content.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 to 48 hours of finishing.

END OF SECTION 03 30 00

SECTION 05 01 70

MAINTENANCE OF DECORATIVE METAL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes maintenance treatment and repairs to of existing decorative sheet metal as follows
   1. Cleaning metal.
   2. Removing corrosion.
   3. Removing paint and priming for repainting.
   4. Stabilizing and protecting metal.
   5. Repairing metal and replacing damaged and missing components in place.
   6. Refinishing metal in place.
   7. Removing and dismantling metal for shop repair, replacement of components, and refinishing; reinstalling repaired metal.
   8. Painting steel uncovered during the Work of this Section.

B. Related Sections:
   1. Section 057000 "Decorative Metal" for replicated decorative metal construction.
   2. Section 079200 "Joint Sealants" for joint sealants.
   3. Section 099600 "High-Performance Coatings" for finishes.

1.03 DEFINITIONS

A. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

B. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

C. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

D. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings: For repair and replacement of decorative metal items and components. Show location and extent of replacement work, with enlarged details of replacement parts indicating materials, profiles, methods of attachment, accessory items, and finishes. Include field-verified dimensions and the following:
   1. Full-size patterns with complete dimensions for new decorative metal components and their jointing, showing relation of existing to new components.
   2. Templates and directions for installing anchor bolts and other anchorages.
   3. Identification of each new metal item and component and its location on the structure in annotated plans and elevations.
   4. Provisions for expansion, weep holes, and conduits as required for each location and exposure.
   5. Provisions for sealant joints if required.

C. Samples for Initial Selection: For the following:
   1. Sealant Materials: See Section 079200 "Joint Sealants."
   2. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following items in sizes indicated, finished as required for use in the Work:

1. Each type of new material to be used for replacing existing or missing decorative metal; 6 inches (150 mm) long in least dimension or whole item.
2. Fittings and brackets.
3. Each type of exposed connection between components. Show method of finishing components at intersections.
4. Each type of exposed finish prepared on metal of the same alloy to be used for the Work of this Section; 6 inches long in least dimension.
5. Sealant Materials: See Section 079200 "Joint Sealants."
6. Accessories: Each type of anchor, accessory, and miscellaneous support in required finishes.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For chemical-cleaner manufacturer and paint-remover manufacturer.

B. Historic Treatment Program: Submit before work begins.

1.06 QUALITY ASSURANCE

A. Chemical-Cleaner Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.

B. Paint-Remover Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.

C. Historic Treatment Program: Prepare a written plan for historic treatment of decorative metal, including each phase or process, protection of surrounding materials during operations, and control of runoff during cleaning, paint removal, and other processes. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures related to historic treatment of decorative metal specified in this and other Sections.

D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Prepare mockups so they are inconspicuous or reversible.
   1. Locate mockups on the building where directed by Architect.
   2. Cleaning: Prepare an area approximately 2 sq. ft. for each process on each type of metal indicated for cleaning.
   3. Refinishing Decorative Metal: Refinish onefoot of decorative marquee perimeter soffit trim for each type of metal indicated to be refinished.
   4. Repairing Decorative Metal Finish: Repair finish of one decorative marquee corner at soffit for each type of metal finish indicated to be repaired.
   5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to historic treatment of decorative metal including, but not limited to, the following:
      a. Construction Schedule: Verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store decorative metal items in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, cracked, or otherwise damaged.

B. Store decorative metal inside a well-ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

C. Protect strippable protective covering on decorative metal from exposure to sunlight and high humidity, except to the extent necessary for the period of decorative metal installation.

1.08 PROJECT CONDITIONS

A. Weather Limitations: Proceed with historic treatment of decorative metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

B. Concealed and undocumented historic items, relics, and similar objects encountered during historic treatment remain Owner's property. Carefully dismantle and salvage each item or object.

PART 2 PRODUCTS

2.01 METAL MATERIALS

A. General: Provide decorative metal materials composed of the alloys, forms, and types that match existing metals and have the ability to receive finishes matching existing finishes unless otherwise indicated. Exposed-to-view surfaces exhibiting imperfections inconsistent with existing materials are unacceptable.

2.02 CLEANING MATERIALS

A. Water: Potable.

B. Mild Detergents and Surfactants:
   1. Job-Mixed Detergent Solution: Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.
   2. Triton XL-80N: Volumetric mixture, mixed with water, 0.1 to 3.0 percent detergent.
   3. Prosoco EnviroKlean 2010 All Surface Cleaner, up to 1:10 dilution with water.

C. Job-mixed biocide: Volumetric mixture consisting of the following: 1 quart of 5 percent calcium hypochlorite or sodium hypochlorite (house-hold bleach) plus 2/3 cup trisodium phosphate-type detergent plus 1/3 cup household detergent powder, mixed in 4 quarts warm, potable water.

2.03 PAINT REMOVERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. ABR Products, Inc.
   2. Back to Nature Products Company.
   3. Cathedral Stone Products, Inc.
   4. Dumond Chemicals, Inc.
   5. Hydroclean; Hydrochemical Techniques, Inc.
   6. PROSOCO, Inc.

B. Alkaline-Paste Paint Remover: Manufacturer's standard alkaline-paste formulation for removing paint from metals.

C. Covered or Skin-Forming Alkaline Paint Remover: Manufacturer's standard covered or skin-forming alkaline formulation for removing paint from metal.

D. Solvent-Type Paint Remover: Manufacturer's standard water-rinsable, solvent-type gel formulation for removing paint from metals.

E. Low-Odor, Solvent-Type Paint Remover: Manufacturer's standard low-odor, water-rinsable solvent-type gel formulation, containing no methanol or methylene chloride, for removing paint from metals.

2.04 PROTECTIVE COATING MATERIALS

A. Antirust Coating: See section 09 96 00 - High-Performance Coatings.

2.05 MISCELLANEOUS MATERIALS

A. Welding Electrodes and Filler Metal: Select according to AWS specifications for metal alloy welded; use metal type and alloy as recommended by producer of metal to be welded or filled and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners: Fasteners of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal joined.
   1. Match existing fasteners in material and in type of fastener unless otherwise indicated.
   2. Use concealed fasteners for interconnecting decorative metal components and for attaching them to other work.
   3. Use concealed fasteners for interconnecting decorative metal components and for attaching them to other work unless exposed fasteners are [unavoidable] [or] [the existing fastening method].
   4. For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.
   5. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

C. Sealant Materials:
   1. See Section 07 92 00 "Joint Sealants".

D. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline cleaners.

E. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces; and that will easily come off entirely, including adhesive.

F. Miscellaneous Products: Base selection of materials and methods of use on the following, subject to approval of a mockup:
   1. Previous effectiveness in performing the work involved.
   2. Little possibility of damaging exposed surfaces.
   3. Consistency of each application.
   4. Uniformity of the resulting overall appearance.
   5. Do not use products or tools that could do the following:
      a. Remove, alter, or in any way harm the present condition or future preservation of surfaces, including surrounding surfaces not in contract.
      b. Leave an unintended residue on surfaces.

2.06 METAL FABRICATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Allen Architectural Metals, Inc.
   2. King Architectural Metals, Inc.
   3. Olek Lejbzon & Co.
   4. Schiff Architectural Detail.

B. Fabricate decorative metal items and components in sizes and profiles to match existing decorative metal, with accurate curves, lines, and angles. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

C. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners to match existing work.

D. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.

E. Date Identification: Emboss on a concealed, interior surface of the metal body of each new component, in easily read characters, "MADE <Insert year>." Manufacturer's name may also be embossed.

2.07 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.08 STEEL FINISHES

A. See Section 09 96 00 "High Performance Coatings."

PART 3 EXECUTION

3.01 PREPARATION

A. General: Protect persons, motor vehicles, building site, plants, surrounding surfaces of building being restored, and surrounding buildings from harm resulting from historic treatment of decorative metal.
   1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment Work.

B. Comply with chemical-product manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
   1. Cover adjacent surfaces with materials that are proven to resist chemical solutions being used unless the solutions will not damage adjacent surfaces. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid strippable masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
   2. Keep wall wet below area being treated to prevent streaking from runoff.
   3. Do not apply chemical solutions during winds of sufficient force to spread them to unprotected surfaces.
   4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
   5. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.02 HISTORIC TREATMENT PROCEDURES, GENERAL

A. General: In treating historic items, disturb them as minimally as possible and as follows.
   1. Stabilize decorative metal to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
   2. Stop the progress of deterioration and corrosion by removing deteriorated coatings and corrosion and reapplying protective coatings.
   3. Repair items where stabilization is not sufficient to stop progress of deterioration.
   4. Repair items in place and retain as much original material as possible.
   5. Replace or reproduce historic items where indicated or scheduled.
   6. Make historic treatment of materials reversible whenever possible.

7. Install temporary protective measures to stabilize decorative metal that is indicated to be completed later.

B. Mechanical Coating Removal: Use only the most gentle mechanical methods, such as scraping and wire brushing, that will not abrade metal substrate. Do not use abrasive methods such as sanding or power tools except as indicated as part of the historic treatment program and approved by Architect.

C. Repair Decorative Metal Item: Match existing materials and features, retaining as much original material as possible to complete the repair.
   1. Unless otherwise indicated, repair decorative metals by patching, re-bending, hammering, and straightening out dents, re-soldering open seams and otherwise reinforcing metals with new metal matching existing metal.
   2. Where indicated, repair decorative metal by limited replacement matching existing material.

D. Replace Decorative Metal Component: Where indicated, duplicate and replace items with new metal matching existing metal.
   1. Replace heavily deteriorated or missing parts or features of decorative metal with compatible materials, using surviving prototypes to create patterns or molds for duplicate replacements.
   2. Do not use substitute materials unless otherwise indicated.
   3. Compatible substitute materials may be used.

E. Surface Preparation and Repainting: Prepare painted decorative metal by cleaning surface, removing less than firmly adhered existing paint, sanding edges smooth, and priming and painting as specified.

3.03 CLEANING

A. General: Use only those methods indicated for each type of decorative metal. A
   1. Brushes: Use plastic or natural-fiber bristle brushes.
   2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that spray methods do not damage surfaces.
      a. Equip units with pressure gages.
      b. Unless otherwise indicated, hold spray tip at least 12 inches from surface and apply material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
      c. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

B. Water Cleaning: Water Cleaning: Clean with water applied by low-pressure spray. Supplement with bristle brush. Use small brushes to remove soil from joints and crevices.

C. Detergent Cleaning: For stubborn soiled areas, scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by low-pressure water rinsing. Use small brushes to remove soil from joints and crevices.

D. Biocidal Cleaning: For removal of biological growths, mold and scum. Prewet the area to be cleaned. Scrub on the solution with soft, natural bristle brushes. Allow to dwell for up to 15 minutes (dwell time to be confirmed with test samples). Rinse thoroughly with low-pressure water. Agitate with additional scrubbing as necessary during rinsing.

E. Mechanical Rust Removal:
   1. Clean and remove rust with light rubbing with abrasive pads and water (Scotch-Brite or similar).
   2. Rinse off residue with low-pressure water spray.
   3. Dry immediately with clean, soft cloths.
   4. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

3.04 PAINT REMOVAL

A. General: Use only those methods indicated for each type of decorative metal. Apply materials to all surfaces, corners, contours, and interstices, with loose, peeling, and flaking paint. Paint removal not necessary if existing paint is well-adhered. After work is complete, remove protection no longer required. Remove tape and adhesive marks.
   1. Brushes: Use brushes that are resistant to chemicals being used.
   2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that spray methods do not damage surfaces.
      a. Equip units with pressure gages.
      b. Unless otherwise indicated, hold spray tip at least 12 inches from surface and rinse material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
      c. Use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

B. Paint Removal with Alkaline-Paste Paint Remover:
   1. Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
   2. Apply paint remover to dry, painted metal with brushes or as recommended by manufacturer.
   3. Allow paint remover to remain on surface for period recommended by manufacturer or as determined by preconstruction testing.
   4. Rinse with water applied by low-pressure spray to remove chemicals and paint residue.
   5. Use mechanical methods recommended by manufacturer to remove chemicals and paint residue.
   6. Repeat process if necessary to remove all loose paint.

3.05 REMOVAL, REPAIR, AND REINSTALLATION

A. Perform removal, dismantling, repair, and reinstallation work as required per the architectural drawings.

3.06 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during historic treatment. Where Architect determines that the steel is structural or that it cannot be totally removed for other reasons, prepare and paint the steel per section 09 96 00 "High Performance Coatings".

3.07 FINISH PAINTING

A. See section 09 96 00 "High Performance Coatings" for finish painting requirements.

B. Colors to match existing color palette.

END OF SECTION 05 01 70

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members.

B. Base plates.

1.02 RELATED REQUIREMENTS

A. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

B. Section 09 96 00 - High Performance Coatings: Finish coating.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.

B. Structural Steel Framing:
   1. Basis of Measurement: By the ton.
   2. Basis of Payment: Includes structural members fabricated, placed and anchored.

1.04 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.; 2011.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2010.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

H. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2004 (Reapproved 2009).

I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

J. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

K. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.

L. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

M. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).

N. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.

O. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011.

P. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength; 2014.

Q. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.

R. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.

S. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

T. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2011 w/Errata.

U. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.

V. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.

W. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

X. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.05 SUBMITTALS

A. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

B. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

C. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

D. Fabricator Test Reports: Comply with ASTM A1011/A1011M.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.06 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.

C. Maintain one copy of each document on site.

D. Fabricator: Company specializing in performing the work of this section with minimum 10 years of documented experience.

E. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).

F. Erector: Company specializing in performing the work of this section with minimum 10 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

E. Steel Bars: ASTM A108 Grade 36.

F. Pipe: ASTM A53/A53M, Grade B, Finish as indicated..

G. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A 153/A 153M, Class C.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 or A325M, Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.

I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

J. Shop and Touch-Up Primer: Fabricator's standard for exterior conditions and compatible with finish coating specified in 09 60 00-High Performance Coatings.

K. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard for exterior conditions and compatible with finish coating specified in 09 60 00-High Performance Coatings.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 1.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

2.04 SOURCE QUALITY CONTROL

A. Welded Connections: Visually inspect all shop-welded connections per OSSC and structural drawing requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Welded connections: Visually inspect all field-welded connections per OSSC and structural drawing requirements.

END OF SECTION 05 12 00

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof deck.

B. Composite floor deck.

C. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing.

B. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.

C. Section 05 12 00 - STRUCTURAL STEEL FRAMING: Support framing for openings larger than 18 inches and shear stud connectors.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2013.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.

D. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2013.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

G. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

H. ASTM E384 - Standard Test Method for Knoop and Vickers Hardness of Materials; 2011e1.

I. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2011 w/Errata.

J. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; American Welding Society; 2008.

K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.

L. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; ICC Evaluation Service, Inc.; 2010 (R2013).

M. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; ICC Evaluation Service, Inc.; 2013.

N. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute; 2007.

O. SSPC-Paint 15 - Steel Joist Shop Primer; The Society for Protective Coatings; 1999 (Ed. 2004).

P. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

A. Shop Drawings: Indicate deck plan, support locations, projections, reinforcement, pertinent details, and accessories.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

C. Certificates: Certify that products furnished meet or exceed values indicated in the drawings..

D. Submit manufacturer's installation instructions.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).

C. Installer Qualifications: Company specializing in performing the work of this Section with minimum 10 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Deck:
   1. Canam Steel Corporation; ____: www.canam-steeljoists.ws.

2.02 STEEL DECK

A. All Deck Types: Reference structural drawings.
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 40/275 minimum for roof deck, Grade 50/340 minimum for composite deck, with G90/Z275 galvanized coating.
   2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
   3. Structural Properties:
      a. Section modulus: Reference structural drawings..
      b. Span Design: Double.
   4. Minimum Base Metal Thickness: 20 gage, 0.0359 inch unless noted otherwise on the drawings.
   5. Nominal Height: 1-1/2 inch.
   6. Profile: Per structural drawings..
   7. Formed Sheet Width: 36 inch.
   8. Side Joints: Lapped, welded.
   9. End Joints: Lapped, welded.

B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:

2.03 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.

B. Welding Materials: AWS D1.1/D1.1M.

C. Fasteners: Galvanized hardened steel, self tapping.

D. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
   1. Material: Steel; ASTM A510/A510M, Grade 1077.
      a. Hardness: Rockwell C 54.5, minimum.
      b. Tensile Strength: 285 kips per square inch, minimum.
      c. Shear Strength: 175 kips per square inch, minimum.
      d. Washers:
         1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
         2) Exposed Roof Deck Applications: 0.591 inch diameter, minimum.
      e. Corrosion Resistance:
         1) Steel Bar Joist Framing Applications: ASTM B 633, SC1, Type III zinc electroplate..
         2) Exposed Roof Deck Applications: Provide manufacturer's standard stainless steel sealing caps with bonded neoprene washer over each fastener.
   2. Products:
      a. Hilti; Reference structural drawings..

E. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
   1. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B 633, SC1, Type III zinc electroplate.
   2. Products:
      a. Hilti Kwik-Flex; Reference structural drawings..

F. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.04 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

A. Erect metal deck in accordance with manufacturer's instructions and ICC report. Align and level.

B. Fasten deck to steel support members at ends and intermediate supports per the structural drawings.
   1. Welding: Use fusion welds through weld washers.
   2. Place and secure special deep fluted sections for integral cocnrete bridging.

C. Reference structural drawings for side lap connections.

D. Weld deck in accordance with AWS D1.3/D1.3M.

E. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

F. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

G. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

H. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION 05 31 00

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof-mounted curbs.

B. Roofing nailers.

C. Roofing cant strips.

D. Preservative treated wood materials.

E. Fire retardant treated wood materials.

F. Communications and electrical room mounting boards.

G. Concealed wood blocking, nailers, and supports.

H. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

D. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.

E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Toggle bolt type for anchorage to hollow masonry.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat all exterior rough carpentry items.
      c. Do not use treated wood in direct contact with the ground.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.

a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
b. Treat lumber exposed to weather.
c. Treat lumber in contact with roofing, flashing, or waterproofing.
d. Treat lumber in contact with masonry or concrete.

2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
   a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
   b. Treat plywood in contact with roofing, flashing, or waterproofing.
   c. Treat plywood in contact with masonry or concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

3.05 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.07 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 74 19.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION 06 10 00

SECTION 07 14 16

COLD FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Two-component polyurethane waterproofing.

1.02 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.
   1. Review waterproofing requirements including, but not limited to, the following:
      a. Surface preparation specified in other Sections.
      b. Minimum curing period.
      c. Forecasted weather conditions.
      d. Special details and sheet flashings.
      e. Repairs.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
   2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings:
   1. Show locations and extent of waterproofing.
   2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
   3. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

C. Samples: For each exposed product and for each color and texture specified, including the following products:
   1. Flashing sheet, 8 by 8 inches.
   2. Membrane-reinforcing fabric, 8 by 8 inches.
   3. Insulation, 8 by 8 inches.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.06 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.
   1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F (3 deg C) above dew point.
   2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.07 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: Twenty years from date of Substantial Completion.

B. Installer's Special Warranty: Specified form, [on warranty form at end of this Section,]signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

2.02 TWO-COMPONENT POLYURETHANE WATERPROOFING

A. Two-component, cold fluid-applied reinforced polyurethane waterproofing membrane with a 36 degree needle punched non-woven 165 g/m2 polyester reinforcing fleece, for a finished dry film membrane thickness of .080 inch nominal per ply.
   1. Products:
      a. Kemper System, Inc; Kemperol 2K-PUR.

2.03 AUXILIARY MATERIALS

A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.

B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated acrylic latex, polyurethane, or epoxy.

C. Sheet Flashing: 50-mil- (1.3-mm-) minimum, nonstaining, uncured sheet neoprene.
   1. Adhesive: Manufacturer's recommended contact adhesivae.

D. Membrane Flashing: A composite of the same resin material as filed membrane with 165 g/m2 fleece reinforcement.

E. Joint Sealant: Single component, non-sag elastomeric polyurethane sealant meeting ASTM C920, Type S, Grade NS, Class 35 for use in sealing cracks and joints, and making watertight seals where required and as recommended by manufacturer for substrate and joint conditions.
   1. Backer Rod: Expanded, closed-cell polyethylene foam designed for use with cold-applied joint sealant.

F. Wood nailers and cant strips: New wood nailers and cant strips shall be pressure treated for rot resistance, #2 or better lumber. Asphaltic or creosote treated lumber is not acceptable.

2.04 INSULATION

A. Board Insulation: Polyisocyanurate insulation board with nonasphaltic facers: Meeting or exceeding the requirements for ASTM C1289-06, Type II, Class 1, Grade 3 (25 psi), 1.5" minimum thickness, square edged.
   1. Products:
      a. Hunter Panel, H-Shield.

B. Tapered Insulation: Polyisocyanurate insulation with nonasphaltic facers: Meeting or exceeding the requirements for ASTM C1289-06, Type II, Class 1, Grade 3 (25 psi), 0.5 - 4.5 inch thickness, square edged.
   1. Products:
      a. Hunter Panel, Tapered H-Shield.

2.05 INSULATION COVER BAORD

A. Cement roof board: High compressivestrength, non-combustible, roof underlayment board consisting of aggregated portland cement slurry with polymer-coated glass-fiber mesh, with the following characteristics:
   1. Board weight: 2.4 lbs/sq. ft.

2.	Board thickness:	1/2" inch
3.	Compressive strength:	>1000 psi nominal
4.	Flute spannability	12 inches per ASTM E-661
5.	Permeance	5.84 perms per ASTM E-96
6.	Water absorption	<15% max per ASTM C-473
7.	Mold resistance	10 per ASTM D-3273

B. Products:
   1. USG, Securock.

2.06 SURFACINGS AND COATINGS

A. Color coating: Colored topcoat, as provided by waterproofing membrane manufacturer:
   1. Color to be selected from manufacturer's standard colors.
   2. Products:
      a. Kemper System America, Inc.'s Kemperdur Deko Finish

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
   1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
   2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

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

3.02 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.
   1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.

E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.03 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471.

B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.04 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and

ASTM C 1471. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Comply with ASTM C 1193 for joint-sealant installation.
2. Apply bond breaker on sealant surface, beneath preparation strip.
3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

B. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.

1. Extend sheet flashings for 4 inches onto perpendicular surfaces and items penetrating substrate.

3.05 WOOD NAILER LOCATION AND INSTALLATION

A. Install pressure-treated wood nailers as specified, and as required by the Membrane manufacturer. Wood nailers are required to match the thickness of insulation and cover board, and are to be secured directly to the structural deck. Wood nailers shall be installed at all roof edges and on either side of expansion joints, as well as beneath any equipment flanges.

B. Secure Wood Nailer: Wood nailers shall be firmly fastened to the deck. The wood nailer attachment must be able to resist a minimum force of 200 lbs. per lineal foot, in any direction. Mechanically fasten wood nailers as required to resist a force of 200 lbs per lineal foot, but with no less than 5 fasteners per 8 foot or 6 fasteners per 10 foot length of nailer. Refer to current FM Loss Prevention Bulletin 1-49 for additional attachment recommendations.

3.06 INSULATION/COVER BOARD INSTALLATION

A. General: Insulation and cover board shall be installed in accordance with the insulation/cover board manufacturer's current published specifications and recommendations for use with adhered roofing.

B. Install Insulation/Cover Board: Install only as much insulation and cover board as can be primed, sealed, and protected before the end of the day's work or before the onset of inclement weather.

C. Fit Insulation/Cover Board: Neatly fit insulation/cover board to all penetrations, projections, and nailers. Insulation shall be loosely butted, with gaps not greater than 1/4". All gaps greater than 1/4" must be filled. Cover board shall be loosely butted, with gaps not greater than 1/4". All gaps greater than 1/8" shall be filled with primer and sand or polyurethane sealant.

D. Strip-In Insulation/Cover Board Joints: Strip all insulation/cover board joints with a strip of flashing membrane. Under no circumstances shall the membrane be left unsupported over a space greater than 1/4".

E. Stagger Insulation/Cover Board Joints: When installing multiple layers of insulation, all joints between succeeding layers shall be staggered a minimum of 6" in each direction.

F. Steel Deck Substrates: Place boards perpendicular to steel deck flutes with edges over flute surface for bearing support. Edges shall be checked so that no edges are left substantially unsupported along the flutes.

G. Drain Sumps: Insulation shall be feathered or tapered to provide a sump area a minimum of 36" x 36" where possible at all drains. Taper insulation around roof drains so as to provide proper slope for drainage. In areas where feathered or tapered insulation leaves insulation core exposed, cover with an appropriate cover board or base sheet/cap sheet assembly to provide a sound and smooth substrate surface.

H. Tapered Insulation: Place the constant thickness first layer and the tapered thickness insulation to the required slope pattern in accordance with insulation manufacturer's instructions.

I. Mechanical Attachment: Follow insulation/cover board and fastener manufacturers' recommendations for the appropriate fastener and plate type, size and length. Reference FM

approvals for fastening patterns that satisfy FM wind uplift requirements. Note: additional fasteners are required in the corner and perimeter regions of the roof. Secure insulation/cover board in accordance with approval requirements.

J. Polyurethane Adhesive Attachment: Follow insulation/cover board and adhesive manufacturers' recommendations for the appropriate adhesive application rate and application procedure. Place the boards onto the roofing adhesive beads. Walk on the boards to spread the roofing adhesive for maximum contact. Periodically walk on the boards until firmly attached. Reference FM approvals for adhesive application patterns that satisfy FM wind uplift requirements. Note: additional adhesive is required in the corner and perimeter regions of the roof. Secure insulation/cover board in accordance with approval requirements.

K. Asphalt Adhesive Attachment: Follow insulation manufacturer's recommendations for the appropriate asphalt application rate and application procedure. Set each insulation panel layer in a full mopping of hot steep asphalt (Type III) at the recommended EVT range. Walk on the boards to spread the roofing adhesive for maximum contact. Periodically walk on the insulation boards until firmly attached. Reference FM approvals for asphalt application rates that satisfy FM wind uplift requirements. Secure insulation in accordance with approval requirements.

3.07 PRIMER APPLICATION

A. General:
   1. Mix and apply primer in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary materials, as supplied by the membrane manufacturer.
   2. The substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.
   3. Do not install primer on any substrate containing newly applied and/or active asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.
   4. Apply primer per manufacturer's written instructions to properly prepared substrate.

3.08 WATERPROOFING MEMBRANE APPLICATION

A. Apply waterproofing membrane according to manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471.

B. Start installing waterproofing in presence of manufacturer's technical representative.

C. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.
   1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of 80 mils.
   2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
   3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft.

D. Cure waterproofing, taking care to prevent contamination and damage during application and curing.

3.09 FLASHING APPLICATION

A. General:
   1. Install flashing system in accordance with the requirements/recommendations of the Membrane manufacturer and as depicted on standard drawings and details. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.

2. Wherever possible, install the flashings before installing the field membrane to minimize foot traffic over newly installed field membrane.
3. All membrane flashings shall be installed concurrently with the waterproofing membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Membrane manufacturer. Should any water penetrate the new waterproofing membrane because of incomplete flashings, the affected area shall be removed and replaced at the contractor's expense.
4. Provide a minimum vertical height of 8" for all flashing terminations. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.
5. All flashings shall be terminated as required by the Membrane Manufacturer.

B. Metal flashing - General:
1. Metal flashings shall be fabricated in accordance with the current recommendations of SMACNA and in accordance with standard drawings and project details.
2. Metal flashing flanges to which membrane is to be bonded shall be a minimum of four (4) inches in width, and secured to the substrate or wood nailers six (6) inches on center staggered with fasteners appropriate to the substrate type. The flanges shall be provided with a roughened surface that has been cleaned of all oil and other residue.
3. Metal edges that will be overlaid with membrane shall be provided with a 1/4” min. hemmed edge.
4. Apply primer, resin and fleece to metal flange, extending membrane to outside face of metal edging, and to vertical face of metal base/curb flashing.

C. Membrane Flashing – General:
1. Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise.
2. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.
3. Fleece shall overlap 2” (5 cm) minimum for all joints. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.

D. Pipes, Conduits, and Unusually Shaped Penetrations:
1. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a two (2) inch (5 cm) overlap between vertical and horizontal flashing components.

E. Drains and Scuppers:
1. Acceptable drain and scupper materials are galvanized, galvalum, cast iron, cast aluminum, copper, hard PVC, and ABS.
2. Flashing material shall extend four (4) inches minimum onto drain or scupper flange and into drain/scupper body when possible.
3. Install clamping ring if provided as part of the drain or scupper design. Install a strainer basket to prevent debris from clogging the drainage line.

F. Walls, Curbs and Base Flashings:
1. Wall, curb and base flashings shall be installed to solid substrate surfaces only. Adhering to cementitious stucco, synthetic stucco, wood siding, metal siding, or other similar materials is not acceptable.
2. Reinforce all transition locations and other potential wear areas with a four (4) inch wide membrane strip evenly positioned over the transition prior to installing the exposed flashing layer.
3. Reinforce all inside and outside corners with a four (4) inch diameter conical piece of membrane prior to installing the exposed flashing layer.

4. All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.
5. Extend flashing a minimum of four (4) inches onto the field substrate surface.

G. Electrical Conduit, Gas Lines and Lightning Protection
1. Supports for electrical conduit and gas lines greater than one (1) inch in diameter require the use of a separate engineered support system.
2. Supports for electrical conduit and gas lines one (1) inch or less in diameter, and bases for lightning protection rods and cable, can be adhered directly to the membrane surface with a single-component, high quality polyurethane sealant.

3.10 MEMBRANE PREPARATION FOR SURFACINGS AND COATINGS

A. Membrane must be clean and dry, and free of all contaminants that may interfere with the adhesion of the surfacing and coating to the membrane surface.

B. Membrane exposed less than 48 hours prior to application of surfacing and coating materials does not require special surface preparation. It is highly recommended that all surfacing and coating materials be applied to the membrane surface within 48 hours.

C. Membrane exposed longer than 48 hours will require sanding/scuffing of the surface to remove the hard gloss finish, followed by an MEK or acetone solvent wipe.

3.11 SURFACING AND FINISHES

A. Coating-Type Finish Surfacing
1. Where specified, provide and install Membrane Manufacturer's approved urethane-based or acrylic-based coating applied over clean, fully cured membrane at the manufacturer's recommended application rate.
2. Pre-mix single-component and two-component coatings prior to application to achieve an even consistency and color. Mix thoroughly for approximately 2 minutes with a clean spiral agitator or stir stick without creating any bubbles or streaks. DO NOT AERATE.
3. Apply coating at the manufacturer's recommended application rate. Two coating applications are recommended for best coverage and appearance. After completion of coating, avoid any traffic for a minimum of two (2) days to allow for surfacing to cure.
4. Lay out pavers to avoid less-than-half-width pavers at perimeter or other terminations.

B. Install pavers to vary no more than 1/16 inch (1.6 mm) in elevation between adjacent pavers and no more than 1/16 inch (1.6 mm) from surface plane elevation of individual paver.

C. Maintain tolerances of paving installation within [1/4 inch in 10 feet (1:48)] <Insert surface tolerance> of surface plane in any direction.

3.12 FIELD QUALITY CONTROL

A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after job completion.Testing Agency: [Owner will engage] [Engage] a qualified testing agency to perform tests and inspections:

B. Notification of Completion: Notify the membrane manufacturer of job completion and schedule a final inspection date.Testing agency shall verify thickness of waterproofing during application for each 100 sq. ft. of installed waterproofing or part thereof.

C. Final Inspection: A meeting at the completion of the project with the membrane manufacturer's technical field representative to evaluate the completed installation of the field and flashing membrane. All punch list items are to be completed prior to the scheduled meeting.

D. Flood Test, an alternate to an EFVM test. A flood test of the completed membrane and flashing system shall be conducted prior to the installation of any overburden/surfacing. The flood test shall be of a 24 hr. minimum duration, and shall apply a water head of 2" over the entire application area. Any incidents of water entry shall be evaluated and all necessary repairs conducted, followed by an additional flood test.

E. Prepare test and inspection reports.

F. Issuance of the Warrantee: Complete all post installation procedures in accordance with the manufacturer's guidelines for warranty issuance of the specified warrantee.

3.13 PROTECTION

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed board insulation from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 14 16

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings and counterflashings.

B. Sealants for joints within sheet metal fabrications.

C. Reglets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking for batten seams.

B. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012)e1.

F. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

B. Samples: Submit two samples 6 inch in size illustrating metal finish color.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage (0.0239 inch) thick base metal.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As shown on drawings.

2.02 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I ("No. 15").

C. Primer: Zinc chromate type.

D. Protective Backing Paint: Zinc molybdate alkyd.

E. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.

F. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

G. Plastic Cement: ASTM D4586, Type I.

H. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Conform to drawing details.

B. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

C. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

D. Apply plastic cement compound between metal flashings and felt flashings.

E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

F. Seal metal joints watertight.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 07 62 00

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2000 (Reapproved 2011).

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

F. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2010.

G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

H. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.

I. SWRI (VAL) - SWR Institute Validated Products directory; Sealant, Waterproofing and Restoration Institute; online at http://www.swrionline.org/ValidatedSealants.

1.03 SUBMITTALS

A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Substrates for which laboratory adhesion and/or compatibility testing is required.
   7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   8. Sample product warranty.
   9. Certification by manufacturer indicating that product complies with specification requirements.
   10. SWRI Validation: Provide currently available sealant product validations as published by SWRI for specified sealants.

B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

E. Installation Plan: Submit at least four weeks prior to start of installation.

F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

G. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

H. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

I. Installation Log: Submit filled out log for each length or instance of sealant installed.

J. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

C. Field Testing Agency Qualifications: Experienced in performing the inspections/testing specified, with qualified technicians on staff.

D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 36 months, that shows satisfactory adhesion, lack of staining, and compatibility.

E. Installation Plan: Include schedule of sealed joints, including the following.
   1. Joint width indicated in contract documents.
   2. Joint depth indicated in contract documents; to face of backing material at centerline of joint.
   3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
   4. Approximate date of installation, for evaluation of thermal movement influence.
   5. Installation Log Form: Include the following data fields, with known information filled out.
      a. Date of installation.
      b. Name of installer.
      c. Actual joint width; provide space to indicate maximum and minimum width.
      d. Actual joint depth to face of backing material at centerline of joint.
      e. Air temperature.

F. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
   1. Identification of testing agency.
   2. Name(s) of sealant manufacturers' field representatives who will be observing
   3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.

a. Test date.
b. Copy of test method documents.
c. Age of sealant upon date of testing.
d. Test results, modeled after the sample form in the test method document.
e. Indicate use of photographic record of test.

G. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
b. If any failures occur in the first 10 linear feet, continue testing at 12 inch intervals at no extra cost to Owner.
3. Field testing agency's qualifications.
4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

H. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

I. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
2. Repair failed portions of joints.

1.05 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
1. Pecora Corporation: www.pecora.com.

B. Selfleveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
1. Pecora Corporation: www.pecora.com.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
a. Wall expansion and control joints.
b. Joints between different exposed materials.
c. Joints at sign and marquee components..
2. Do not seal the following types of joints.

a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
c. Joints where installation of sealant is specified in another section.

B. Exterior Joints: Use nonsag non-staining silicone sealant, Type 1, unless otherwise indicated.
1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing; Type 2.
2. Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing; Type 2.

2.03 JOINT SEALANTS - GENERAL

2.04 NONSAG JOINT SEALANTS

A. Type 1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Color: To be selected by Architect from manufacturer's standard range.
5. Products:
a. Pecora Corporation; 890FTS Field Tintable Ultra Low Modulus Architectural Silicone Sealant - Class 50: www.pecora.com.

B. Type 2 - Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

2.05 SELF-LEVELING SEALANTS

A. Type 3 - Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Products:
a. Pecora Corporation; NR-200 Self-Leveling Traffic-Grade Polyurethane Sealant: www.pecora.com.

2.06 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
3. Open Cell: 40 to 50 percent larger in diameter than joint width.
4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
5. Products:
a. Type O: Backer Rod Mfg., Inc; Denver Foam Open Cell Polyurethane Backer rod; www.backerrod.com.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location shown in the test plan.
   1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
   2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
   3. Arrange for sealant manufacturer's technical representative to be present during tests.
   4. Record each test on Preinstallation Adhesion Test Log as indicated.
   5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
   6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.

C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION 07 92 00

SECTION 09 96 00
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings and surface preparation for the following:
   1. Architectural sheet metal at existing marquees.
   2. Existing structural steel.
   3. New structural steel.

1.02 REFERENCE STANDARDS

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; current edition, www.paintinfo.com.

C. SSPC-SP 1 - Solvent Cleaning; Society for Protective Coatings; 2015.

D. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings; 2007.

E. SSPC-SP 11 - Power Tool Cleaning to Bare Metal; Society for Protective Coatings; 2012.

1.03 SUBMITTALS

A. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
   3. Manufacturer's installation instructions.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.

B. Samples: Submit two samples 8 x 8 inch in size illustrating colors available for selection.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Data: Include cleaning procedures and repair and patching techniques.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon of each type and color.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.05 MOCK-UP

A. Provide mock-up of marquee section, four feet long by four feet wide, illustrating coating, color, and surface sheen, for each specified coating.

B. Locate where directed.

C. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.

C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

E. Restrict traffic from area where coating is being applied or is curing.

1.08 WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide high performance coating products from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

B. High-Performance Coatings:
   1. Tnemec Company, Inc; Fluoronar Series 1072: www.tnemec.com.
   2. Substitutions: Section 01 60 00 - Product Requirements.

2.02 HIGH-PERFORMANCE COATINGS

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."

2.03 TOP COAT MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
   1. Colors: to match existing historic colors.

B. Fluoropolymer Coating System Type P-1:
   1. Number of Coats: Two minimum.
   2. Finish Coat: High-Solids Fluoropolymer, Exterior, High Performance Architectural.
      a. Sheen: Satin.
      b. Percentage of solids by volume: 60.0 +/- 2.0% (mixed), minimum.
      c. Dry film thickness, per coat: 2.0 to 3.0 mils minimum.
      d. Products:
         1) Tnemec Fluoronar Series 1072.
   3. Intermediate Coat: Polyamidoamine Epoxy, Exterior, High Performance Architectural
      a. Sheen: Satin.

b. Percentage of solids by volume: 67.0 +/- 2.0% (mixed), minimum.
c. Dry film thickness, per coat: 3.0 to 5.0 mils minimum.
d. Products:
1) Tnemec Hi-Build Epoxoline II Series N69

4. Primer: As recommended by coating manufacturer for specific substrate.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
1. Aromatic Polyurethane, Mio-Zinc Filled Primer.
a. Products:
1) Tnemec Perimeprime Series 394.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. Proceed with coating application only after unacceptable conditions have been corrected.
1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Existing Painted and Sealed Surfaces:
1. Strip existing paint and coatings from surface.
2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

E. Metal:
1. Solvent clean according to SSPC-SP1.
2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning", and protect from corrosion until coated.
3. In addition, for surfaces to be finished with Coating Type P-1, remove tight rust, and shop primer, if any to bare metal using power tools according to SSPC-SP 11 "Power Tool Cleaning to Bare Metal", and protect from corrosion until coated.

F. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.06 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.07 PROTECTION

A. Protect finished work from damage.

3.08 SCHEDULE

A. Colors: To mach existing historic marquee colors.

B. Exterior metal at marquees and marquee parapets including interior cavities to all be painted with Type P-1.

END OF SECTION 09 96 00

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. "PORTLAND" Blade sign display
   1. Sign display consists of the existing steel blade sign frame that will be refurbished by sign fabricator and a new aluminum sign cladding on the frame to match existing design for the north and south blade signs.

1.02 RELATED REQUIREMENTS

A. Refer to the existing "PORTLAND" sign cladding for design intent, frame construction, lettering font, foreground mounting, dimensions, and colors for new cladding.

B. Refer to existing strucutral and architectural drawings of the sign.

C. Section 05 01 70 - Maintenance of Decorative Metal: Refurbishment of sign cladding steel frame

D. Section 09 96 00 - High-Performance Coatings: Coatings on steel surfaces

1.03 SUBMITTALS

A. Shop Drawings: Provide detailed drawings showing that the new blade sign display cladding will be a like-for-like representation of the original sign cladding.

B. Engineers Calculations: Provide engineers calculations for framework modifications and attachments to support the integrity of the existing structure and attachments.

C. Samples: Submit material and color samples illustrating the finished colors of the sign. Colors shall match original sign.

D. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Fabricator shall remove and protect all existing LED bulbs from the existing blade sign for use on the newly re-furbished sign display.

B. Protect all sign display sections and components from damage during transport from site and to site for installation.

C. Store & protect the display from adverse conditions during the refurbish process. All surfaces shall be protected from water and humidity to ensure positive adhesion of primer and finished paint products.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below
   1. Sheet aluminum: ASTM B209, Alloy 5052-H38.

B. Existing steel frame, General: Utilize existing steel frame for the blade signs. Clean and prep for new finishes per specificaiton 05 01 70 - Maintenance of Decorative Metal.

2.02 FIINISHES

A. Aluminum
   1. All external final paint finishes shall be Matthews Acrylic Polyurethane or approved equal

B. Steel
   1. Internal steel structure and all structural steel components shall be coated with a high-performance coating per 09 96 00 - High-Performance Coatings.

2.03 NEON

A. **General**
   1. Neon tubing and processing equipment shall be EGL or Erucom certified.
   2. Tubing shall be 15mm C.L. Designer 65 White as approved by owner/representative.

B. Processing
   1. Processing is the life of the neon tubing. It is critical that all equipment and techniques conform to the requirements of this section. This is the minimum quality acceptable.
   2. Processing equipment must be capable of achieving and maintaining a vaccum of less than 5 microns.
   3. Gauges must include a temperature gauage for glass temperature, milliamp bombarding meter, torr or positive pressure gas filling gauge and a vacuum gauge.
   4. Tubes shall be individually processed and filled with industry standard filling pressures.
   5. Neon tubing must be heated to a minimum 250 degrees Celsius (485 degrees Fahrenheit).
   6. Gas must be filled at no less than 50 degrees Celsius (122 degrees Fahrenheit).
   7. All neon units must be welded to manifold for evacuation. No tube or hose-type connections are acceptable.
   8. Only triple distilled mercury in glass bottles must be used. Mercury despensers must be glass.
   9. Neon units must be aged (operated) for a minimum of 24 hours prior to installation.
   10. Neon units shall be warranted for two years to be trouble free.
   11. All neon units four feet or less must add 2mm gas pressure ot the gas pressure chart levels.

C. Transformers and Wiring
   1. Transformers must comply with local and federal codes. All transformer certification must clearly be marked.
   2. Transformers must be loaded in accordance with ANSI footage charts and a 5-10% reduction of load shall be employed.
   3. All neon installations shall be tested with a milliamp meter to ensure they are operating within guidelines.
   4. High voltage cable wiring shall not exceed 15 feet in any case.
   5. Primary wiring shall be isolated from the high voltage neon transformer wiring.
   6. Transformers with a maximum 12,000 volt secondary voltage shall be used. No 15,000 volt are to be sued.
   7. Proper grounding and bonding must be followed per current code requirements.
   8. Maintain 1.5" spacing minimum of high voltage cables from surfaces.
   9. Use of PVC electrode insulators for outdoor applications are prohibited.
   10. All GTO high voltage cable must be reated for 15,000 volt operation.
   11. All transformers must be HPF (High Power Factor).
   12. Installation and transformers must be warranted agasint defect for two (2) years minimum.

2.04 FABRICATION

A. Refer to original drawings, existing sign display, and fabricator's shop drawings as approved by owner for fabrication of sign display cladding.

B. Sign display cladding shall be installed on existing steel frame once it is refurbished.

C. Sign display cladding to be fabricated from sheet aluminum with minimum thicknesses as indicated below:
   1. Background/ face panels including front, back, and sides: 0.125 inches

2. Scrollwork/ channel returns: 0.090 inches

D. Sign display cladding side panels to be fabricated from 3'-0" segments to allow for continuous access to electrical components inside the sign display.

E. Seams shall be tight and free of burrs or curled edges.

F. Sign display to incorporate weep holes and positive drainage at horizontal surfaces to prevent standing water on the display.

G. Sign display to incorporate neon letters per original design. See specification _____

H. Sign display to incorporate chase light sockets per original design for installation of salvaged LED bulbs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify site conditions before starting work.

B. Verify that substrate surfaces are ready to receive work. Verify Street/Sidewalk closure requirements with the city prior to mobilization on site.

C. Verify sequencing for removal of existing sign with owner and general contractor. Ideally, one blade sign as selected by owner, to remain on the building during fabrication of the other blade sign if feasible.

D. Provide detailed photo documentation of the refurbish process is required. Fabricator to allow factory visits by owner/representative during the process.

3.02 INSTALLATION

A. Coordinate re-installation of the display.

B. Install sign display level, plumb, and at the original height of the existing display sign with sign surfaces free from distortion or other defects in appearances.

C. Verify building connections and provide any required welding inspection reports prior to installation.

D. Install salvaged LED chase bulbs.

E. Owner/ Representative shall do a final inspection of the structure/display to ensure work performed is acceptable prior to transport to location.

F. Protect from damage until Substantial Completion; repair or replace damage items.

END OF SECTION 10 14 00

SECTION 26 0501
MINOR ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Demolition drawings are based on casual field observation and existing record documents.

C. Report discrepancies to Owner before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

2.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

2.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
   1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
   2. PCB- and DEHP-containing lighting ballasts.
   3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

F. Disconnect and remove abandoned panelboards and distribution equipment.

G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

I. Repair adjacent construction and finishes damaged during demolition and extension work.

J. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

2.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment that remain or that are to be reused.

B. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

C. Electrical tape.

D. Heat shrink tubing.

1.02 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

D. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

E. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; National Electrical Manufacturers Association; 2009 (ANSI/NEMA WC 70/ICEA S-95-658).

H. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

J. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

K. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

L. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

M. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

N. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

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

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

C. Nonmetallic-sheathed cable is not permitted.

D. Metal-clad cable is not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

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

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

D. Comply with NEMA WC 70.

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

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

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.

H. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      b. Equipment Ground, All Systems: Green.
      c. Travelers for 3-Way and 4-Way Switching: Purple.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
   1. Copper Building Wire:
      a. Cerro Wire LLC: www.cerrowire.com.
      b. Encore Wire Corporation: www.encorewire.com.
      c. Southwire Company: www.southwire.com.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
   1. Feeders and Branch Circuits:
      a. Size 10 AWG and Smaller: Solid.
      b. Size 8 AWG and Larger: Stranded.

2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.04 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:
1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

C. Wiring Connectors for Terminations:
1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
2. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
3. Conductors for Control Circuits: Use crimped terminals for all connections.

D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

G. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.05 WIRING ACCESSORIES

A. Electrical Tape:
1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage wire and cable has been completed.

B. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

C. Verify that field measurements are as shown on the drawings.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location shown.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
   7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
      a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
      b. Increase size of conductors as required to account for ampacity derating.
      c. Size raceways, boxes, etc. to accommodate conductors.
   8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

F. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

G. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

H. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

I. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

J. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

K. Insulate ends of spare conductors using vinyl insulating electrical tape.

L. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

M. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

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

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
   1. Use insulated copper conductors unless otherwise indicated.

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as shown on the drawings.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.

END OF SECTION

SECTION 26 0534
CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flexible metal conduit (FMC).

B. Liquidtight flexible metal conduit (LFMC).

C. Electrical metallic tubing (EMT).

D. Conduit fittings.

E. Accessories.

1.02 REFERENCE STANDARDS

A. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

C. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); National Electrical Contractors Association; 2013.

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2012 (ANSI/NEMA FB 1).

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

G. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

H. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

I. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

D. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

E. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

F. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).

G. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.

H. Exposed, Exterior: Use galvanized steel rigid metal conduit.

I. Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.

2.02 CONDUIT REQUIREMENTS

A. Fittings for Grounding and Bonding: Also comply with Section 26 0526.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

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

D. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homeruns: 1/2 inch inch (16 mm) trade size.
   3. Control Circuits: 1/2 inch (16 mm) trade size.
   4. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
   5. Underground, Interior: 3/4 inch (21 mm) trade size.
   6. Underground, Exterior: 3/4 inch (21 mm) trade size.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.06 ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

3. Connectors and Couplings: Use compression (gland) or set-screw type.
   a. Do not use indenter type connectors and couplings.

2.07 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
   5. Arrange conduit to maintain adequate headroom, clearances, and access.
   6. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
   7. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
   8. Route conduits above water and drain piping where possible.
   9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   10. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
   11. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
      a. Heaters.
      b. Hot water piping.
      c. Flues.
   12. Group parallel conduits in the same area together on a common rack.

E. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).

F. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

G. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
5. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

I. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.

J. Provide grounding and bonding in accordance with Section 26 0526.

3.03 FIELD QUALITY CONTROL

A. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0537
BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2012 (ANSI/NEMA FB 1).

C. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2013 (ANSI/NEMA OS 1).

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

I. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Project Record Documents: Record actual locations for junction boxes, pull boxes, and cabinets and enclosures.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
   4. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
   5. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
   6. Minimum Box Size, Unless Otherwise Indicated:
      a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
      a. Indoor Clean, Dry Locations: Type 1, painted steel.
      b. Outdoor Locations: Type 4X, stainless steel.
   3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
      a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
      b. Boxes 6 square feet (0.56 sq m) and Larger: Provide hinged-cover enclosures.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces are ready to receive boxes.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Box Locations:
   1. Unless dimensioned, box locations indicated are approximate.
   2. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
   3. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0534.

G. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

H. Install boxes plumb and level.

I. Install boxes as required to preserve insulation integrity.

J. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

K. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

L. Close unused box openings.

M. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

N. Provide grounding and bonding in accordance with Section 26 0526.

O. Identify boxes in accordance with Section 26 0553.

3.03 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Warning signs and labels.

1.02 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
   2. Do not install identification products until final surface finishes and painting are complete.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Switchboards:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location when not within sight of equipment.
         4) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
      b. Panelboards:

1) Identify ampere rating.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

c. Enclosed switches, circuit breakers, and motor controllers:
1) Identify voltage and phase.
2) Identify power source and circuit number. Include location when not within sight of equipment.
3) Identify load(s) served. Include location when not within sight of equipment.

d. Busway:
1) Identify ampere rating.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Provide identification at maximum intervals of 40 feet (12 m).

2. Emergency System Equipment:
a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.
3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.
4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
5. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".

B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
2. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

C. Identification for Raceways:
1. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet (6.1 m).
a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches (76 mm) wide.
1) Color Code:
(a) Emergency Power System: Red.
2) Field-Painting: Comply with Section 09 9123 and 09 9113.
3) Vinyl Color Coding Electrical Tape: Comply with Section 26 0519.
2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.

D. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
2. Use voltage markers or color coded boxes to identify systems other than normal power system.
a. Color-Coded Boxes: Field-painted in accordance with Section 09 9123 and 09 9113 per the same color code used for raceways.
1) Emergency Power System: Red.
2) Fire Alarm System: Red.
b. For exposed boxes in public areas, do not color code.

3. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

E. Identification for Devices:
1. Use identification label to identify fire alarm system devices.
2. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
3. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
4. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
a. Indoor Clean, Dry Locations: Use plastic nameplates.
b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
a. Exception: Provide minimum thickness of 1/8 inch (3 mm) when any dimension is greater than 4 inches (100 mm).
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
2. Legend:
a. System designation where applicable:
1) Emergency Power System: Identify with text "EMERGENCY".
2) Fire Alarm System: Identify with text "FIRE ALARM".
b. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
a. System Designation: 1 inch (25 mm).
b. Equipment Designation: 1/2 inch (13 mm).
5. Color:
a. Normal Power System: White text on black background.
b. Emergency Power System: White text on red background.
c. Fire Alarm System: White text on red background.

D. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch (5 mm).
5. Color: Black text on clear background.

E. Format for Fire Alarm Device Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
2. Legend: Designation indicated and device zone or address.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch (5 mm).
5. Color: Red text on white background.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch (3 mm).

F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

C. Minimum Size:
1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
4. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).

D. Legend:
1. Markers for Voltage Identification: Highest voltage present.
2. Markers for System Identification:
a. Emergency Power System: Text "EMERGENCY".

E. Color: Black text on orange background unless otherwise indicated.

2.05 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
1. Materials:
2. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.

C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Enclosure front.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Branch Devices: Adjacent to device.
   6. Interior Components: Legible from the point of access.
   7. Conduits: Legible from the floor.
   8. Boxes: Outside face of cover.
   9. Conductors and Cables: Legible from the point of access.
   10. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Mark all handwritten text, where permitted, to be neat and legible.

3.02 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 26 0917
PROGRAMMABLE CONTROLLERS

PART 2 PRODUCTS

END OF SECTION

SECTION 26 2943
PROGRAMMABLE LOGIC CONTROLLERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. References:
   1. NFPA 70 (NEC)
   2. Programming Languages IEC 61131-3

1.02 SUMMARY

A. This Section includes Programmable logic controllers for control of Marquee lighting systems.

1.03 DEFINITIONS

A. AI: Analog Input

B. AO: Analog Output

C. Fixed: A PLC style consisting of a fixed number of I/O, a processor, and a power supply all in one enclosure. Some fixed PLCs have limited expansion ability.

D. CPU: Central Processing Unit

E. DI: Digital Input

F. Distributed I/O: Hardware that has been specially designed to function as Remote I/O.

G. DO: Digital Output

H. I/O Input and/or Output

I. Modular: A PLC style consisting of cards that are assembled to comprise a complete unit. All I/O, CPU, and Power Supply are dedicated cards. Typically, these cards are inserted into a chassis.

J. PLC: Programmable Logic Controller

1.04 SUBMITTALS

A. Product Data: For each type of PLC include dimensions, mounting arrangements, and weights. Also include manufacturer's technical data on features, performance, electrical ratings, characteristics, and terminal connections.

B. Operation and Maintenance Data: Provide for each PLC component literature detailing routine maintenance requirements (if any).

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer shall have, within 100 miles (160km) of Project site, a facility, distributor, system integrator, or panel shop capable of providing training, parts, and coordination of emergency maintenance and repairs.

B. Source Limitations:
   1. Provide all PLCs from a single manufacturer. If the PLC manufacturer has authorized third party vendors to provide modules that are compatible with their platforms, then products manufactured by these authorized third party vendors will be acceptable.

C. Comply with NFPA 70.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver PLC components in packaging designed to prevent damage from static electricity, and physical damage.

B. Store PLCs according to manufacturers' requirements.

1.07 PRODUCT PROTECTION

A. Control panel designer shall provide independent line fuses or circuit breakers, per the manufacturer's recommendation, for each power Supply, Input Module, Output Module, and other modules with separately derived power requirements.

B. Control panel designer shall insure that communication signals, 4-20mA signals, embedded HART signals, are properly conditioned for the PLC and protected from all sources of radiated energy or harmonics.

1.08 SPARE I/O

A. Each PLC will be sized to handle the required I/O plus a percentage of spares. When calculating spare I/O count, always round up. When configuring spare I/O counts, use the following criteria:
   1. Analog Inputs (AI): Required for the PLC plus 10%.
   2. Analog Ouputs (AO): Required for the PLC plus 10%.
   3. Digital Inputs (DI): Required for the PLC plus 10%.
   4. Digital Outputs (DO): Required for the PLC plus 10%.

1.09 SPARE PARTS

A. Furnish spare parts as described below for each type of PLC. Material shall be packaged for long term storage and identified with labels describing contents.
   1. I/O Cards: Provide as a minimum a spare of each type of card identified. Provide an additional spare for every 10 cards of a specific type installed.
   2. Processors: Provide as a minimum a spare for each type of CPU identified.
   3. PLC oriented Power Supplies: Provide as a minimum a spare of each type of power supply identified. Provide an additional spare for every 10 power supplies of a specific type installed.
   4. Memory Cards: Provide as a minimum a spare of each type of card identified. Provide an additional spare for every 10 cards of a specific type installed
   5. Specialty Modules: Provide as a minimum a spare of each type of module identified. Provide an additional spare for every 10 modules of a specific type installed

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Qualified Manufacturers:
   1. Only manufacturers that have been selling PLCs for a minimum of twenty years will be considered acceptable.

B. Basis-of-Design Product: Square D - Schneider Electric; Programmable Controllers

2.02 PROGRAMMABLE LOGIC CONTROLLERS

A. GENERAL:
   1. Description: A chassis mount PLC designed for up to 1024 points of I/O.
   2. The PLC shall:
      a. Collect data, perform process control functions, communicate with other PLCs, and distribute process information along the local area network.
      b. Be able to have its program downloaded from a remote workstation over a network, or locally programmed from a portable laptop computer.
      c. Allow for the expansion of the system by addition and configuration of hardware.
   3. Executive firmware shall be stored in Flash memory and can be updated in the field using standard programming tools. Executive firmware files shall be readily available via a public web site.
   4. Each discrete point shall have a light emitting diode to indicate point status. Green shall indicate that the point is logic level "1", also referred to as "on" or "high".
   5. The PLC shall utilize Ethernet protocols that meet the following:
      a. Protocols that are assigned to port 502 of the TCP/IP stack by the IANA (Internet Assigned Numbers Authority).

b. Programming software will have embedded network configuration tools that utilize FDT/DTM technologies. PLC systems that have the PLC programming and network configuration tools in separate software will not be acceptable.
c. Will not rely on third party vendors to meet the above criteria.

6. Processors:
   a. Each General Processor shall have a USB terminal port for programming. The processor shall accept an 8Mb SD memory card. This card shall be capable of storing, at a minimum application files, data files, PDF files, CAD files, Microsoft office files. Processor performance shall be rated at least 6,900 instructions per millisecond at a program make up of 65% Boolean and 35% numerical. Acceptable processors are detailed below:
7. General Processors
   a. 4,096 Kb of internal user RAM. Processor shall have a multi-protocol serial port, and an Ethernet port.
   b. Upon power loss, the PLC shall insure memory is transferred to flash memory before PLC RAM powers down. PLCs with a battery backup will not be accepted.
   c. The PLC shall have on board status lights to indicate the following various functions:
      1) Green RUN lamp that will illuminate while the program is executing
      2) Red ERR lamp that will illuminate when a fault occurs in the processor
      3) Red I/O Lamp that will illuminate upon an I/O failure or configuration fault.
      4) Yellow SER COM lamp will illuminate when activity is present on the serial port
8. General I/ O Cards: The PLC shall have a series of general I/O cards. They will be as follows:
   a. Discrete Inputs:
      1) Sixteen (16) channel 120VAC input card
   b. Discrete Outputs:
      1) Sixteen (16) channel 24VDC (0.5A/channel) protected transistor sink and source output cards
      2) Thirty-two (32) channel 24VDC (0.5A/channel) protected transistor source output card
      3) Sixty-Four (64) channel 24VDC (0.5A/channel) protected transistor sink output card
      4) Eight (8) channel 24VDC 24VDC/240VAC isolated relay output card
      5) Sixteen (16) channel 24VDC/240VAC relay output card
      6) Sixteen (16) channel 48-240VAC (1A/channel) triac output card.
   c. Communication Capabilities: The PLC shall support the following without the need for third party modules
      1) The PLC shall have an Ethernet card with four (4) ports. Each port shall be capable of communicating both Modbus TCP, and Ethernet I/P simultaneously. Cards requiring that the port be configured for one protocol will not be accepted. The card will also support daisy chain wiring.
   d. Power Supplies: The PLC shall have chassis mounted power supplies to provide power for the processor and applicable modules. The power supplies shall be available in both 24 VDC and 115 VAC models. The available power ratings will be from 16 to 36W.
   e. Chassis: The chassis shall come in 4, 6, 8, and 12 position configurations. The cards will be secured to the chassis via a screw connection.
   f. Other:
      1) Programming cable: The PLC shall utilize a USB to Mini B cable for programming. This cable shall be compatible with those designed for downloading digital cameras to USB compatible PC. Accordingly, this cable shall be available through most traditional retail stores serving the consumer electronics market.

2) Alarming: The PLC shall have a configurable alarming capability. Each alarm point can be configured to display an alphanumeric message in the alarm buffer. The buffer can be displayed via a web page, or on an operator interface screen.
3) I/O Connector cables:
   (a) Unterminated connector cables shall have one end terminated to HE10 terminal block modules. The other end shall be unterminated to allow custom interface to panel devices.
   (b) Terminated connector cables shall have one end terminated to interface to terminal block, or FCN socket, cards. The other end shall be terminated to interface with HE10 terminal block modules.

B. PLC PROGRAMMING REQUIREMENTS:
1. All specified PLC platforms will be programmed using the same programming software package. PLCs that use multiple software programming packages under similar trade names will not be accepted.
2. The system shall be designed to execute all languages without a significant decrease in processing speed.
3. Programming software shall have integrated tools for network configuration, and communication capabilities. PLC's that use separate programming, communication, and network configuration software shall not be accepted.

C. PLC ENVIRONMENTAL REQUIREMENTS:
1. The PLCs must meet or exceed the following environmental requirements:
   a. Minimum temperature range:
      1) Operating: -25 to +70o C (-13 to +158oF)
   b. Relative humidity: 30 to 95% non condensing.
   c. Altitude:
      1) Operation 0-6,500 feet minimum
      2) Storage 0-9,800 feet minimum
   d. Degree of protection: NEMA 1 (IP20)
   e. Shock resistance: 147m/s2 for 11ms.

D. WEB SERVICES:
1. Description: The PLC's shall be designed for connection to the World Wide Web via standard and customizable web pages. Standard web pages shall display all internal status points, status registers, alarm words, and status of each I/O point. Customizable web pages shall be created by the programmer to display the actual process or machine being operated.

E. BASIS OF DESIGN:
1. Basis of Design: The basis of design is the Modicon M340 Platform.

PART 3 EXECUTION

3.01 INSTALLATION

A. PLC mounting shall be in accordance with manufacturers requirements. This includes anchorage within enclosures, spacing, wire sizing, and ventilation requirements. Before starting up, remove all temporary stickers used to cover ventilation holes.

B. Wiring, wire ducts, or other devices shall obstruct the removal of cards from the rack.

C. PLC lights, keys, communication ports, and memory card slots shall be accessible at all times. Lights shall be visible at all times when enclosure door is opened.

3.02 IDENTIFICATION

A. Identify PLC components, and wiring according to all applicable codes, standards and contract document sections.

B. Each I/O point shall be identified on the door of PLC I/O cards.

C. DEMONSTRATION

1. Control panel supplier shall provide a qualified service representative to train Owner's maintenance personnel to adjust, operate, and maintain PLCs. Manufacturer’s standard training will be sufficient unless specified elsewhere.

3.03 FIELD QUALITY CONTROL

A. Field Service: The PLC based control panel supplier shall provide a qualified service representative to perform the following:
   1. Inspect PLCs, wiring, components, connections, and equipment installation.[Test and adjust supplied programmable controllers, components, and equipment.]
   2. Assist in field testing of equipment[including pre-testing and adjusting of controllers and its associated application program if necessary.].
   3. Report results in writing.

3.04 DEMONSTRATION

A. Control panel supplier shall provide a qualified service representative to train Owner's maintenance personnel to adjust, operate, and maintain PLCs. Manufacturer’s standard training will be sufficient unless specified elsewhere.

END OF SECTION

SECTION 26 5600
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

B. Lamps.

C. Luminaire accessories.

1.02 REFERENCE STANDARDS

A. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; Illuminating Engineering Society; 2008.

B. IES LM-80 - Approved Method: Measuring Lumen Maintenance of LED Light Sources; Illuminating Engineering Society; 2008.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

D. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems; National Electrical Contractors Association; 2006.

E. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2012.

F. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 1598 - Luminaires; Current Edition, Including All Revisions.

H. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Notify Engineer of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Include IES LM-79 test report.
      c. LED Light Engine specification sheet
      d. Driver specification sheet
      e. Surge protection specification sheet
      f. In-Situ temperature test

D. Bidders may also be asked for the following information to validate the lumen maintenance curves. These items should be furnished within two business days, when requested:

1. Brief explanation of methodology used to arrive at the projected lumen maintenance
2. The LED manufacturer's LM-80 test report for a minimum of 6000 hours testing

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

C. The LED Light Engine must be classified by an OSHA Nationally Recognized Testing Laboratory (NRTL) as complying with UL 1598c and UL 8750 (Examples of NRTLs include CSA, Intertek [ETL], and UL).

D. All electrical components in LED Light Engine shall be RoHS compliant.

E. The manufacturer shall submit documentation of the calculated life expectancy of their LED Light Engine. The documentation provided shall be based upon in-situ TSP temperature data from an independent Energy Star qualified lab (as described in 5. above) and the LM-80 lumen maintenance data provided by the LED Light Engine manufacturer's LED supplier. The resulting calculated L70 or lifetime of the LED Light Engine shall be no less than 70,000 hours

F. Product shall be ARRA Compliant

G. Be able to produce Salt Spray testing data of no less than four (4) years

H. Comply with all National Electrical Manufactures Standards (NEMA) Standards

I. Be UL approved and listed in the Sign Components Manual (SAM manual) for both new construction and in field retrofit applications

J. Be produced in an ISO-9001 United States Manufacturing facility

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

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

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

H. Recessed Luminaires:
   1. Ceiling Compatibility: Comply with NEMA LE 4.
   2. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.

I. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

J. LED Light Engines
   1. General:
      a. LED Light Engine manufacturer shall have produced LED Light Engines for signage for a minimum of 5 years at the time of this bid.
      b. Proposed specific products must be available, in full production for a minimum of one (1) year.
      c. Proposed products must be able to meet new construction and retrofit signage at all required current & future signage wattages/Amps.
      d. The luminaire shall have a minimum 7-year Photometric Performance Warranty and a 7-year outage warranty covering the LED Light Engine, and shall have a minimum 5-year outage warranty covering the power supply.
   2. Mechanical Requirements:
      a. Heat sinking for the LED Light Engine and electrical components shall be integral to the LED Light Engine itself, with no moving or active parts (it should be a passive heat sink). It shall be shaped to maximize heat movement, and designed so that dirt and debris will not accumulate between fins or channels.
      b. The LED Light Engine shall operate in ambient temperatures of -40?C (-40?F) to +40?C (140?F).
      c. The LED Light Engine finish (exposed surface) shall withstand minimum 1000 hours salt spray resistance testing per ASTM B117.
   3. LED Package (Light Source) Requirements
      a. The LEDs shall be from Cree, Edison Optics, Nichia, Osram or Philips Lumileds
      b. The LED package shall have been tested for a minimum of 6000 hours per IES LM-80-08.
      c. The LEDs shall have a nominal correlated color temperature (CCT) options as follows: [5000K +/-500k].
      d. The LEDs shall have a minimum color rendering index (CRI) of 80.
      e. The projected L-70 lifetime (the point in time at which the LEDs are expected to produce only 70% of their initial lumen output) for the LED Light Engine shall be a minimum of 70,000 hours. Manufacturer shall supply a calculation pursuant to the Department of Energy TM-21 calculations. Please follow this link to the DOE TM-21 calculator - www.energystar.gov/TM-21calculator.
   4. Photometric Requirements
      a. The LED Light Engine shall deliver gross initial Lumens per sign type as follows
         1) 375 Lumens PSF
   5. Electrical Requirements
      a. The driver (power supply) shall have the following characteristics:
         1) UL recognized component listed for outdoor use
         2) Minimum power factor 0.90
         3) Maximum THD (Total Harmonic Distortion) 20%
         4) Compliance with FCC Title 47, Part 15 (Class A)
         5) Operating Temp Ranges Advance -40? - 60? C operating temp. = -40?F 140?F
      b. The driver shall be available with input voltage ranges from 120-277 or 347-480 volts.
      c. The driver, as operated in the sign, must not exceed the driver manufacturer's maximum case temperature limits for a rated life of at least 50,000 hours.

d. The LED Light Engine shall be protected against surges according to IEEE C62.42 C High (10 kA and kV).

K. Exposed Hardware: Stainless steel.

2.03 LAMPS

A. Manufacturers:
1. General Electric Company/GE Lighting: www.gelighting.com.
2. Osram Sylvania: www.sylvania.com.
3. Philips Lighting Company: www.lighting.philips.com.
4. Manufacturer Limitations: Where possible, provide lamps produced by a single manufacturer.

B. Lamps - General Requirements:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Engineer to be inconsistent in perceived color temperature.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Recessed Luminaires:
1. Install trims tight to mounting surface with no visible light leakage.

F. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to bottom of luminaire.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.05 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.

3.06 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. Demonstration: Demonstrate proper operation of luminaires to Engineer, and correct deficiencies or make adjustments as directed.

C. Just prior to Substantial Completion, replace all lamps that have failed.

3.08 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

Arlene Schnitzer Concert Hall
Portland Sign Revisions

Structural Calculations

KPFF Project No. 215220

April 25, 2016

Submitted To:

Architectural Resources Group
111 SW Fifth Avenue, 24th Floor
Portland, OR 97204

Submitted By:

KPFF Consulting Engineers
111 SW Fifth Avenue, Suite 2500
Portland, OR 97204-3628

kpff

April 25, 2016

Ms. Kelly Gillard
Architectural Resources Group
111 SW Fifth Avenue, 24th Floor
Portland, OR 97204

Re: Arlene Schnitzer Concert Hall—Portland Sign Revisions
SW Broadway and Park Avenue—Portland, OR
Permit Calculations

Dear Kelly:

Attached please find one copy of structural calculation sheets 1 through 46, dated December 4, 2015, which documents the package #1 Portland sign revisions to the Arlene Schnitzer Concert Hall in Portland, Oregon as shown on drawings S0.1 through S6.1 ALT, dated April 22, 2016. Design is based on the 2014 Oregon Structural Specialty Code (OSSC), based on the 2012 International Building Code (IBC).

If you have any questions or need further information, please call me.

Sincerely,

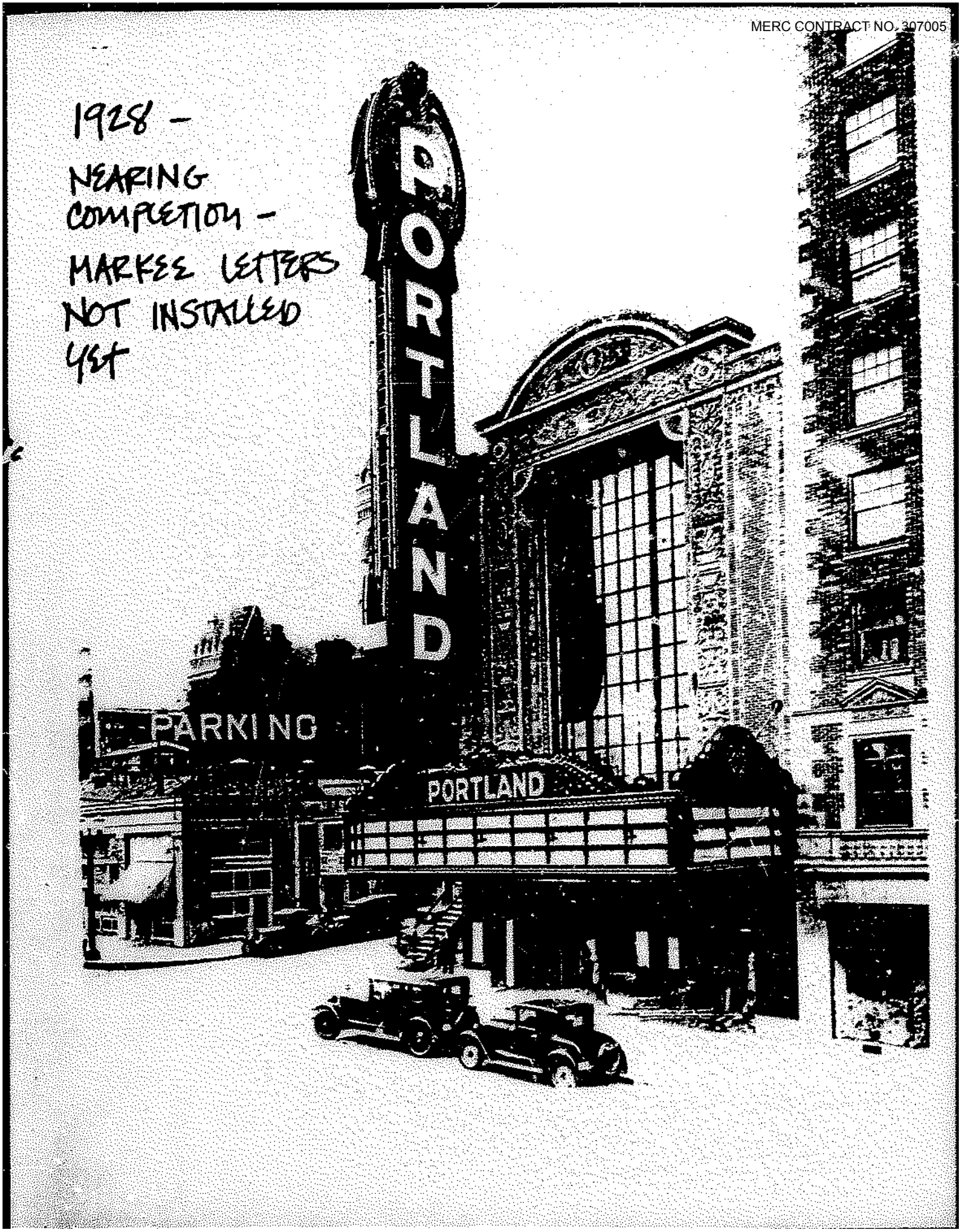
Nick Kennedy, P.E.

NK/bd

Attachments

215220_calc letter_portland sign_4-22-16.doc

1928 -
NEARING
COMPLETION -
MARQEE LETTERS
NOT INSTALLED
YET



COMPUTATION SHEET

CHARLES L. YOUNGMAN, P.E.
Civil & Structural Engineering
980 Holiday Ct. S.
Salem, Oregon 97302
(503) 364-8207

PAGE 1 OF 14
CLIENT Ballard Sign Co.
PROJECT Portland Sign Support Truss
JOB NO 8350 DATE 5-23-94

GIVEN:

EXISTING Paramount Sign Support Truss
SIZE: 7'-10" x 2-3" x 60' LONG.
SUPPORT: TWO EXISTING CANTILEVER SUPPORT BEAMS BUILT OUT FROM BUILDING.
BOTTOM OF SIGN IS ELEV. 32'-0" ABOVE GROUND ELEV. 0.00

DESIGN WIND LOADS: U.B.C. 1982, OREGON MODIFIED
LOCATION – Multnomah County
– Assume Full Exposure to Columbia River Winds, 90 mph

q_s = 21 psf
Exposure B
I = 1.0
Ce = 0.8 h = 20'-40'
= 1.0 h = 40'-60'
= 1.1 h = 60'-100'

U.B.C. 11-1 Method 1
C_q = 1.4 ANY DIRECTION
$P = C_e C_q q_s I$

SEISMIC ZONE 2

REQ'D DESIGN A NEW SIGN SUPPORT TRUSS CLOSELY MATCHING EXISTING NON-REFURBISHABLE TRUSS.

WIND ZONE PRESSURES
BOTTOM OF SIGN, height above ground 27' above ground.
SIGN HEIGHT = 65'-3" (El. 32.0 → 97.25)
27' TO 40' (El. 32 → 45.0), P = .8 x 1.4 x 21 x 1.0 = 23.5 psf
40' TO 60' (El. 45 → 65.0), P = 1.0 x 1.4 x 21 x 1.0 = 29.4 psf
60' TO 12.25' (El. 65 → 97.25) P = 1.1 x 1.4 x 21 x 1.0 = 32.4 psf.

REGISTERED PROFESSIONAL ENGINEER 5415 OREGON JULY 9, 1985 CHARLES L. YOUNGMAN

COMPUTATION SHEET

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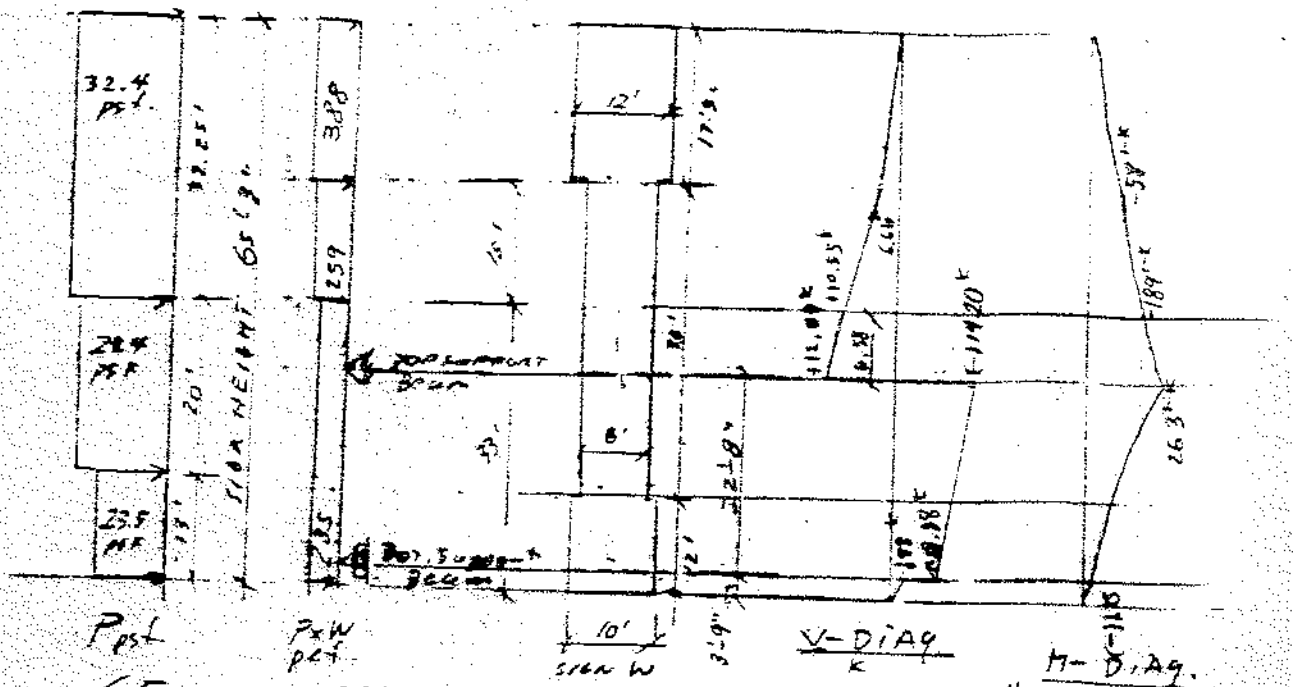
PAGE 2 OF 14
CLIENT Ballard Sign Co
PROJECT Portland Sign Support Truss
JOB NO. 8350 DATE 5-23-95

COMPUTE TRUSS LOADS, SHEAR, & MOMENTS

A. WIND NORMAL TO WIDE SIDE OF SIGN SURFACE



$\Sigma F_{HORIZ.} = 388 \times 17.25 + 259 \times 15 + 33 \times 23.5 = 18300^{\#}$

$R_{TOP\ BM.} = \dfrac{388(17.25)(52.88) + 259 \times 15 \times 36.75 + 33 \times 23.5 \times 12.75}{22.67'\ (1000)} = 26.3^{k}$

$R_{BOT\ BM.} = \overrightarrow{18.3^{k}} - \overleftarrow{26.3^{k}} = 8^{k} \rightarrow$

MAXIMUM MOMENT = 263 ft-k @ TOP SUPPORT
MAXIMUM SHEAR = 14.2 k @ TOP SUPPORT

WIND CONTROL OVER SEISMIC ?

Sign wt. 17000

Horiz. Force = $ZIC_s W_p = \frac{3}{8} \times 1 \times .8 \times 17600 = 5300^{\#}$

$< 18.3^{k}$

WIND CONTROLS !

COMPUTATION SHEET

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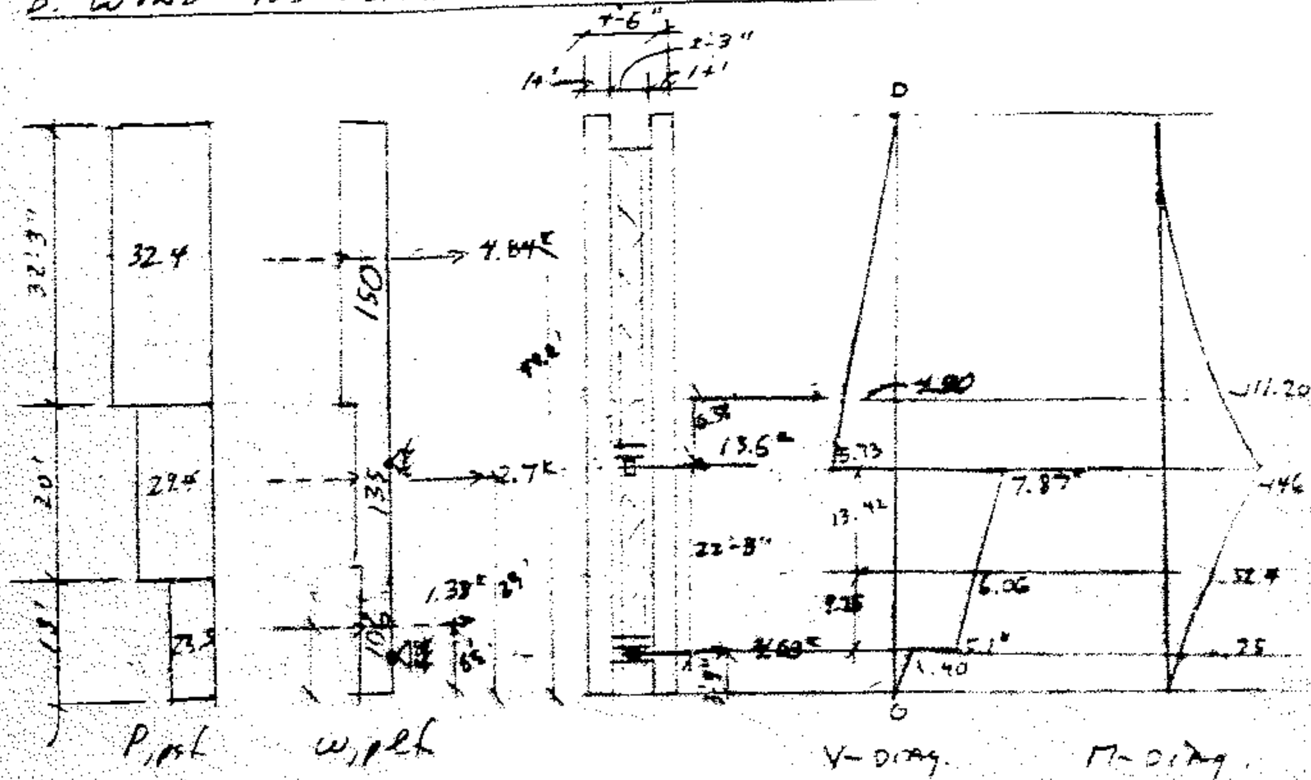
CLIENT [illegible]
PROJECT [illegible]
JOB NO. [illegible] DATE 5-24-94

B. WIND NORMAL TO NARROW SIDE



$\Sigma F_H = 4.84 + 2.7 + 1.38 = 8.92^k$

$R_{TOP} = \frac{4.84(49.2) + 2.7 \times 23 + 1.38 \times 6.5}{22'\text{-}8''} = 13.6^k$

$R_{BOT} = 8.92 - 13.6 = 4.68^k$

MAXIMUM MOMENT $= 111.2^{1-k}$
SHEAR $= 7.87^k$

SEISMIC HORIZ. FORCE $= Z I C_p W_p$

$Z = 3/8$
$I = 1.0$
$C_p = .8$
$W_p = 17{,}600$

$= 3/8(1.0)(.8)(17.6^k)$
$= 5.3^{KIP} < 8.92^k$

WIND CONTROLS!

COMPUTATION SHEET

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PAGE 9 OF 14
CLIENT Ballard Sign Co
PROJECT Pertinent Sign Support Truss
JOB NO. 8350 DATE 5-25-84

DESIGN CONNECTION OF TRUSS TO SUPPORT BEAMS

Assumptions

1. Must satisfy requirements of CH2M REPORT
   a. Attach sign truss to the top & bottom channels of top support beam.
   b. Bottom support beam is not loaded by the sign self weight. All sign self weight to be carried by top beam.
   c. Allowance of 1" deflection of top beam should be made in connections.
2. Connection must easy to field install
   use field welds in combination with bolts, if need.
   Contractor to layout here!

COMPUTATION SHEET

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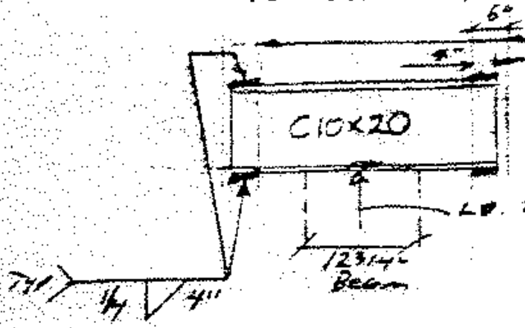
PAGE 9A OF 12
CLIENT Ballard Sign Co.
PROJECT Portland Sign ...
JOB NO 8850 DATE 5-25-94

TOP BEAM CONNECTION

VERTICAL LOAD — 17.6^k
HORIZONTAL LOADS — Parallel to Beam 13.5^k (3A...)
— ⊥ to Beam 26.3^k (3A...2)

FOR VERTICAL LOAD RESISTANCE, INSTALL 10" channel welded to truss chords.



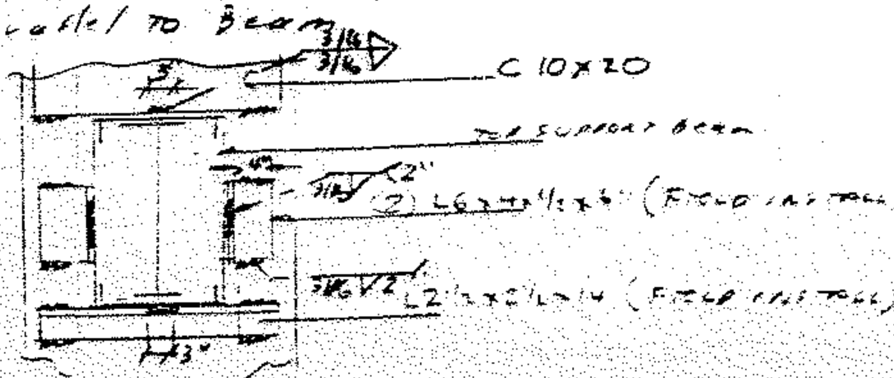
Fillet weld 1/4"
weld length each end = 14400 psi / (2 end)(8800#)(.707 x 1/4)
= 4.5"
use 4" top + bottom

Channel Web Shear = 8.8^k each end.
max. web shear f_v = .4 x 36000 = 14.4 ksi
min. t_w channel = 8800 # / 14400 x 10" psi.in = .06"
use C 10 x 20 or heavier
t_w = 3/8"
b_f = 2 3/4"

Field weld each C10x20 to support beam
3/16 fillet L = 26.3 / (14.4 x 1.33 x .707 x 3/16) = 10.4", use 3" each side each C10x20

PLACE L 2 1/2 x 2 1/2 x 1/4 under top support beam, weld each end to chords + to beam.

PLACE L 6 x 4 x 1/2 x 6" clip angles inside of chords, weld legs to box beam + chords as insurance against further movement parallel to beam.



COMPUTATION SHEET

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PAGE 12 OF 16
CLIENT Ballard Sign Co
PROJECT [illegible]
JOB NO 9332 DATE 5-26-[illegible]

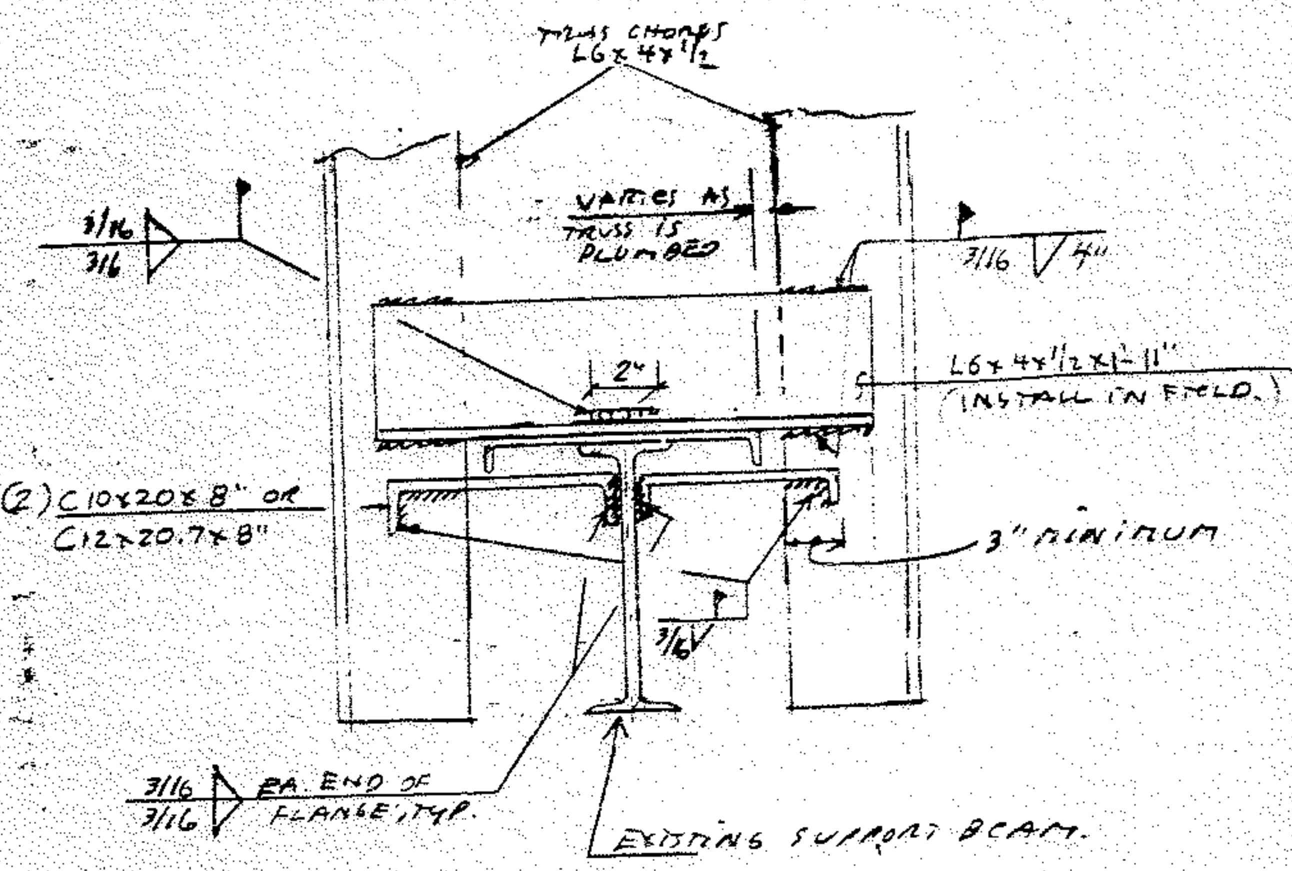
Bottom Beam Connection

Vertical Load — 0

Horizontal Loads — ⊥ to Beam 8^k (see pg. 2)
∥ to Beam 4.68^k (see pg. 3)

Place L6x4x1/2 over top flange —
weld 4" leg to beam — 3/16 fillet; L = 8000 / [illegible] = 3"
use 2" welds 4 places
8" total.

Install C10x20 x 8" or C12x20.7x8" two channels under beam flange, as backup redundancy to top angle



TRUSS CONNECTION TO BOTTOM SUPPORT BEAM (7/12)

2 REQ'D TOTAL.

COMPUTATION SHEET

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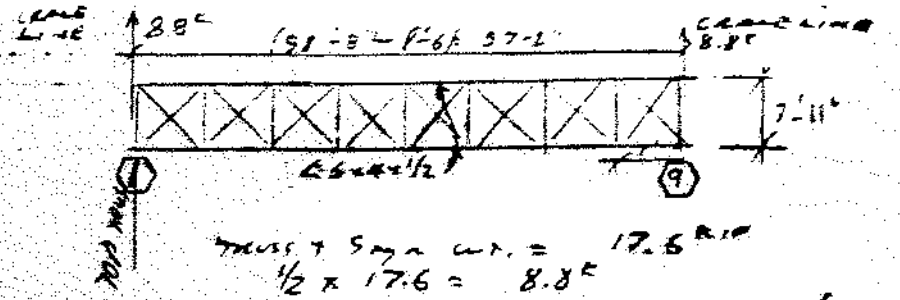
(503) 364-8207

PAGE 13 OF —
CLIENT Ballard Sign
PROJECT Pontiac Sign Support Truss
JOB NO 9350 DATE 8-1-94

DESIGN GRADE LINE ATTACHMENT POINT AT TOP & BOTTOM OF TRUSS



TRUSS + SIGN WT. = 17.6 K/P
1/2 x 17.6 = 8.8 K
W/FT. SIGN = $\frac{17600}{57.2'}$ = 308 #/L.

TRUSS BENDING MOMENT = $308\left(\frac{57.2}{8}\right)^2$ = 126000 FT-#
TRUSS TOP & BOT. CHORD T or C = $\frac{126000}{7'-9''}$ = 16240 # (2 ANGLES)

C/A = $\frac{16240\#}{2 \times 16.20''}$ = 500 PSI.

MAX. kl/r_z = $\frac{1 \times 84''}{.87}$ = 97, MAX F_a = 19.35 KSI
> 500 PSI. OK.

MAXIMUM DIAGONAL TENSION = $\frac{8.8^K}{2 \text{ each}}\left(\frac{\sqrt{7^2+7^2}}{7'}\right)$ = 6.6 K/L

MAXIMUM T/A for 2"x3/8" F.B. = $\frac{6600}{2 \times 3/8}$ = 3520 PSI.
< .6 x 36000 = 21,600 OK.

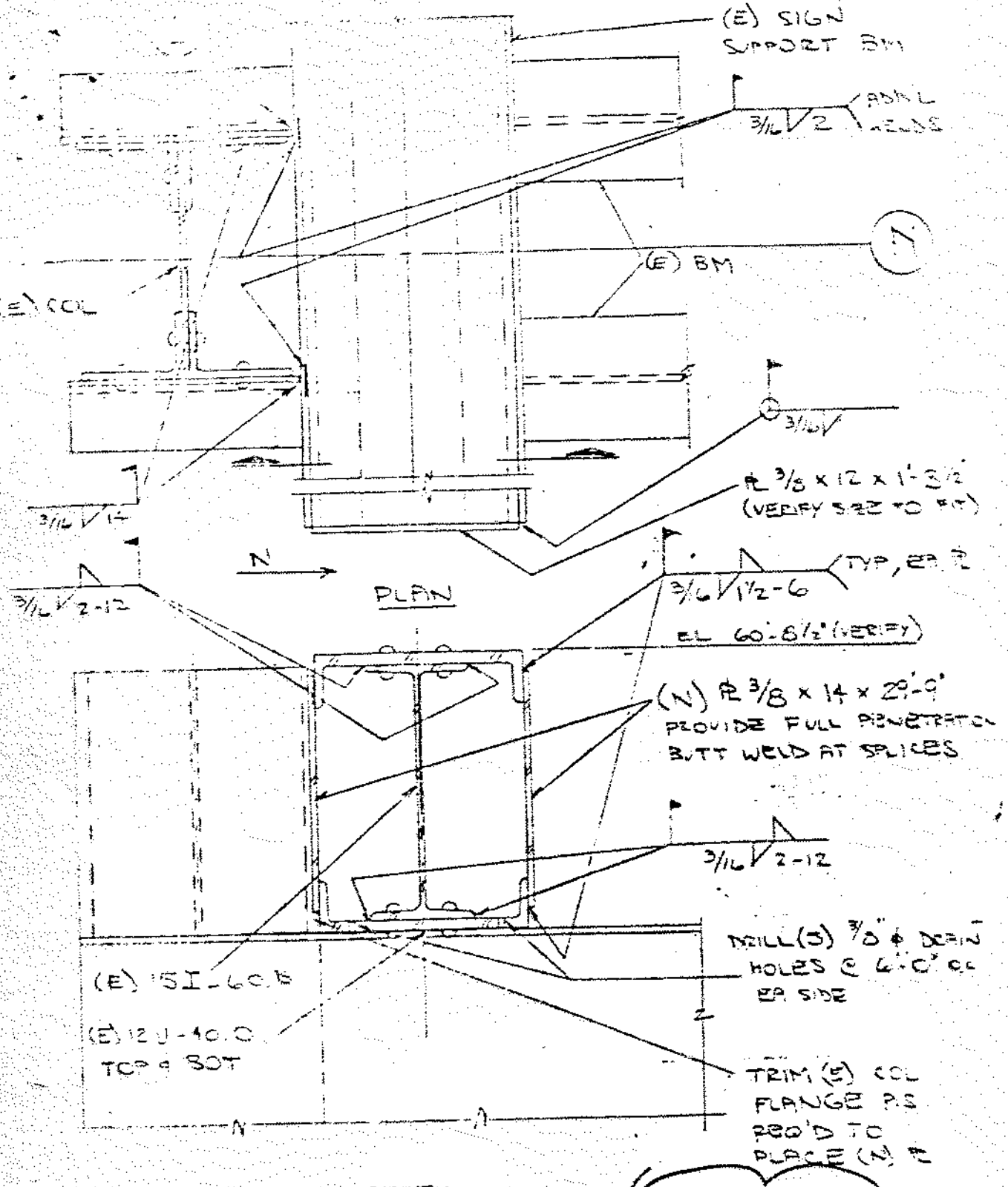
WELD STRENGTH = .707 x 3/16 x 2 x 1½" x 14400 = 5730
< 6.6
USE 1¾" WELD.

MAXIMUM VERTICAL WELD C = $\frac{8.8 - 7 \times .308}{2 \text{ each}}$ = 3.3 K
MEMBER L 2½ x 2½ x ¼ r_z = .491, A = 1.19

C/A = $\frac{3300}{1.19}$ = 2770 PSI.

kl/r_z = $\frac{1 \times 92''}{.491}$ = 187. F_a = 4.27 KSI. 72,770 OK

TRUSS CHECKS FOR HORIZONTAL LIFTING POSITION



NOC 6234

...rtland ...nter ...the ...rforming ...rts	Concert Hall Renovation Brown, Gunglejan, O'Toole, Rapalf & Associates, P.C. ELS Design Group Barker Alvers Project Address: 721 N.W. 20th Avenue Portland, Oregon 97209	Ref. 3.6 Date: 5-15-04 Page RS-114 PORTLAND SIGN SUPPORT RECONDITIONING DETAILS

NOTES:

1. REMOVE AND REPLACE (E) BRICK AND CAST STONE AS REQ'D TO RECOVER THE WORK.

2. SANDBLAST ALL EXPOSED STRUCTURAL STEEL TO REMOVE RUST TO BARE METAL.

3. STRUCTURAL STEEL PLATE SHALL CONFORM TO ASTM A36

4. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, EIGHTH EDITION.

5. ALL WELDS SHALL CONFORM TO AWS D1.1-81, E70XX ELECTRODES, AND SHALL BE DONE BY CERTIFIED WELDERS

6. PAINT ALL EXPOSED STRUCTURAL STEEL AS SPECIFIED

7. THE SIGN SHALL BE ATTACHED TO THE TOP AND BOTTOM CHANNELS OF THE TOP SUPPORT MEMBER.

8. THE BOTTOM SIGN SUPPORT MEMBER (APPROX. TO STEEL EL. +35'-0") SHALL NOT SUPPORT ANY VERTICAL LOAD FROM THE SIGN, ALLOW FOR 3/4" DEFLECTION OF THE TOP SUPPORT BM. AND ADJUSTABLE FOR FIELD ADJUSTMENT.

9. [illegible] FOR ADDITIONS FOR THE SIGN-TO-SUPPORT BM.

10. [illegible] FOR REVIEW.

NOC 6234

Concert Hall Renovation

Ref. 36 Date: 5-15-84 Page RS-115

PORTLAND SIGN SUPPORT RECONDITIONING DETAILS

CH2M HILL

SUBJECT PCPA / PARAMOUNT THEATER — BY S. WADDERS — DATE 4-30-84
PORTLAND SIGN SUPPORT BEAMS — SHEET NO 1 OF 25
STRUCTURAL CALCS — PROJECT NO. P162460.A2.10

GEOMETRY : (SEE SHT 1a) FROM GARY COKER / BILLBOARD SIGN CO.

WEIGHT = 17,600 LBS FROM DENNIS O'TOOLE / SOCRA

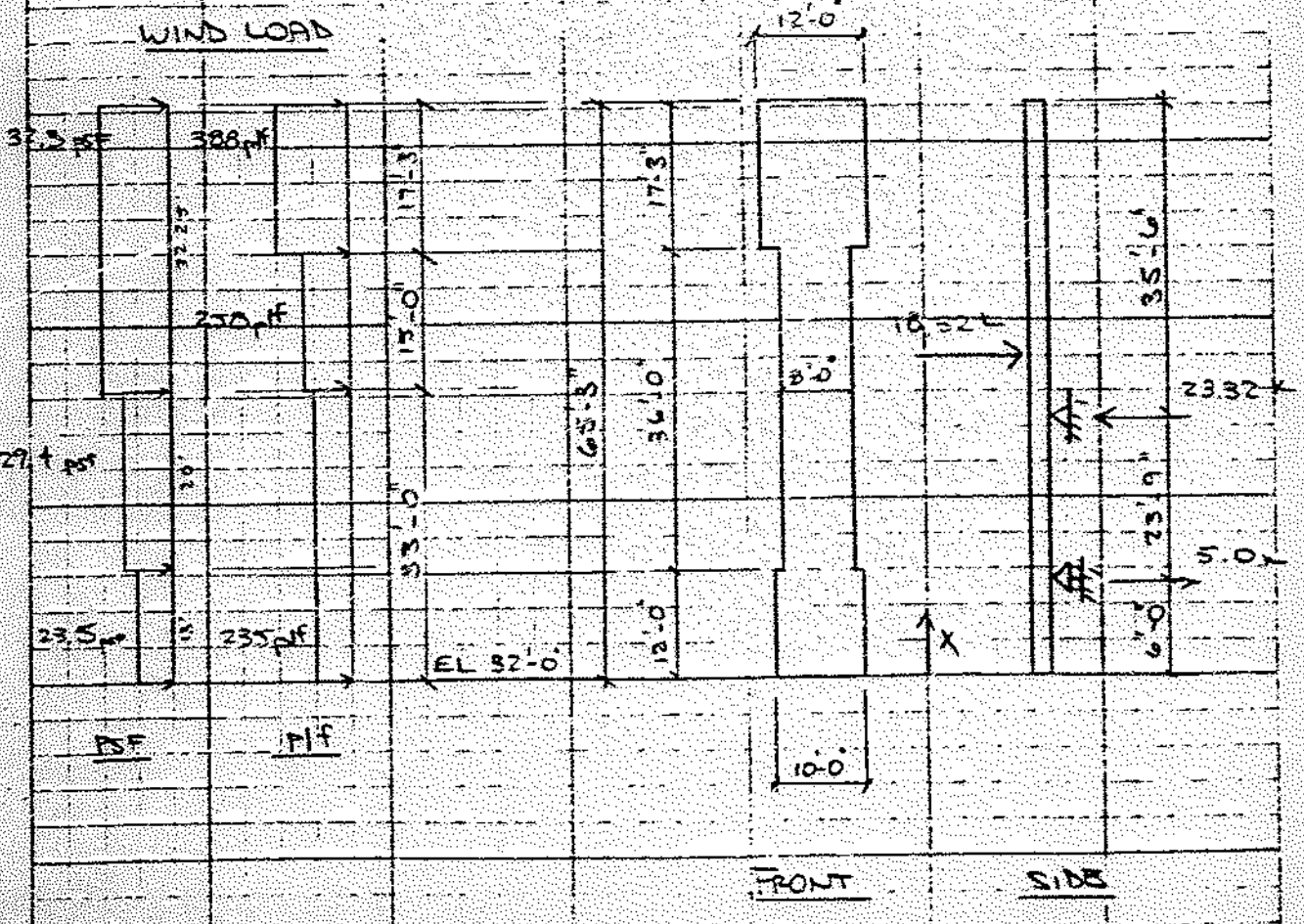
STRUCTURAL DESIGN CRITERIA

WIND: UBC 90 mph ZONE, EXPOSURE B

SEISMIC: UBC ZONE 2

APPROXIMATED SIGN GEOMETRY

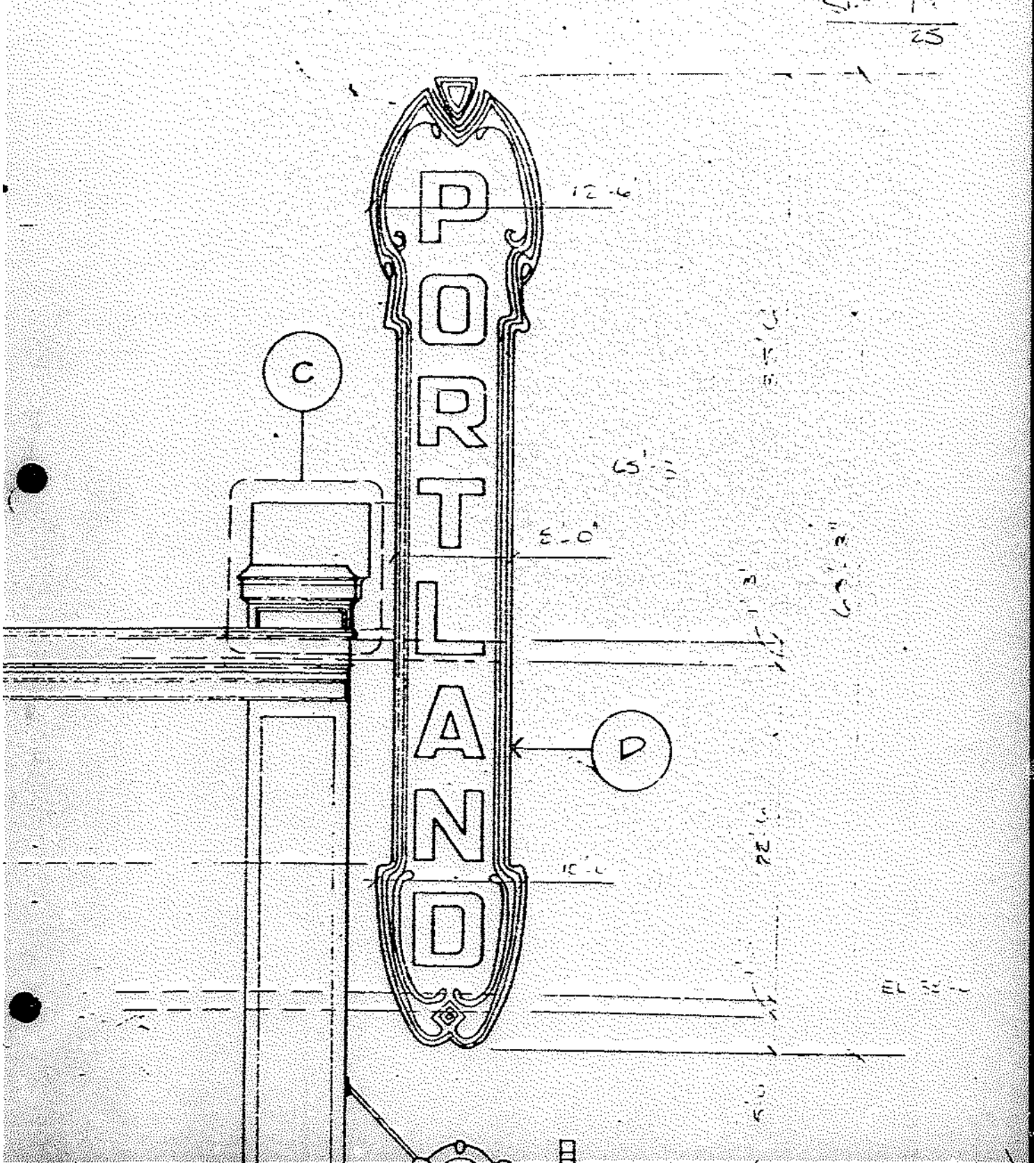
WIND LOAD



steel metal to vertical profiles as originally constructed at Studio Building.

P. Repair existing cement plaster. Paint all cement plaster.

C. Paint all exposed metal where occurs including grates and ornamental metal. See Finish Schedule for colors.



SUBJECT PCPP / PARAMOUNT
SIGN SUPPORT BEAMS
STRUCTURAL CALCS

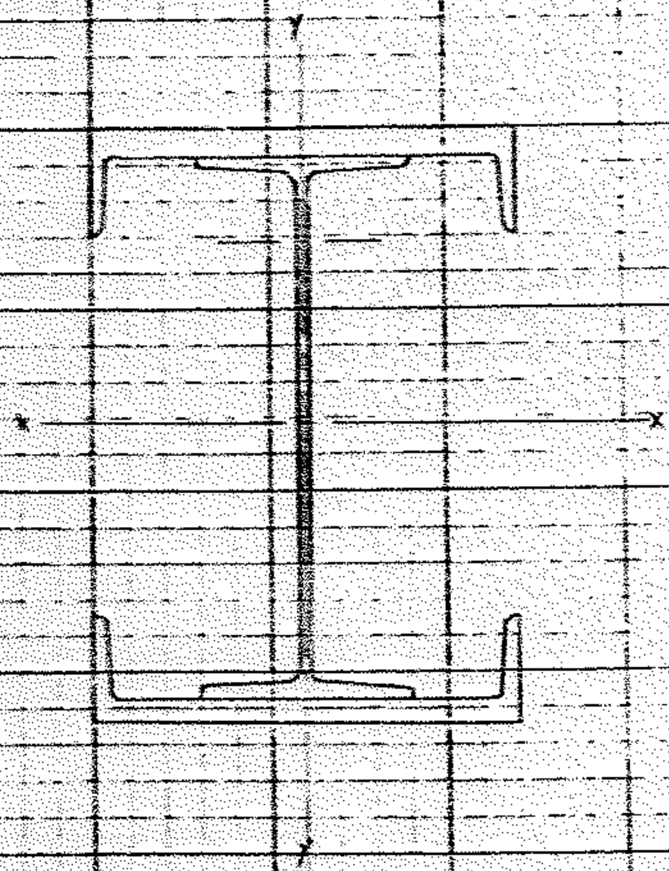
BY S WANDERS DATE 5-1-81
SHEET NO. 7 OF 25
PROJECT NO P16294 A2.10

$\bar{y} = \frac{.75(12)(.75/2) + 2(2.25)(.612)(1.875)}{11.8} = 0.724$ in

$I_y = \frac{12(.75)^3}{12} + 12(.75)(.349)^2 + 2\left[\frac{.612(2.25)^3}{12} + (.612)(2.25)(1.151)^2\right]$

$= .422 + 1.096 + 2[.581 + 1.824] = 6.329$

COMPOSITE SECTION



A = 41.27 in²
d = 16.50 in
I_x = 1958.4 in⁴
S_x = 237.4 in³
I_y = 420.56
S_y = 70.1 in³

$I_x = 6090 + 2[6.329 + 11.8(7.526)^2] = 1958.4$ in⁴

$I_y = 2596 + 2(1873) = 420.56$ in⁴

SUBJECT [illegible] — BY [illegible] DATE [illegible]
Slab Support Beams — SHEET NO 15 OF 35
[illegible] — PROJECT NO [illegible]

SECTION PROPERTIES

[illegible]

$A = 9.26\ in^2$

$d = 12.0\ in$

$b_f = 5.0\ in$

$t_f = .544$

$t_w = .350\ in$

$I_x = 215.8\ in^4$

$S_x = 36.0\ in^3$

$I_y = 9.5\ in^4$

$S_y = 3.8\ in^3$

[illegible] (SEE SHT. 6)

COMPOSITE SECTION

$A = 21.06\ in^2$

$d = 12.75\ in$

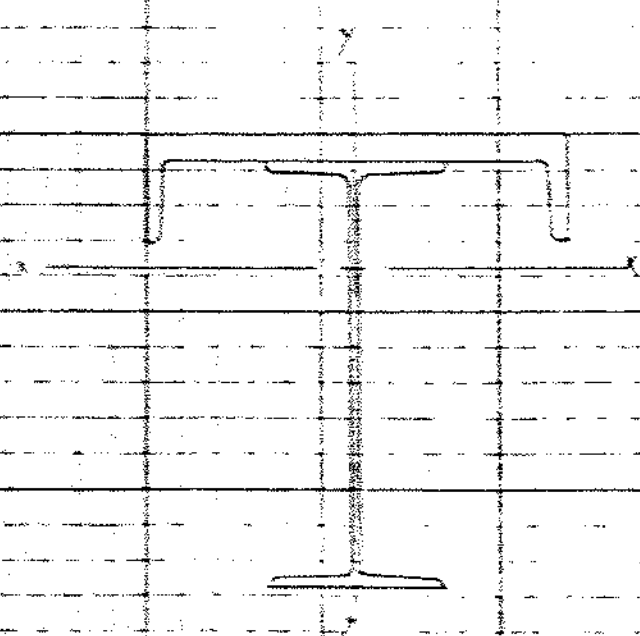
$I_x = 410.5\ in^4$

$S_{x_{top}} = 43.8\ in^3$

$S_{x_{bot}} = 121.7\ in^3$

$I_y = 206.8\ in^4$

$S_y = 34.5\ in^3$



$\bar{y} = [9.26(6) + 11.8(12.026)] / 21.06 = 9.376$

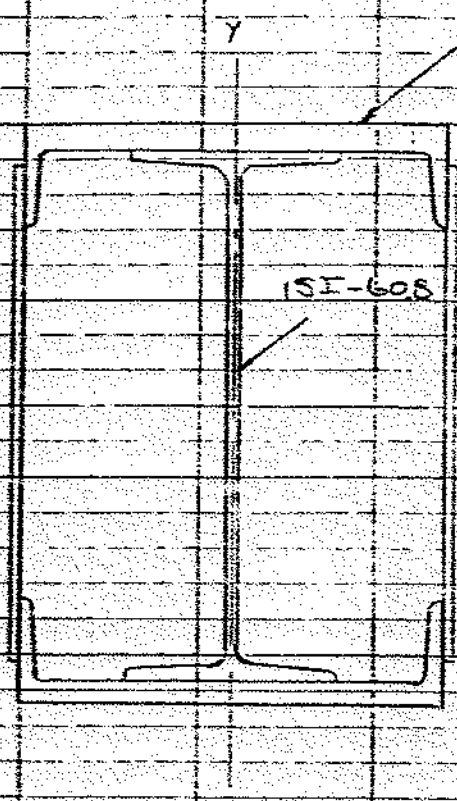
$I_x = 215.8 + 9.26(3.376)^2 + 6.329 + 11.8(2.65)^2 = 410.5\ in^4$

CH2M HILL

SUBJECT FCPA / Piedmont — BY S Wanders — DATE 2-14-24
Sign Support Bus — SHEET NO. 20 OF 25
Structural Calcs — PROJECT NO P162416.A2.10

COMPOSITE SECTION

TRY PL t x 14" CONT. EA SIDE



DETERMINE t : AISC 19.2 STIFFENED ELEMENTS UNDER COMPRESSION

b = 14"

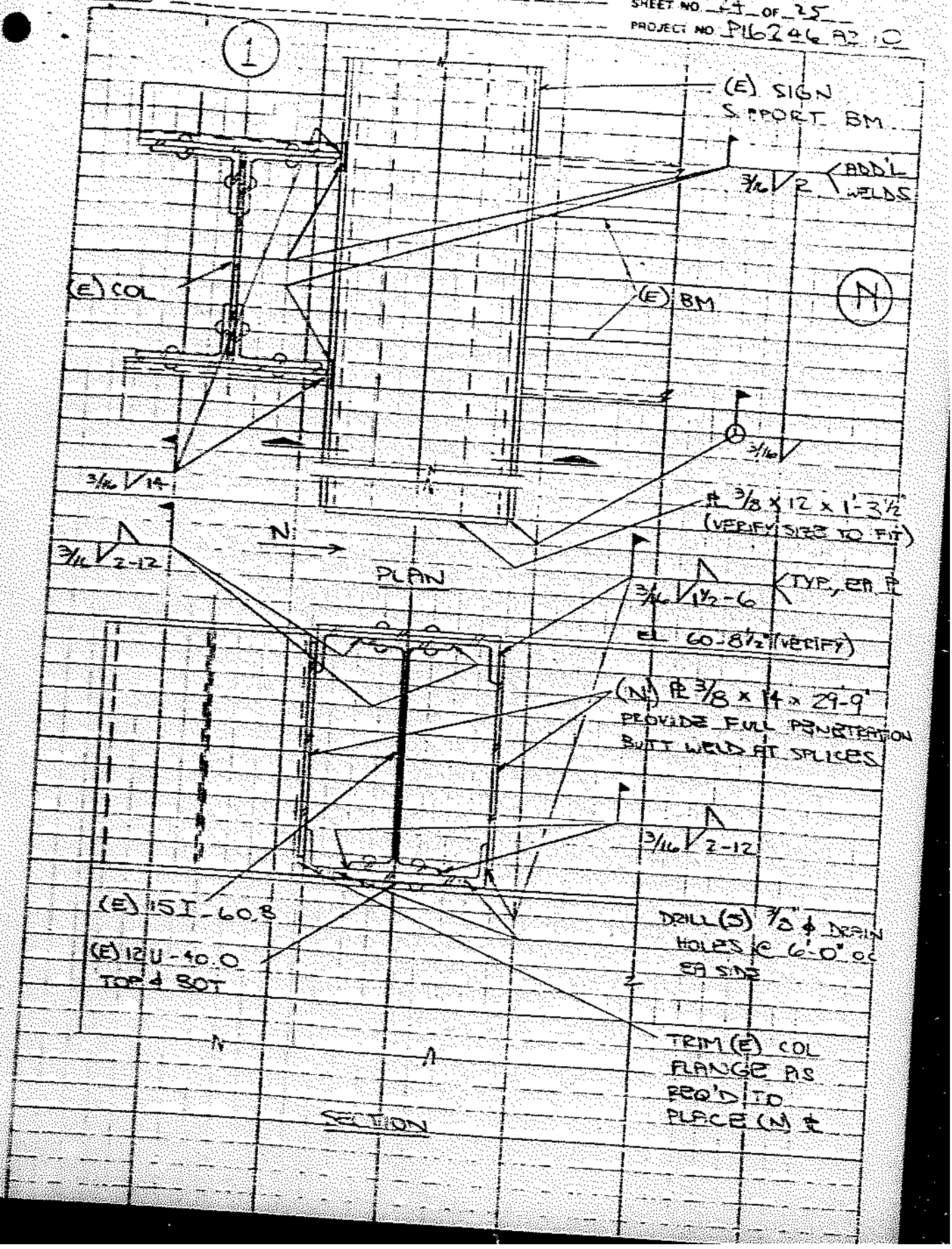
$$\frac{b}{t} \le \frac{253}{\sqrt{36}} = 42.167 \Rightarrow t \ge \frac{14}{42.167} = .332" \Rightarrow 3/8"$$

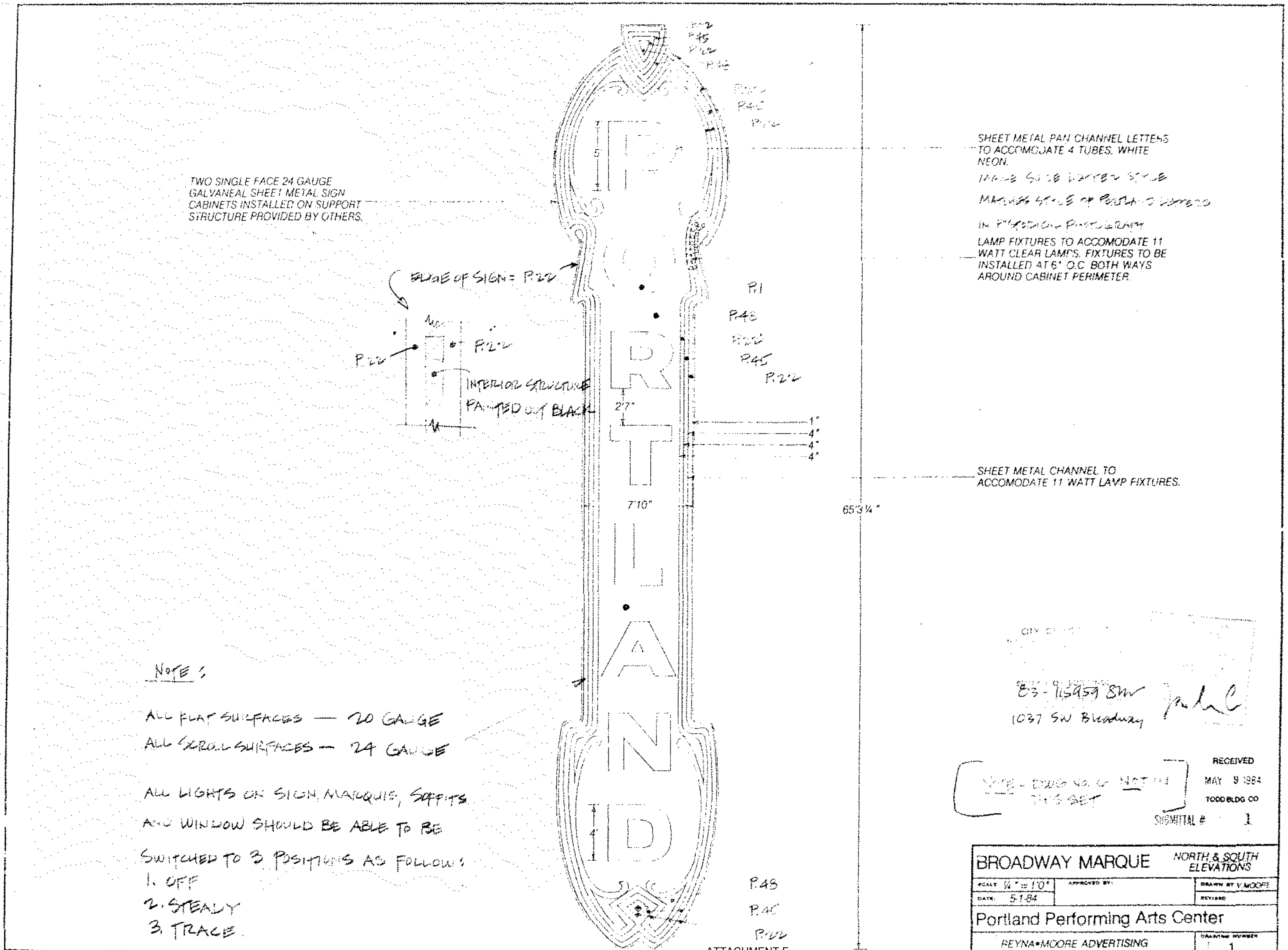
TRY PL 3/8 x 14" CONT. EA SIDE

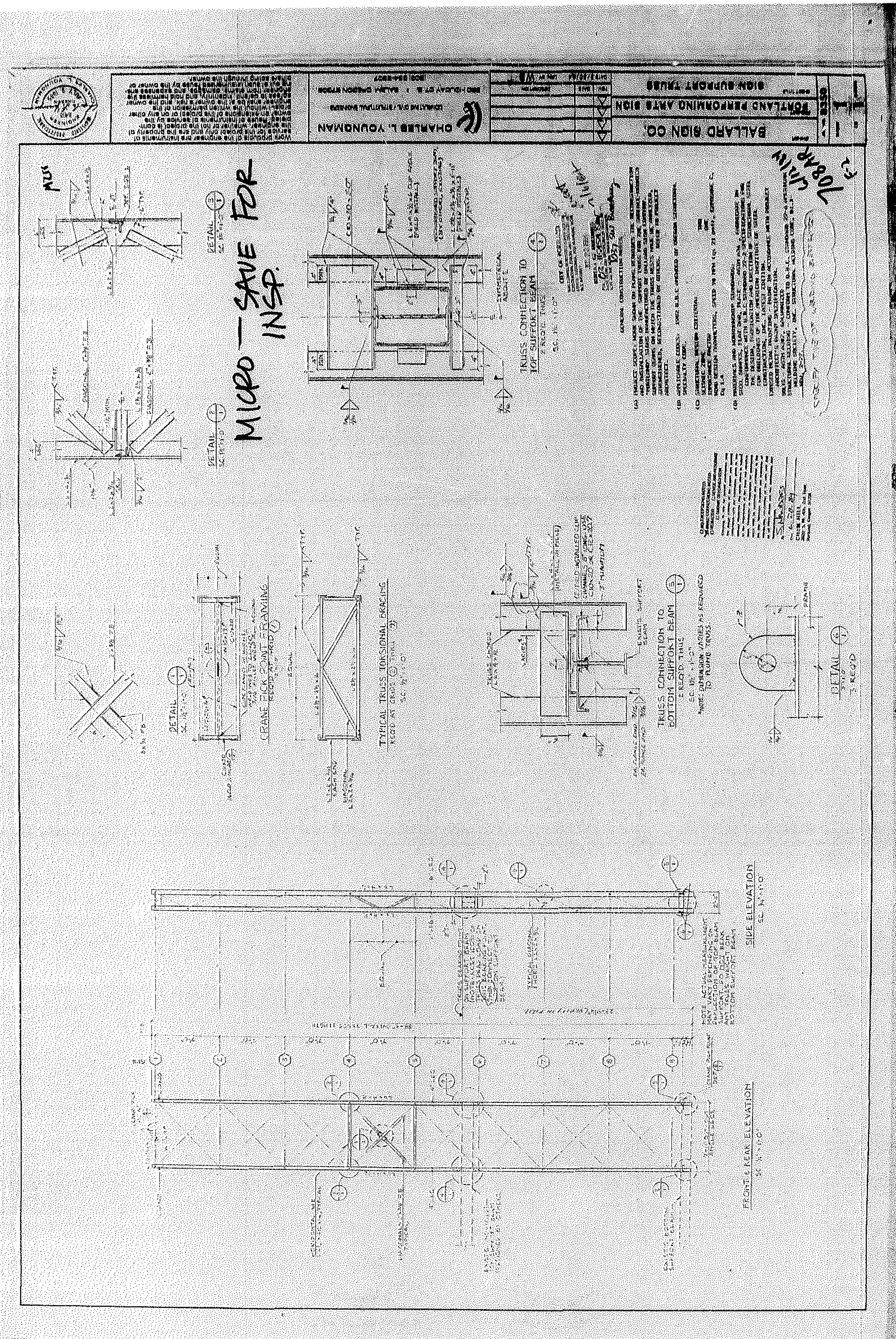
CHM HILL

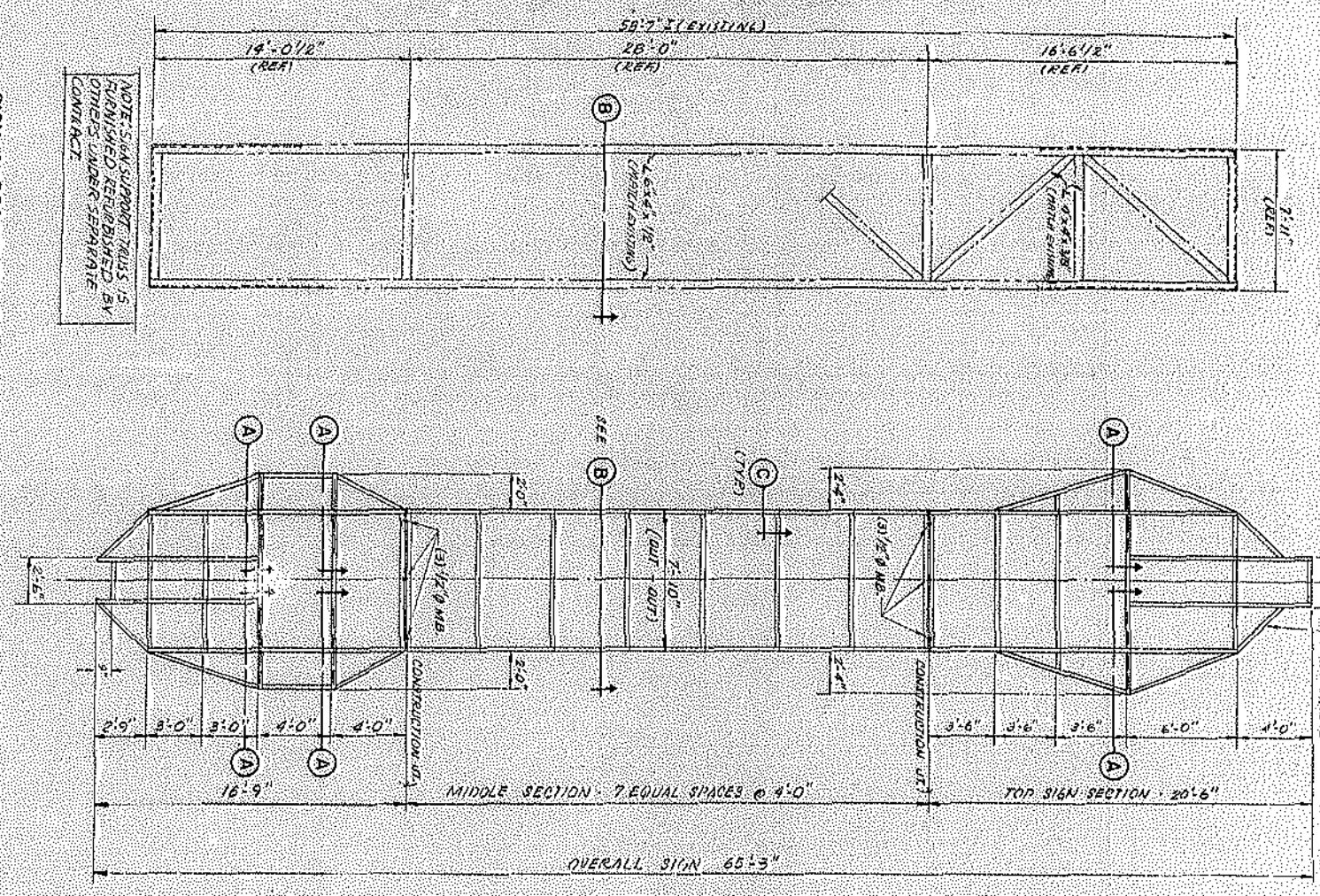
SUBJECT PCPA / PARAMONT
SIGN SUPPORT BMS

BY S.WANDERS DATE 5-15-09
SHEET NO. 24 OF 25
PROJECT NO P162462.10




TWO SINGLE FACE 24 GAUGE GALVANEAL SHEET METAL SIGN CABINETS INSTALLED ON SUPPORT STRUCTURE PROVIDED BY OTHERS.
EDGE OF SIGN = P.22
P.22
P.22
INTERIOR STRUCTURE PAINTED OUT BLACK
P.1
P.48
P.22
P.45
P.22
2'7"
7'10"
1"
4"
4"
4"
65'3 ¼"
SHEET METAL PAN CHANNEL LETTERS TO ACCOMODATE 4 TUBES, WHITE NEON.
LAMP FIXTURES TO ACCOMODATE 11 WATT CLEAR LAMPS. FIXTURES TO BE INSTALLED AT 6" O.C. BOTH WAYS AROUND CABINET PERIMETER.
SHEET METAL CHANNEL TO ACCOMODATE 11 WATT LAMP FIXTURES.
NOTE:
ALL FLAT SURFACES — 20 GAUGE
ALL SCROLL SURFACES — 24 GAUGE
ALL LIGHTS ON SIGN, MARQUIS, SOFFITS AND WINDOW SHOULD BE ABLE TO BE SWITCHED TO 3 POSITIONS AS FOLLOWS:
1. OFF
2. STEADY
3. TRACE
P.48
P.40
P.22
83-115959 SW
1037 SW Broadway
RECEIVED
MAY 9 1984
TODD BLDG CO
SUBMITTAL # 1
BROADWAY MARQUE
NORTH & SOUTH ELEVATIONS
SCALE ¼" = 1'0"
DATE 5-1-84
APPROVED BY:
DRAWN BY V. MOORE
REVISED
Portland Performing Arts Center
REYNA•MOORE ADVERTISING
DRAWING NUMBER 1
ATTACHMENT F


BALLARD SIGN CO.
PORTLAND PERFORMING ARTS SIGN
SIGN SUPPORT TRUSS
CHARLES L. YOUNGMAN
MICRO — SAVE FOR INSP.
TRUSS CONNECTION TO TOP SUPPORT BEAM
TRUSS CONNECTION TO BOTTOM SUPPORT BEAM
TYPICAL TRUSS TORSIONAL BRACING
CRANE PICK POINT FRAMING
SIDE ELEVATION
FRONT & REAR ELEVATION



SIGN SUPPORT TRUSS

SCALE: 1/4"=1'-0"

BY OTHERS

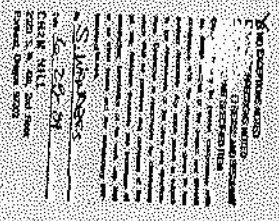
SIGN FRAME

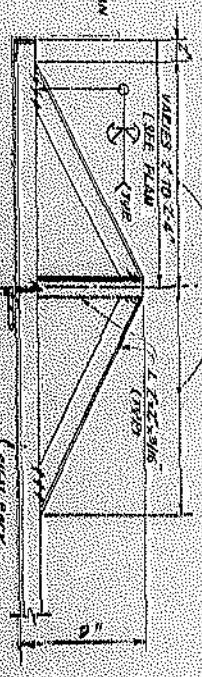
(2 REQUIRED)

SCALE: 1/4"=1'-0"

SIGN

NOTE: FOR LIGHTING & SHEETMETAL REFER TO BALLARD SIGN CO. DRAWINGS.



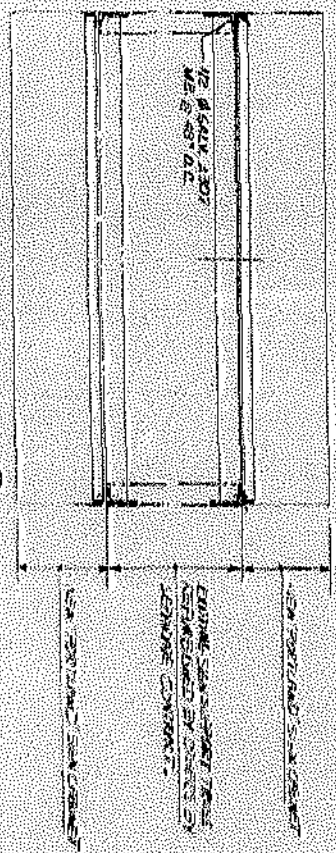


DETAIL SECTION (A)

SCALE: 1 1/2"=1'-0"

TYPICAL FRAME JOINT DETAIL (C)

SCALE: 3"=1'-0"



SIGN SUPPORT TRUSS REQUIREMENTS

SCALE: 3/4"=1'-0"

OWNER	BALLARD SIGN CO.		
PROJECT	PORTLAND PERFORMING ARTS SIGNS		
SHEET TITLE	BROADWAY DOUBLE FACED MARQUEE SIGN FRAMING	REV.	DATE / DESCRIPTION
		DATE 4/84	DRN. BY R.H.E.

CHARLES L. YOUNGMAN

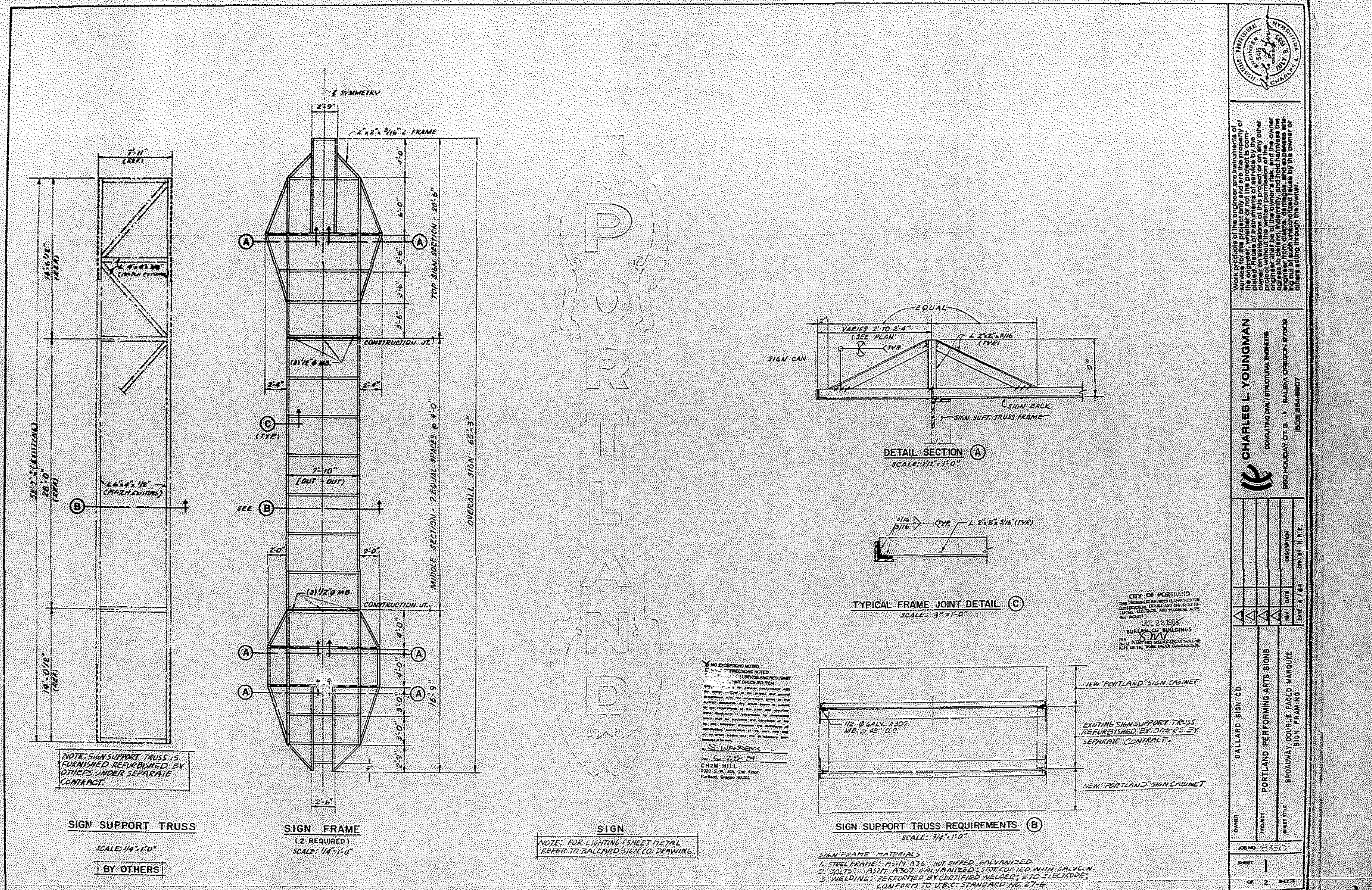
CONSULTING CIVIL / STRUCTURAL ENGINEER

880 HOLIDAY DR. S. - SALEM, OREGON 97302

(503) 588-8807

Work products of the engineer are instruments of service for this project only and are the property of the engineer, whether or not the project is constructed. Reuse of instruments of service by the owner on extensions of this project or on any other project without the written permission of the engineer shall be at the owner's risk, and the owner agrees to defend, indemnify, and hold harmless the engineer from claims, damages, and expenses arising out of such unauthorized reuse by the owner or others acting through the owner.

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 9, 1974 — CHARLES L. YOUNGMAN


SIGN SUPPORT TRUSS
SCALE: 1/4" = 1'-0"
BY OTHERS
NOTE: SIGN SUPPORT TRUSS IS FURNISHED REFURBISHED BY OTHERS UNDER SEPARATE CONTRACT.
SIGN FRAME
(2 REQUIRED)
SCALE: 1/4" = 1'-0"
OVERALL SIGN 65'-3"
TOP SIGN SECTION - 20'-6"
MIDDLE SECTION - 7 EQUAL SPACES @ 4'-0"
CONSTRUCTION JT.
2" x 2" x 3/16" ∠ FRAME
℄ SYMMETRY
7'-10" (OUT - OUT)
SIGN
NOTE: FOR LIGHTING & SHEET METAL REFER TO BALLARD SIGN CO. DRAWING.
PORTLAND
DETAIL SECTION A
SCALE: 1 1/2" = 1'-0"
EQUAL
VARIES 2' TO 2'-4" (SEE PLAN)
SIGN CAN
SIGN BACK
SIGN SUPT. TRUSS FRAME
TYPICAL FRAME JOINT DETAIL C
SCALE: 3" = 1'-0"
SIGN SUPPORT TRUSS REQUIREMENTS B
SCALE: 3/4" = 1'-0"
NEW "PORTLAND" SIGN CABINET
EXISTING SIGN SUPPORT TRUSS REFURBISHED BY OTHERS BY SEPARATE CONTRACT.
1/2" Ø GALV. A307 MB. @ 48" O.C.
SIGN FRAME MATERIALS
1. STEEL FRAME: ASTM A36, HOT DIPPED GALVANIZED
2. BOLTS: ASTM A307 GALVANIZED; SPOT COATED WITH GALVCON.
3. WELDING: PERFORMED BY CERTIFIED WELDERS; E70 ELECTRODES; CONFORM TO U.B.C. STANDARD NO. 27-6
CITY OF PORTLAND
BUREAU OF BUILDINGS
CH2M HILL
CHARLES L. YOUNGMAN
CONSULTING CIVIL / STRUCTURAL ENGINEERS
880 HOLIDAY CT. S. • SALEM, OREGON 97302
(503) 364-6807
BALLARD SIGN CO.
PORTLAND PERFORMING ARTS SIGNS
BROADWAY DOUBLE FACED MARQUEE SIGN FRAMING
Work products of the engineer are instruments of service for the project only and are the property of the engineer, whether or not the project is completed. Reuse of instruments of service by the owner on extensions of this project or on any other project without the written permission of the engineer shall be at the owner's risk, and the owner agrees to defend, indemnify, and hold harmless the engineer from claims, damages, and expenses arising out of such unauthorized reuse by the owner or others acting through the owner.
SHEET 1 OF 2 SHEETS

COMPARISON OF EXISTING SIGN LOADS AND CURRENT CODE LOADS:

Sign Support Loads

OLD Wind Lateral on Wide Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
12	17.25	207	51.875	32.4	6706.8	347915.3
8	15	120	35.75	32.4	3888	138996
8	20	160	18.25	29.4	4704	85848
8	1	8	12.5	29.4	235.2	2940
10	12	120	2.25	23.5	2820	6345
		615			18354	582044.3

Top Wind Area	32.4	PSF
Middle Wind Area	29.4	PSF
Bottom Wind Area	23.5	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	18354	lb ←
Rtop	25674.65	lb
Rbot	-7320.65	lb

NEW Wind Lateral on Wide Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
12	17.25	207	51.875	27.8	5754.6	298519.9
8	15	120	35.75	27.8	3336	119262
8	20	160	18.25	27.8	4448	81176
8	1	8	12.5	27.8	222.4	2780
10	12	120	2.25	27.8	3336	7506
		615			17097	509243.9

Top Wind Area	27.8	PSF
Middle Wind Area	27.8	PSF
Bottom Wind Area	27.8	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	17097	lb ←
Rtop	22463.34	lb
Rbot	-5366.34	lb

Out of plane loading with Exposure B is less than previous, so existing structure is okay.

OLD Seismic Lateral on Wide Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
12						
	17.25					
		207	51.875	8.618	1783.926	92541.16
8						
	15					
		120	35.75	8.618	1034.16	36971.22
8						
	20					
		160	18.25	8.618	1378.88	25164.56
8						
	1					
		8	12.5	8.618	68.944	861.8
10						
	12					
		120	2.25	8.618	1034.16	2326.86
		615			5300.07	157865.6

Top Seis Area Load	8.618	PSF
Middle Seis Area	8.618	PSF
Bottom Seis Area	8.618	PSF
Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	5300.07	lb
Rtop	6963.635	lb
Rbot	-1663.56	lb

NEW Seismic Lateral on Wide Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
12						
	17.25					
		207	51.875	25.45	5268.15	273285.3
8						
	15					
		120	35.75	25.45	3054	109180.5
8						
	20					
		160	18.25	25.45	4072	74314
8						
	1					
		8	12.5	25.45	203.6	2545
10						
	12					
		120	2.25	25.45	3054	6871.5
		615			15651.75	466196.3

Top Seis Area Load	25.45	PSF
Middle Seis Area	25.45	PSF
Bottom Seis Area	25.45	PSF
Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	15651.75	lb
Rtop	20564.46	lb
Rbot	-4912.71	lb

New ultimate seismic out of plane is larger than existing, however, it is not larger than the wind load, so existing structure is okay.

Sign Support Loads

OLD Wind Lateral on Narrow Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
4.5	17.25	77.625	51.875	32.4	2515.05	130468.2
4.5	15	67.5	35.75	32.4	2187	78185.25
4.5	20	90	18.25	29.4	2646	48289.5
4.5	1	4.5	8.75	29.4	132.3	1157.625
4.5	12	54	2.25	23.5	1269	2855.25
		293.625			8749.35	260955.8

Top Wind Area	32.4	PSF
Middle Wind Area	29.4	PSF
Bottom Wind Area	23.5	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	8749.35	lb ←
Rtop	11511.07	lb
Rbot	-2761.72	lb

NEW Wind Lateral on Narrow Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
4.5	17.25	77.625	51.875	27.8	2157.975	111945
4.5	15	67.5	35.75	27.8	1876.5	67084.88
4.5	20	90	18.25	27.8	2502	45661.5
4.5	1	4.5	8.75	27.8	125.1	1094.625
4.5	12	54	2.25	27.8	1501.2	3377.7
		293.625			8162.775	229163.7

Top Wind Area	27.8	PSF
Middle Wind Area	27.8	PSF
Bottom Wind Area	27.8	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	8162.775	lb ←
Rtop	10108.67	lb
Rbot	-1945.9	lb

In plane loading with Exposure B is less than previous, so existing structure is okay.

OLD Seismic Lateral on Narrow Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
4.5	17.25	77.625	51.875	18.05	1401.131	72683.68
4.5	15	67.5	35.75	18.05	1218.375	43556.91
4.5	20	90	18.25	18.05	1624.5	29647.13
4.5	1	4.5	8.75	18.05	81.225	710.7188
4.5	12	54	2.25	18.05	974.7	2193.075
		293.625			5299.931	148791.5

Top Seis Area Load	18.05	PSF
Middle Seis Area	18.05	PSF
Bottom Seis Area	18.05	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	5299.931	lb ←
Rtop	6563.366	lb
Rbot	-1263.43	lb

NEW Seismic Lateral on Narrow Surface

width ft	height ft	Area ft^2	centroid ft	Lateral psf	Lateral lb	Moment about base ft*lb
4.5	17.25	77.625	51.875	53.3	4137.413	214628.3
4.5	15	67.5	35.75	53.3	3597.75	128619.6
4.5	20	90	18.25	53.3	4797	87545.25
4.5	1	4.5	8.75	53.3	239.85	2098.688
4.5	12	54	2.25	53.3	2878.2	6475.95
		293.625			15650.21	439367.7

Top Seis Area Load	53.3	PSF
Middle Seis Area	53.3	PSF
Bottom Seis Area	53.3	PSF

Top Beam	22.67	ft
Bott Beam	3.75	ft
Fsum	15650.21	lb ←
Rtop	19381.02	lb
Rbot	-3730.81	lb

New ultimate seismic in plane is larger than existing, however, it is an axial load and will not fail the support members strengthened in 1984. Also, service level is 10,955lb, only 25% over the service wind load of 8,749lb. Existing structure is okay.

Main frame

		L	Quantity	lb/ft	Wt (lb)
main verts	L6x4x1/2	59.5	4	16.2	3856
face X bracing	PL 3"x1/4"	10	32	2.55	817
face horizontals	L2.5x2.5x1/4	7.25	18	4.1	535
side diagonals	L2x2x3/16	4.25	32	2.44	332
side horizontals	L2x2x3/16	2	20	2.44	98
torsional members	L2x2x3/16	8.67	20	2.44	423
misc for T&B connection					300
Main top beam from bldg		12	1	176	2112
Main bottom beam from bldg		12	1	71.8	862
Total					9333

External frames		L or A	Quantity	plf or psf	Wt (lb)
angle verts	L2x2x3/16	899	1	2.44	2194
angle horiz.	L2x2x3/16	7.75	18	2.44	340
angle horiz.	L2x2x3/16	2.5	10	2.44	61
20 ga pl		600	4	1.5	3600
Misc (lights, electrical)		600	2	5	6000
				Total	**21528**

ULTIMATE SEISMIC LOADS:

Seismic Loads ACSE 7-10 Chapter 13

Ap	2.5
Rp	3
Sds	0.727
Wp	21528
Ip	1
z/h	1

Fp = 0.727 Wp
15651 lbs

SERVICE WIND LOADS:

	615	ft^2	adjusted area

Double check wind load calc: Using V = 120 and Exposure B

Wind Loads ACSE 7-10 Chapter 29

Min = 16psf	9840	lbs	
Kz	0.98475		Exposure B
Kzt	1		
Kd	0.85		
V	120		
qz @ 98.25ft	31		
G	0.85		
Cf	1.769		
As	615	ft^2	
F =	28534	lbs	
F*0.6 for ASD comparison	17121	lbs	27.8 PSF
F used in 1984 calcs	18320	lbs	19382.56 if 5% over

Surface Roughness B for approximately 2,600ft towards base of wooded hillside
River is only about 1,500ft on one side but direction of river does not provide large fetch for wind acceleration, can assume Roughness B typical

sign bottom		
height above ground	33	ft
sign top		
height above ground	98.25	ft
B/s	0.191571	
s/h	0.6525	

		0.1	0.191571	0.2
Cf	0.7	1.85	1.758429	1.75
	0.6525	1.85	1.769303	1.761875
	0.5	1.85	1.804215	1.8

		B	C
Kz	90	0.96	1.24
	98.25	0.98475	1.2565
	100	0.99	1.26

If 2600 min ft for exposure B
If 100ft*20=2000 ft for exposure C
actual is 2200 ft
Say actual Kz is between B and C per ASCE 7-10 Figure C26.7-2 and 26.7.3 EXCEPTION

	0.666667	of difference between B and C
Use	1.165917	if Exposure B/C
Use	0.98475	if Exposure B
Use	1.2565	if Exposure C

-
-
-
-

Structural Design Requirements

The following items address frequently asked questions concerning structural design requirements within the jurisdiction of the City of Portland.

General Design Requirements
The following requirements are applicable to both commercial and residential projects located within the jurisdiction of the City of Portland.

- **Soils:** Foundation and retaining wall design parameters may be based upon the default soil properties of the building code or as justified by submission of a Geotechnical Report.
  - Default allowable foundation bearing capacity within the City of Portland is 1,500 psf (minimum 12" wide footing).
  - Default lateral soil load for the design of basement and retaining walls supporting level backfill shall be 40 psf/ft for laterally unrestrained retaining walls and 60 psf/ft for laterally restrained retaining walls. Lateral pressures for walls supporting sloping backfill or surcharge loads must be determined by a Geotechnical Report.
  - Design of basement and retaining walls shall include lateral soil loads due to earthquake motions.
  - Soil frost depth is 18-inches.
- **Snow:**
  - The minimum design roof snow load is 20 psf + 5 psf rain on snow surcharge where applicable per the *2014 Oregon Structural Specialty Code*.
  - Ground snow load used for determining drift requirements is based on *Snow Load Analysis for Oregon* as published by the Structural Engineer Association of Oregon. Ground snow loads at a specific site can be determined at the following link: http://snowload.seao.org/lookup.html.

Commercial Permits

Current wind load calculations require V=120mph, but the Exposure Category can be B at this site.

The current state building code governing commercial and engineered residential construction is the *2014 Oregon Structural Specialty Code (OSSC)*, which is based upon the *2012 International Building Code (IBC)* as amended by the State of Oregon.

Wind: Design wind pressures are to be determined using the 3-second gust wind speed and the procedures of the *2010 edition of Minimum Design Loads for Buildings and Other Structures* (ASCE 7-10) or in accordance with the alternate method contained in the OSSC (if applicable). The design wind speeds 3-second gust for the City of Portland are:

Risk Category	Vult (mph)

I	115
II	120
III, IV	130

Wind exposure category is site dependent and must be determined by the Engineer of Record based upon site conditions.

Seismic:

- All locations within or administered by the City of Portland are classified as Seismic Design Category D in accordance with the procedures of the OSSC.
- Seismic design parameters for specific sites may be determined based upon zip-code or latitude and longitude using the web tool developed by the United States Geologic Survey available at http://earthquake.usgs.gov/designmaps/us/application.php.
- City of Portland Title 24.85 governs mandatory seismic upgrades for existing buildings. A seismic upgrade may be required for existing buildings undergoing a change of use or occupancy, addition, renovation, alteration, or URM building re-roof. Please refer to City of Portland Title 24.85 for additional information.
- Chapter 24.85, section 24.85.065 (B) of the Portland City code requires certain cost triggers be adjusted annually by the construction cost index. The following are the updated cost triggers.

Table 24.85-C

Building Description	Cost of Alteration or Repair
Single story Unreinforced Masonry (URM) building	$56.75
Unreinforced Masonry (URM) building two or more stories	$42.56

The updated costs for required ASCE 31 evaluation report per section 24.85.060 is $248,000. See Frequently Asked Questions on Title 24.85.

- Link to URM Database

Five Stories of Wood-framed Residential Construction over a Concrete Podium:
See Frequently Asked Questions on this topic.

Residential Permits

The structural requirements for residential projects may be either prescriptive or engineered. In prescriptive design, the ORSC (Oregon Residential Specialty Code) defines a conservative method of construction to resist vertical and lateral loads. In engineered design, an engineer licensed in the State

of Oregon prepares engineering calculations and drawings that demonstrate how the structure resists vertical and lateral loads.

View the current State Building Codes and Rules. Refer to Commercial Permits, above, for information regarding engineered residential design.

The following are design values may be used for prescriptive residential design:

Wind: Applicable design wind pressure is 18 psf.
Seismic: Applicable Seismic Design Category is D1.

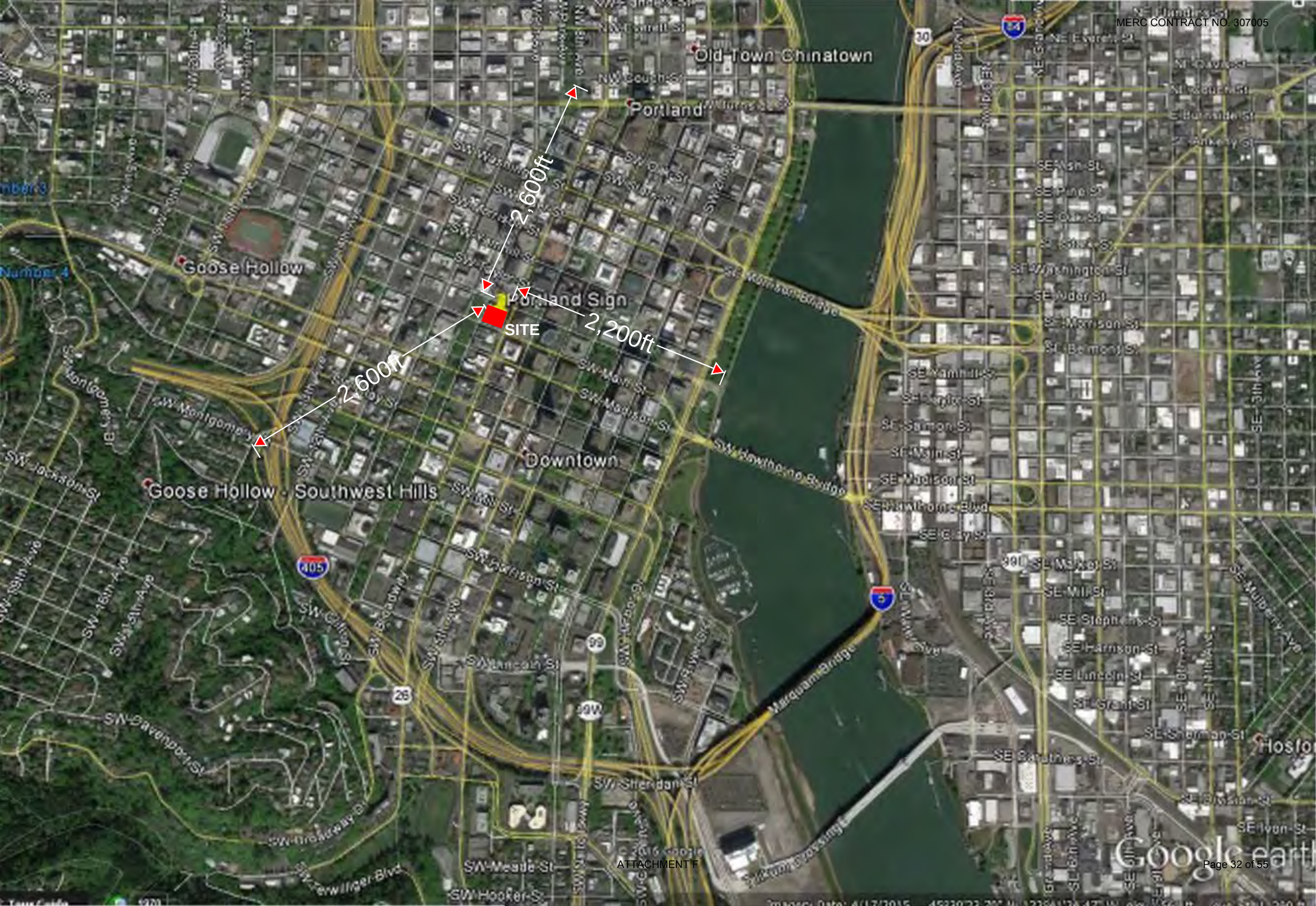
Miscellaneous Structures

Transmission and Cell Towers Design loads shall be determined per *Structural Standards for Steel Antennae Towers and Antennae Supporting Structures* (TIA/EIA-222 F-96). The structural design must account for atmospheric ice loads and increased wind load on ice covered sections.

Signs and Fabric Covered Awnings
Signs and fabric covered awnings are governed by City of Portland Title 32. Please visit the BDS Signs webpage for more information on the Sign permitting process.

- **Signs:** Structural design per Title 32.42.010.
- **Fabric Covered Awnings:** Structural design per Title 32.52.010.

Floating Structures Floating Structures are governed by the City of Portland Title 28.


Old Town Chinatown
Portland
Goose Hollow
Portland Sign
SITE
2,600ft
2,200ft
2,600ft
Downtown
Goose Hollow - Southwest Hills
Hawthorne Bridge
Marquam Bridge
Google earth

buildings, the algebraic sum of the pressures acting on opposite faces of each building surface shall be taken into account.

26.5 WIND HAZARD MAP

26.5.1 Basic Wind Speed

The basic wind speed, V, used in the determination of design wind loads on buildings and other structures shall be determined from Fig. 26.5-1 as follows, except as provided in Section 26.5.2 and 26.5.3:

For Risk Category II buildings and structures – use Fig. 26.5-1A.
For Risk Category III and IV buildings and structures – use Fig. 26.5-1B.
For Risk Category I buildings and structures - use Fig. 26.5-1C.

The wind shall be assumed to come from any horizontal direction. The basic wind speed shall be increased where records or experience indicate that the wind speeds are higher than those reflected in Fig. 26.5-1.

26.5.2 Special Wind Regions

Mountainous terrain, gorges, and special wind regions shown in Fig. 26.5-1 shall be examined for unusual wind conditions. The authority having jurisdiction shall, if necessary, adjust the values given in Fig. 26.5-1 to account for higher local wind speeds. Such adjustment shall be based on meteorological information and an estimate of the basic wind speed obtained in accordance with the provisions of Section 26.5.3.

26.5.3 Estimation of Basic Wind Speeds from Regional Climatic Data

In areas outside hurricane-prone regions, regional climatic data shall only be used in lieu of the basic wind speeds given in Fig. 26.5-1 when (1) approved extreme-value statistical-analysis procedures have been employed in reducing the data; and (2) the length of record, sampling error, averaging time, anemometer height, data quality, and terrain exposure of the anemometer have been taken into account. Reduction in basic wind speed below that of Fig. 26.5-1 shall be permitted.

In hurricane-prone regions, wind speeds derived from simulation techniques shall only be used in lieu of the basic wind speeds given in Fig. 26.5-1 when approved simulation and extreme value statistical analysis procedures are used. The use of regional wind speed data obtained from anemometers is not permitted to define the hurricane wind-speed risk along the Gulf and Atlantic coasts, the Caribbean, or Hawaii.

In areas outside hurricane-prone regions, when the basic wind speed is estimated from regional climatic data, the basic wind speed shall not be less than the wind speed associated with the specified mean recurrence interval, and the estimate shall be adjusted for equivalence to a 3-sec gust wind speed at 33 ft (10 m) above ground in Exposure C. The data analysis shall be performed in accordance with this chapter.

26.5.4 Limitation

Tornadoes have not been considered in developing the basic wind-speed distributions.

26.6 WIND DIRECTIONALITY

The wind directionality factor, K_d, shall be determined from Table 26.6-1. This directionality factor shall only be included in determining wind loads when the load combinations specified in Sections 2.3 and 2.4 are used for the design. The effect of wind directionality in determining wind loads in accordance with Chapter 31 shall be based on an analysis for wind speeds that conforms to the requirements of Section 26.5.3.

26.7 EXPOSURE

For each wind direction considered, the upwind exposure shall be based on ground surface roughness that is determined from natural topography, vegetation, and constructed facilities.

26.7.1 Wind Directions and Sectors

For each selected wind direction at which the wind loads are to be determined, the exposure of the building or structure shall be determined for the two upwind sectors extending 45° either side of the selected wind direction. The exposure in these two sectors shall be determined in accordance with Sections 26.7.2 and 26.7.3, and the exposure whose use would result in the highest wind loads shall be used to represent the winds from that direction.

26.7.2 Surface Roughness Categories

A ground Surface Roughness within each 45° sector shall be determined for a distance upwind of the site as defined in Section 26.7.3 from the categories defined in the following text, for the purpose of assigning an exposure category as defined in Section 26.7.3.

USE OF EXPOSURE CATEGORY B IS JUSTIFIED AT THIS SITE BASED ON DISTANCE TO ADJACENT CLEAR AREAS

Surface Roughness B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C: Open terrain with scattered obstructions having heights generally less than 30 ft (9.1 m). This category includes flat open country and grasslands.

Surface Roughness D: Flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice.

26.7.3 Exposure Categories

Exposure B: For buildings with a mean roof height of less than or equal to 30 ft (9.1 m), Exposure B shall apply where the ground surface roughness, as defined by Surface Roughness B, prevails in the upwind direction for a distance greater than 1,500 ft (457 m). For buildings with a mean roof height greater than 30 ft (9.1 m), Exposure B shall apply where Surface Roughness B prevails in the upwind direction for a distance greater than 2,600 ft (792 m) or 20 times the height of the building, whichever is greater.

Exposure C: Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D: Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 5,000 ft (1,524 m) or 20 times the building height, whichever is greater. Exposure D shall also apply where the ground surface roughness immediately upwind of the site is B or C, and the site is within a distance of 600 ft (183 m) or 20 times the building height, whichever is greater, from an Exposure D condition as defined in the previous sentence.

For a site located in the transition zone between exposure categories, the category resulting in the largest wind forces shall be used.

EXCEPTION: An intermediate exposure between the preceding categories is permitted in a transition zone provided that it is determined by a rational analysis method defined in the recognized literature.

26.7.4 Exposure Requirements.

26.7.4.1 Directional Procedure (Chapter 27)

For each wind direction considered, wind loads for the design of the MWFRS of enclosed and partially enclosed buildings using the Directional Procedure of Chapter 27 shall be based on the exposures as defined in Section 26.7.3. Wind loads for the design of open buildings with monoslope, pitched, or troughed free roofs shall be based on the exposures, as defined in Section 26.7.3, resulting in the highest wind loads for any wind direction at the site.

26.7.4.2 Envelope Procedure (Chapter 28)

Wind loads for the design of the MWFRS for all low-rise buildings designed using the Envelope Procedure of Chapter 28 shall be based on the exposure category resulting in the highest wind loads for any wind direction at the site.

26.7.4.3 Directional Procedure for Building Appurtenances and Other Structures (Chapter 29)

Wind loads for the design of building appurtenances (such as rooftop structures and equipment) and other structures (such as solid freestanding walls and freestanding signs, chimneys, tanks, open signs, lattice frameworks, and trussed towers) as specified in Chapter 29 shall be based on the appropriate exposure for each wind direction considered.

26.7.4.4 Components and Cladding (Chapter 30)

Design wind pressures for components and cladding shall be based on the exposure category resulting in the highest wind loads for any wind direction at the site.

26.8 TOPOGRAPHIC EFFECTS

26.8.1 Wind Speed-Up over Hills, Ridges, and Escarpments

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, shall be included in the design when buildings and other site conditions and locations of structures meet all of the following conditions:

DETERMINE OF WIND LOADS

1. The hill, ridge, or escarpment is isolated and unobstructed upwind by other similar topographic features of comparable height for 100 times the height of the topographic feature ($100H$) or 2 mi (3.22 km), whichever is less. This distance shall be measured horizontally from the point at which the height H of the hill, ridge, or escarpment is determined.
2. The hill, ridge, or escarpment protrudes above the height of upwind terrain features within a 2-mi (3.22-km) radius in any quadrant by a factor of two or more.
3. The structure is located as shown in Fig. 26.8-1 in the upper one-half of a hill or ridge or near the crest of an escarpment.

the wind load resistance may not be exactly the same in all directions as implied by a value of 1.0. A value of 0.85 might be more appropriate if a triangular trussed frame is shrouded in a round cover. A value of 1.0 might be more appropriate for a round chimney having a lateral load resistance equal in all directions. The designer is cautioned by the footnote to Table 26.6-1 and the statement in Section 26.6, where reference is made to the fact that this factor is only to be used in conjunction with the load combinations specified in Sections 2.3 and 2.4.

C26.7 EXPOSURE

The descriptions of the surface roughness categories and exposure categories in Section 26.7 have been expressed as far as possible in easily understood verbal terms that are sufficiently precise for most practical applications. Upwind surface roughness conditions required for Exposures B and D are shown schematically in Figs. C26.7-1 and C26.7-2, respectively. For cases where the designer wishes to make a more detailed assessment of the surface roughness

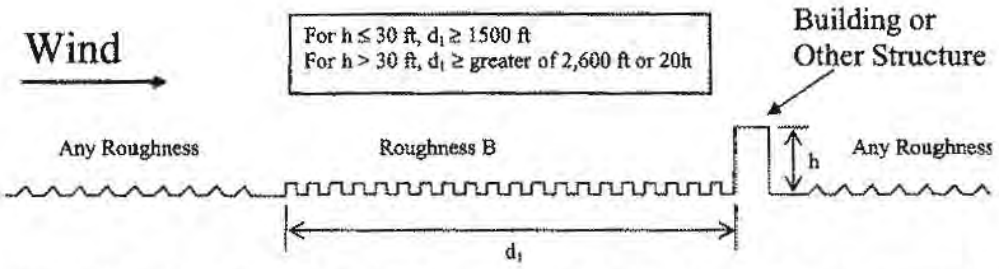
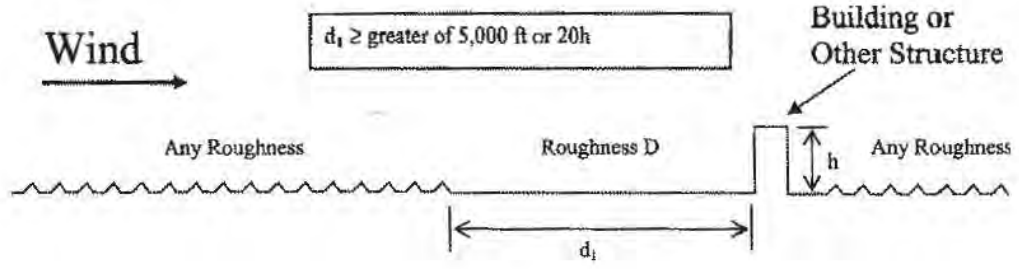
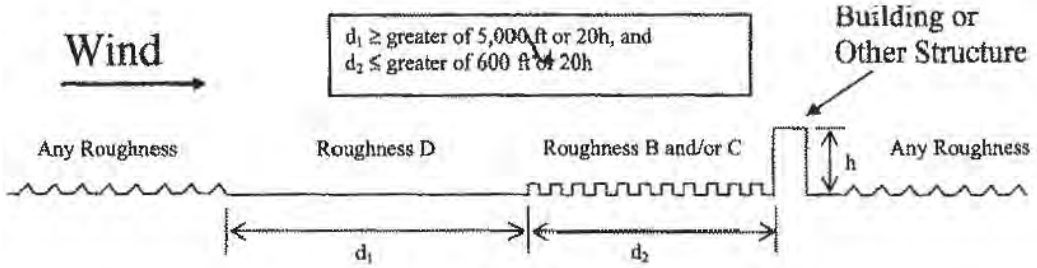


FIGURE C26.7-1 Upwind Surface Roughness Conditions Required for Exposure B.



(a)



(b)

FIGURE C26.7-2 Upwind Surface Roughness Conditions Required for Exposure D, for the Cases with (a) Surface Roughness D Immediately Upwind of the Building, and (b) Surface Roughness B and/or C Immediately Upwind of the Building.

category and exposure category, the following more mathematical description is offered for guidance (Irwin 2006). The ground surface roughness is best measured in terms of a roughness length parameter called z_0. Each of the surface roughness categories B through D correspond to a range of values of this parameter, as does the even rougher category A used in previous versions of the standard in heavily built-up urban areas but removed in the present edition. The range of z_0 in ft (m) for each terrain category is given in Table C26.7-1. Exposure A has been included in Table C26.7-1 as a reference that may be useful when using the Wind Tunnel Procedure. Further information on values of z_0 in different types of terrain can be found in Simiu and Scanlan (1996) and Table C26.7-2 based on Davenport et al. (2000) and Wieringa et al. (2001). The roughness classifications in Table C26.7-2 are not intended to replace the use of exposure categories as required in the standard for structural design purposes. However, the terrain roughness classifications in Table C26.7-2 may be related to ASCE 7 exposure categories by comparing z_0 values between Table C26.7-1 and C26.7-2. For example, the z_0 values for Classes 3 and 4 in Table C26.7-2 fall within the range of z_0 values for Exposure C in Table C26.7-1. Similarly, the z_0 values for Classes 5 and 6 in Table C26.7-2 fall within the range of z_0 values for Exposure B in Table C26.7-1.

Research described in Powell et al. (2003), Donelan et al. (2004), and Vickery et al. (2008b) showed that the drag coefficient over the ocean in high winds in hurricanes did not continue to increase with increasing wind speed as previously believed (e.g., Powell 1980). These studies showed that the sea surface drag coefficient, and hence the aerodynamic roughness of the ocean, reached a maximum at mean wind speeds of about 30 m/s. There is some evidence that the drag coefficient actually decreases (i.e., the sea surface becomes aerodynamically smoother) as the wind speed increases further (Powell et al. 2003) or as the hurricane radius decreases (Vickery et al. 2008b). The consequences of these studies are that the surface roughness over the ocean in a hurricane is consistent with that of exposure D rather than exposure C. Consequently, the use of exposure D along the hurricane coastline is now required.

For Exposure B the tabulated values of K_z correspond to $z_0 = 0.66$ ft (0.2 m), which is below the typical value of 1 ft (0.3 m), whereas for Exposures C and D they correspond to the typical value of z_0. The reason for the difference in Exposure B is that this category of terrain, which is applicable to suburban areas, often contains open patches, such as highways, parking lots, and playing fields. These cause local increases in the wind speeds at their edges. By using an exposure coefficient corresponding to a lower than typical value of z_0, some allowance is made for this. The alternative would be to introduce a number of exceptions to use of Exposure B in suburban areas, which would add an undesirable level of complexity.

The value of z_0 for a particular terrain can be estimated from the typical dimensions of surface roughness elements and their spacing on the ground area using an empirical relationship, due to Lettau (1969), which is

$$z_0 = 0.5 H_{ob} \frac{S_{ob}}{A_{ob}} \qquad \text{(C26.7-1)}$$

where

H_{ob} = the average height of the roughness in the upwind terrain
S_{ob} = the average vertical frontal area per obstruction presented to the wind
A_{ob} = the average area of ground occupied by each obstruction, including the open area surrounding it

Vertical frontal area is defined as the area of the projection of the obstruction onto a vertical plane normal to the wind direction. The area S_{ob} may be estimated by summing the approximate vertical frontal areas of all obstructions within a selected area of upwind fetch and dividing the sum by the number of obstructions in the area. The average height H_{ob} may be estimated in a similar way by averaging the individual heights rather than using the frontal areas. Likewise A_{ob} may be estimated by dividing the size of the selected area of upwind fetch by the number of obstructions in it.

As an example, if the upwind fetch consists primarily of single family homes with typical height $H_{ob} = 20$ ft (6 m), vertical frontal area (including some trees on each lot) of 1,000 ft^2 (100 m^2), and ground area per home of 10,000 ft^2 (1,000 m^2), then z_0 is calculated to be $z_0 = 0.5 \times 20 \times 1{,}000/10{,}000 = 1$ ft (0.3 m), which falls into exposure category B according to Table C26.7-1.

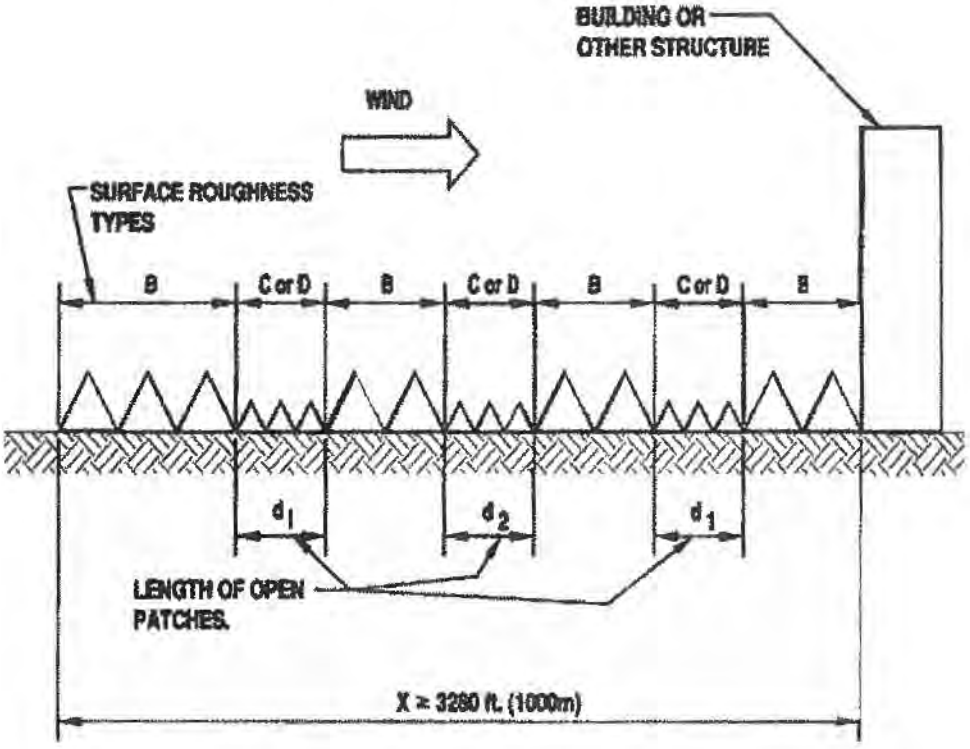
Trees and bushes are porous and are deformed by strong winds, which reduce their effective frontal areas (ESDU, 1993). For conifers and other evergreens no more than 50 percent of their gross frontal area can be taken to be effective in obstructing the wind. For deciduous trees and bushes no more than 15 percent of their gross frontal area can be taken to be effective in obstructing the wind. Gross frontal

area is defined in this context as the projection onto a vertical plane (normal to the wind) of the area enclosed by the envelope of the tree or bush.

Ho (1992) estimated that the majority of buildings (perhaps as much as 60 percent to 80 percent) have an exposure category corresponding to Exposure B. While the relatively simple definition in the standard will normally suffice for most practical applications, oftentimes the designer is in need of additional information, particularly with regard to the effect of large openings or clearings (e.g., large parking lots, freeways, or tree clearings) in the otherwise "normal" ground surface roughness B. The following is offered as guidance for these situations:

1. The simple definition of Exposure B given in the body of the standard, using the surface roughness category definition, is shown pictorially in Fig. C26.7-1. This definition applies for the surface roughness B condition prevailing 2,630 ft (800 m) upwind with insufficient "open patches" as defined in the following text to disqualify the use of Exposure B.
2. An opening in the surface roughness B large enough to have a significant effect on the exposure category determination is defined as an "open patch." An open patch is defined as an opening greater than or equal to approximately 164 ft (50 m) on each side (i.e., greater than 165 ft [50 m] by 164 ft [50 m]). Openings smaller than this need not be considered in the determination of the exposure category.
3. The effect of open patches of surface roughness C or D on the use of exposure category B is shown pictorially in Figs. C26.7-3 and C26.7-4. Note that the plan location of any open patch may have a different effect for different wind directions.

Aerial photographs, representative of each exposure type, are included in the commentary to aid



"OPEN PATCHES" - OPENINGS ≥ 164FT x 164FT (50m x 50m)
$d_1, d_2, \ldots, d_i \geq$ 164FT (50m)

$d_1 + d_2 + \ldots + d_i \leq$ 656FT (200m)

TOTAL LENGTH OF SURFACE ROUGHNESS B ≥ 2630FT (800m)
WITHIN 3280 FT (1000m) OF UPWIND FETCH DISTANCE.

FIGURE C26.7-3 Exposure B with Upwind Open Patches.

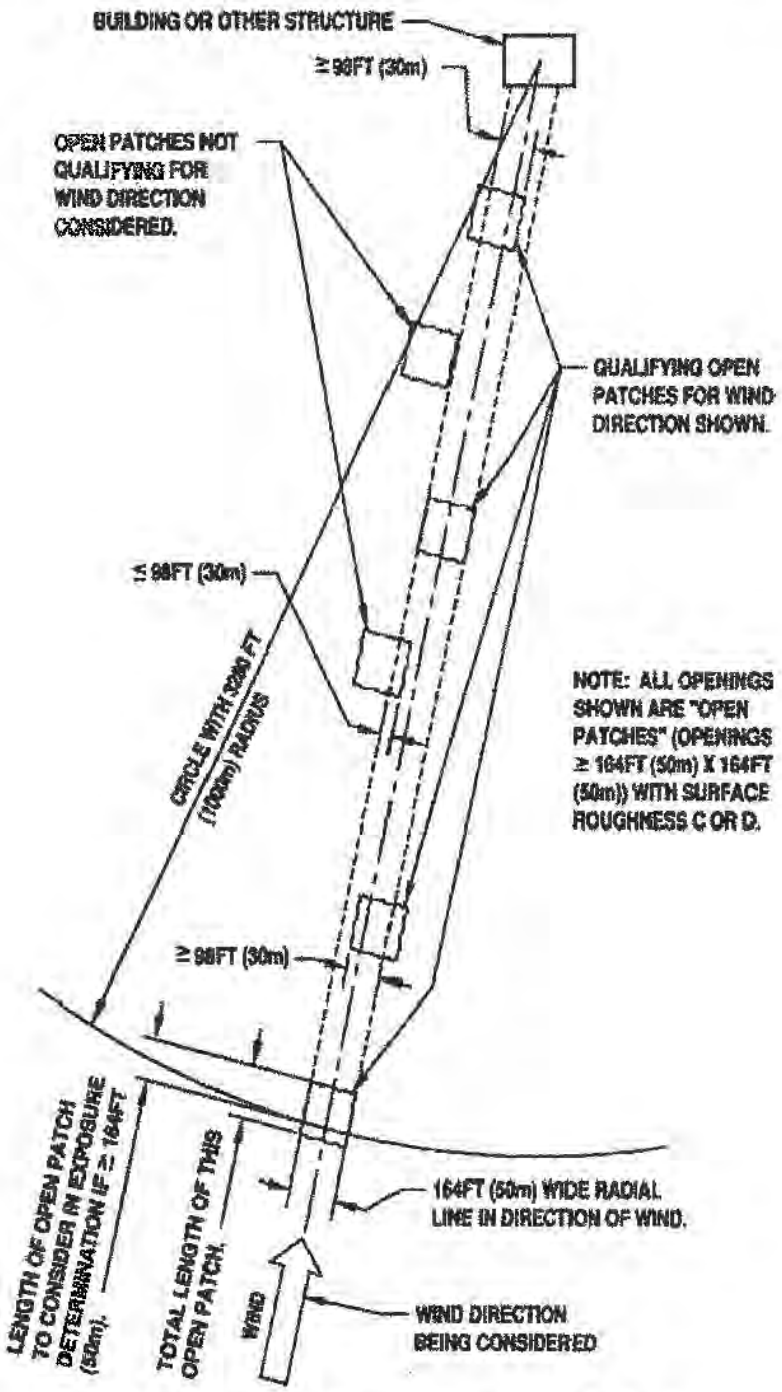


FIGURE C26.7-4 Exposure B with Open Patches.

the user in establishing the proper exposure for a given site. Obviously, the proper assessment of exposure is a matter of good engineering judgment. This fact is particularly true in light of the possibility that the exposure could change in one or more wind directions due to future demolition and/or development.

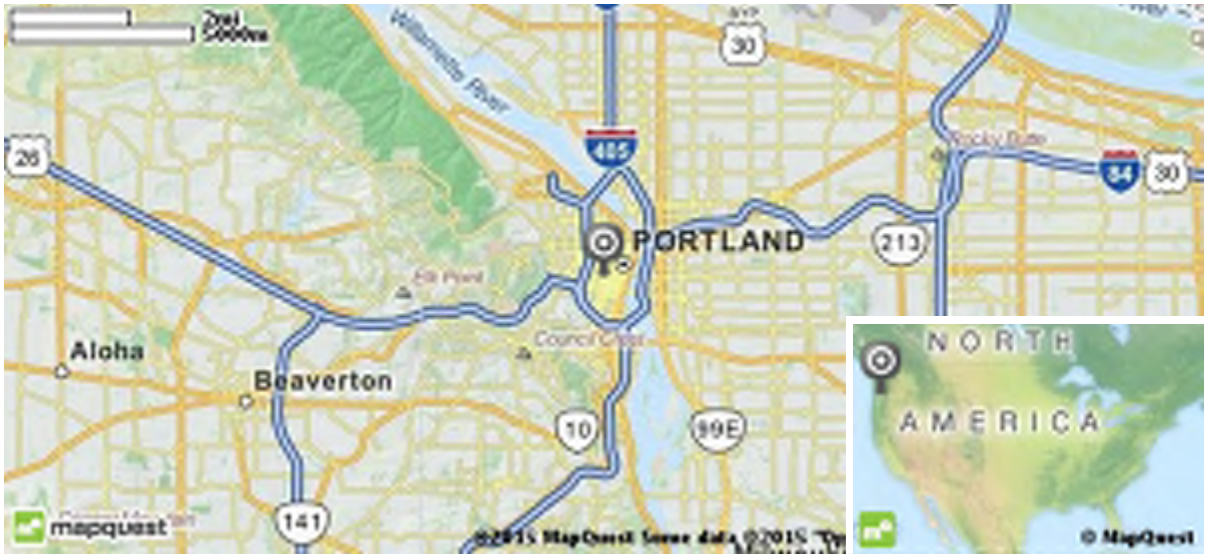
C26.7.4 Exposure Requirements

The standard in Section 26.5.1 requires that a structure be designed for winds from all directions. A rational procedure to determine directional wind loads is as follows. Wind load for buildings using Section 27.4.1 and Figs. 27.4-1, 27.4-2 or 27.4-3 are

USGS Design Maps Summary Report

User–Specified Input

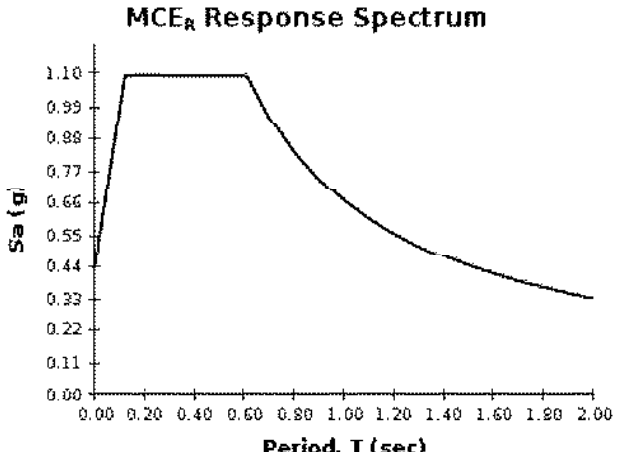
Report Title	Portland SIgn Mon September 21, 2015 21:58:05 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	45.5167°N, 122.6811°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

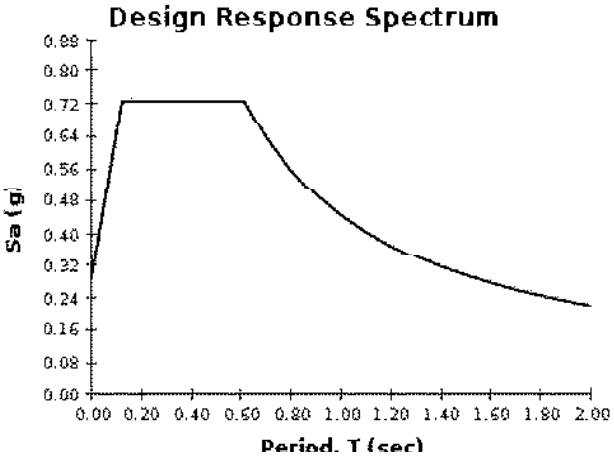


USGS–Provided Output

S_S =	0.987 g	S_{MS} =	1.091 g	S_{DS} =	0.727 g
S_1 =	0.424 g	S_{M1} =	0.669 g	S_{D1} =	0.446 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





Gravity Load Take-Off
Main frame

		L	Quantity	lb/ft	Wt (lb)
main verts	L6x4x1/2	59.5	4	16.2	3856
face X bracing	PL 3"x1/4"	10	32	2.55	817
face horizontals	L2.5x2.5x1/4	7.25	18	4.1	535
side diagonals	L2x2x3/16	4.25	32	2.44	332
side horizontals	L2x2x3/16	2	20	2.44	98
torsional members	L2x2x3/16	8.67	20	2.44	423
misc for T&B connection					300
Total					6360

External frames		L or A	Quantity	plf or psf	Wt (lb)
angle verts	L2x2x3/16	899	1	2.44	2194
angle horiz.	L2x2x3/16	7.75	18	2.44	340
angle horiz.	L2x2x3/16	2.5	10	2.44	61
20 ga pl		588	4	1.5	3528
Misc (lights, electrical)		588	2	5	5880
				Total	**18363**

kpff
Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 40
Location	Date	
Client ARG	Revised	Job No.
	Date	

Determine Design Ice Load on Portland Sign

Wide Face Area = 588.4 sf, $D_L = 8'$

Narrow Face Area = 130.5 sf

$t_d = 2.0\, t\, I_i\, f_z\, (K_{zt})^{0.35}$ ASCE 7-10 EQ. 10.4-5

$t = 0.67''$ (site specific icing study)

$I_i = 1.0$ (Table 1.5-2, Risk Cat. II)

$f_z = \left(\frac{z}{33}\right)^{0.10}$, $z = 80'$ total sign height/2 = 40' average

$= 1.02$

$K_{zt} = 1.0$

$t_d = 1.37''$,

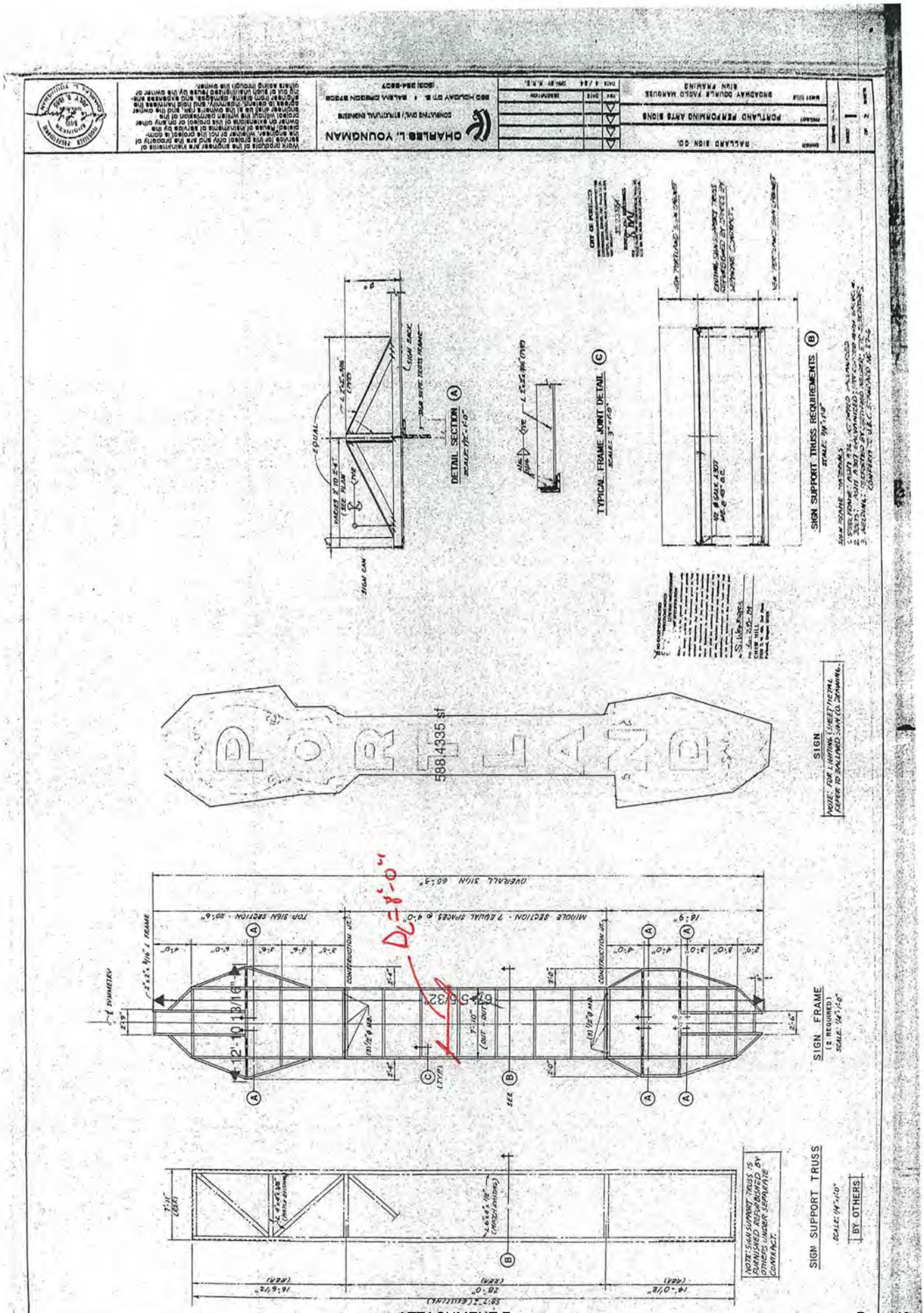
$A_i = \pi t_d (D_L + t_d)$

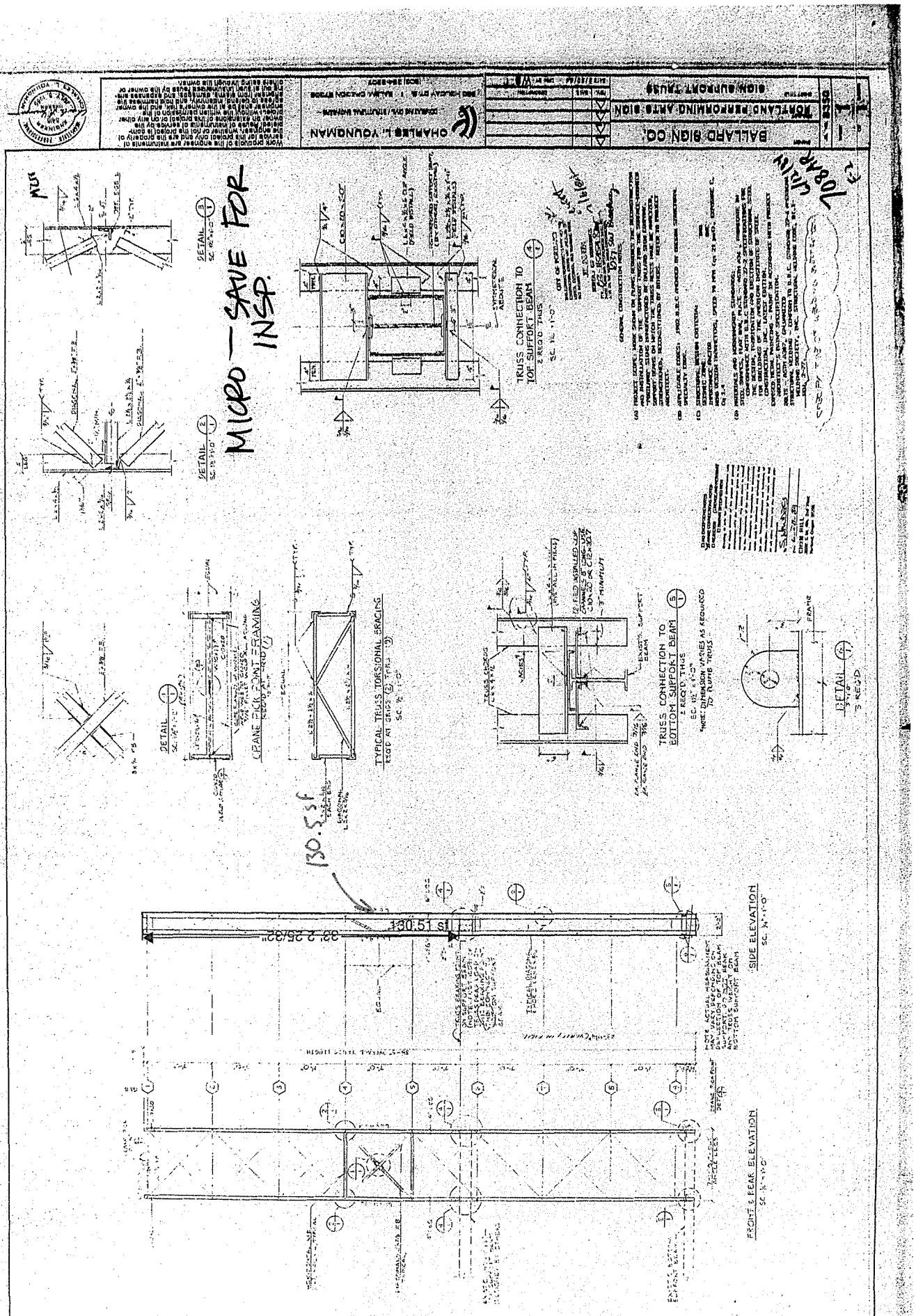
$= \pi \cdot \frac{1.37''}{12} \cdot \left(8' + \frac{1.37''}{12}\right)$

$= 2.91\ ft^2$

$V_i = A_i \cdot L = 2.91\ ft^2 \cdot 66.25' = 193\ ft^3$

$wt = V_i \cdot 56\ pcf\ ice = \underline{10.8\ k\ total}$


PORTLAND
588.4335 sf
SIGN
SIGN FRAME
SIGN SUPPORT TRUSS
DETAIL SECTION (A)
TYPICAL FRAME JOINT DETAIL (C)
SIGN SUPPORT TRUSS REQUIREMENTS (B)
BY OTHERS


MICRO — SAVE FOR INSP.
130.51 sf
33' 2 25/32"
SIDE ELEVATION
FRONT & REAR ELEVATION
TYPICAL TRUSS TORSIONAL BRACING
TRUSS CONNECTION TO TOP SUPPORT BEAM
TRUSS CONNECTION TO BOTTOM SUPPORT BEAM
DETAIL
CRANE PICK POINT FRAMING
BALLARD SIGN CO.
PORTLAND PERFORMING ARTS SIGN
SIGN SUPPORT TRUSS
CHARLES L. YOUNGMAN

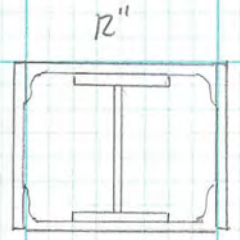
kpff Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 41
Location	Date	
Client ARG	Revised	Job No.
	Date	

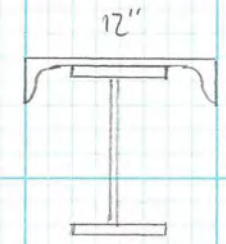
Check Strength and Deflection of Supporting Beams with Ice Loads

Distribute Dead and Ice Loads to Top and Bottom Beams based on stiffness

Top Beam: $I = 2155\ in^4$



Bottom Beam: $I = 410.5\ in^4$



Total stiffness = $2155\ in^4 + 410.5\ in^4 = 2566\ in^4$

Top = 0.84

Bot = 0.16

DL = 18.36 k

Ice = 10.8 k

Top loads = $18.36k \cdot 0.84 = 15.42k$

$= 10.8k \cdot 0.84 = 9.07k$

Bot loads = $18.36k \cdot 0.16 = 2.94k$

$10.8k \cdot 0.16 = 1.73k$

Deflection checks: $D + 0.7D_i = 15.42k + 0.7 \cdot 9.07k = 21.77\ k$ Top ASD

$= 5.57\ k$ Bot.

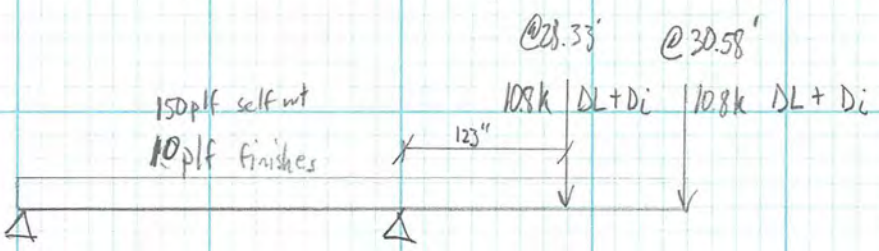
$1.2D + 0.2D_i = 1.2 \cdot 18.06 + 0.2 \cdot 15.96 = 24.86k$ Top LRFD

$= 4.74\ k$ Bot.

kpff Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 42
Location	Date 4/20/16	
Client ARG	Revised	Job No.
	Date	

Design Replacement Top Beam Carrying Portland Sign



Determine I_{req} for 3/4" deflection at tip of beam ($\leq L/200$)

$$\Delta_{total} = \frac{(10plf + 150plf)}{12000} \cdot \frac{150''}{24 \cdot 29000 ksi \cdot I}\left(4(150^{2})216.96'' - 216.96^{3} + 6(150)^{3} - 4(150)^{3} + 150^{3}\right) +$$

(Assured self-weight)

$$\frac{10.8k \cdot 10''^{2}(216.96'' + 150'')}{3 \cdot 29000 ksi \cdot I} + \frac{10.8k \cdot 123''^{2}(216.96'' + 123'')}{3 \cdot 29000 ksi \cdot I}$$

$$0.625'' = \frac{55.85 in^{5}}{I} + \frac{1024.96 in^{5}}{I} + \frac{638.473 in^{5}}{I}$$

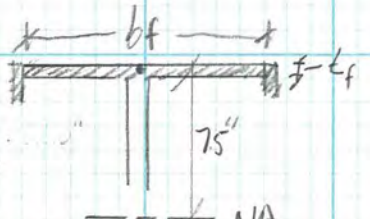
$$I = \frac{1719.28}{0.75''} = 2292 in^{4}$$ - use W14 x 53 w/ 1/2" plates and MC12x50

Determine stitch weld

$V_{max} = 32k$ $Q = 15'' \cdot bf \cdot t_f = 15'' \cdot$ $= 94.93 in^{3}$

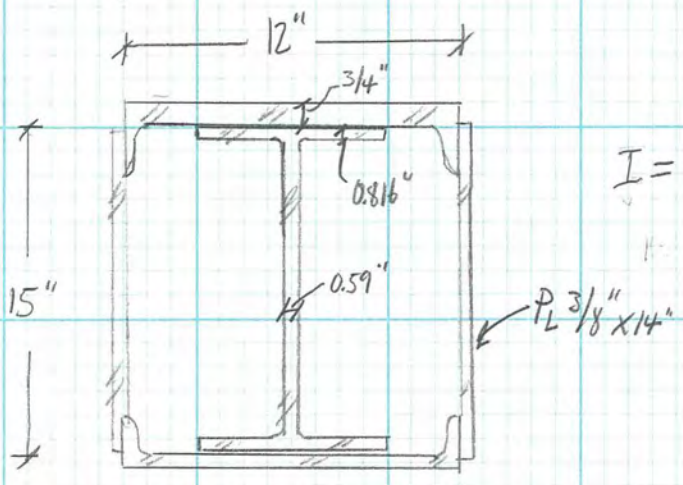
$I = 2208 in^{4}$ $VQ/I = 0.573 k/in$

3/16" P.P is good for 5.9 k/in so use 1.5" weld @ 6" o.c.



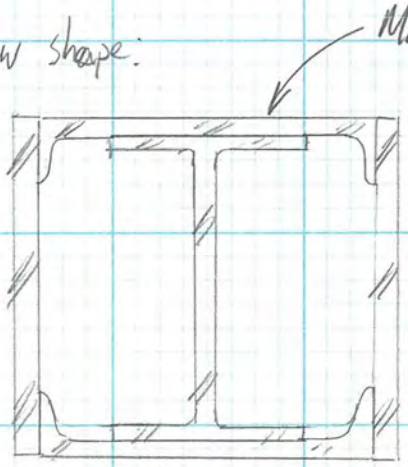
kpff Portland, Oregon	Project Portland Sign Renovations	By NK	Sheet No. 43
	Location	Date 4/20/16	
	Client ARG	Revised	Job No.
		Date	

Previous Shape:



$I = 2130 in^4$, 8.8 k pt loads $\Delta_{end} = 0.53"$

New shape:



$I = 2208 in^4$

$\Delta = 0.779" \approx L/200$ ok for ice load case

$\approx 0.55"$ w/out ice loading

$= L/272$ ok

kpff Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 44
Location	Date 4/20/16	
Client ARG	Revised	Job No.
	Date	

Check Combined Wind and Gravity Loading

Assuming Wt = 11.3k and 0.8k ice

See page 2 of 25 ref. KPFF pg. 21

4-30-84 Lakes

$M_{ux} = 354.3 k\text{-}ft$

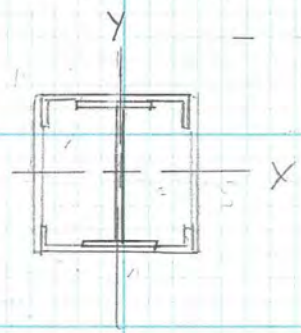
$M_{uy} \approx M_{ux} = 354.3 k\text{-}ft$

Assume boxed member will not lateral/torsional buckle, it is subject to Flange and Web local buckling.

Flange Local buckling: $b = 12"$ $t = 0.835"$ $b/t = 14 \leq 1.12\sqrt{E/F_y} = 27$ ok (compact)

Web local buckling: $h = 15"$ $t = 0.5"$ $h/t = 30 \leq 2.42\sqrt{E/F_y} = 58 \leq 5.7\sqrt{E/F_y} = 137$

I_x (built-up) $= 2155 in^4$ I_y (built-up) $= 1066 in^4$



$Z_x = 1.15 \cdot S_x = \frac{2155}{7.5"} \times 1.15 = 330.43 in^3$

$Z_y = 1.15 S_y = \frac{1066}{6"} \times 1.15 = 204.32 in^3$

$\phi M_{nx} = 50 ksi \cdot 330.43 in^3 \cdot 0.9 = 1238 k\text{-}ft$

$\phi M_{ny} = 50 ksi \cdot 204.32 in^3 \cdot 0.9 = 766.2 k\text{-}ft$

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Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 45
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	Date	

Check Combined Loading - Continued

$M_{ux} = M_{uy} = 354.3$ k-ft

$\phi M_{nx} = 1238$ k-ft

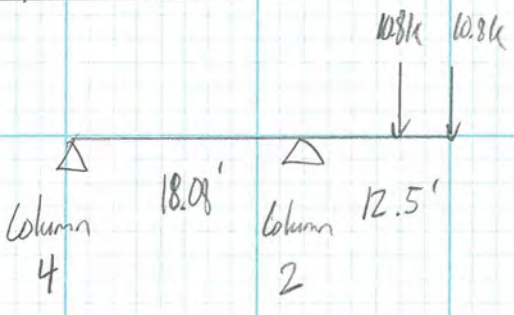
$\phi M_{ny} = 766$ k-ft

$$\frac{M_{ux}}{\phi M_{nx}} + \frac{M_{uy}}{\phi M_{ny}} = 0.75 \text{ ok} \checkmark$$

kpff Portland, Oregon

Project Portland Sign Renovations	By NK	Sheet No. 46
Location	Date 4/20/16	
Client ARG	Revised	Job No.
Ref. Details 3 and 4 S6.1 ALT	Date	

Design Beam Connections

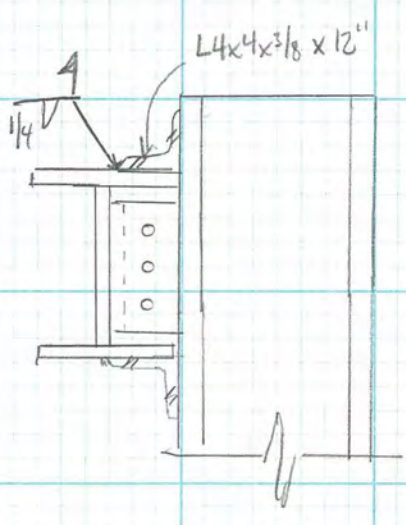


Max Factored Reaction @ Column 4 = -18.3k

Connection [3]" is good for 59k LRFD ok ✓

Max Factored Reaction @ Column 2 = 52.9k ok for connection [3]

Lateral Forces: Wind forces equal applied gravity loads so reactions are the same



Check 12" weld:

$\phi R_n = 0.75 \cdot 42 ksi \cdot 0.707 \cdot 0.25" \cdot 12" \times 2 \text{ welds} = 66k$ ok ✓

Check steel yield: $\phi R_n = 0.9 \cdot 12" \cdot 0.375" \times 36 ksi = 146k$ ok ✓

Site Specific Icing Study

International Climatic Evaluations Inc. (ICE)
1110 Finch Avenue West, Suite 814, Toronto, Ontario M3J 2T2 (416) 736-7453 Fax: (416) 736-4372

December 6, 2010

KPFF Consulting Engineers
111 SW Fifth Avenue, Suite 2500
Portland, Oregon 97204
USA

Attn: **Mr. Erik Kabusreiter, P.E.**

Re: Site Specific Wind and Ice Data for a Building in Portland, Oregon

Dear Mr. Kabusreiter,

Further to your request by email on November 30, 2010, we have studied the statistical data available and most appropriate for the location in question to arrive at the site-specific wind and ice design values appropriate for your application in keeping with the requirements of ASCE 7-05 10.1.1, Site-Specific Studies. We confirm that we have followed the recommendations of ASCE 7-05 and that the results we present below give the best estimate for wind, ice and wind with ice values for this location in Portland, Oregon.

It should be noted that ASCE 7 recommends site-specific studies such as the one reported here for mountainous terrain and gorges, thus recognizing these to be more appropriate than the map values.

The building site in Portland, Oregon is situated in the downtown area, at a base elevation of 19 m ASL. Portland is located within the Willamette Valley and is flanked by the Coast Range on the west and the Cascades Range on the east, at a distance of 30 miles from downtown (see Figure 1).

Figure 1 Location of the building in downtown Portland.

Design Wind Speed

The closest meteorological station to the site is at Portland Airport, at 8 m ASL, about 6 miles to the northeast of the site (see Figure 2).

Figure 2 Location map of building and Portland Airport meteorological station.

This station has a long record of data, which includes hourly wind, temperature and precipitation information. The location of the airport station within the valley and its proximity to the building site make the data very representative of the downtown site. The only adjustment to winds that was required was for the roughness of the city centre compared to the airport exposure.

The 30 year period from 1977 to 2006 was used in analyzing the wind statistics and the occurrence of icing conditions. The R (v2.9) statistical package was used with the evir[1] extreme value analyses procedure based on the Generalized Extreme Value distribution to perform the extreme wind analysis, and the Peaks over Threshold method was used to perform extreme event analysis for freezing rain and in-cloud and fog riming.

Using the hourly precipitation data reported for the airport and the CRREL Simple icing model[2], the predicted equivalent radial ice thickness on a cylinder for 50 year return is 0.67", with a maximum of 1.2" at the upper 95% confidence interval. Only 14 events yielding more than 0.1 radial inch of ice were detected in the 30 year period. Of these, only 3 produced more than 0.5 radial inches of ice.

Using the event statistics for the freezing rain events, and allowing for an extra window of 2 days to cover the situation of high winds following an icing event while the ice is still present on the structure, the companion wind for the extreme event is predicted to be up to 57 mph for the 3-second gust at the airport and 49 mph at the city site. It should also be noted that the CRREL Simple model, as is the case with most models of icing, assumes that the conductor is oriented crosswise to the wind and is horizontal for capturing raindrops. This tends to over-estimate the likely accumulation on a vertical member, so the above numbers should be viewed as conservative.

This site is also subjected to fogging and low level cloud, which can cause rime icing on cold elements on the building for sub-freezing conditions. For low cloud riming, an estimate is made of the magnitude of rime accumulation by determining the occurrence of low ceiling and with corresponding temperature being below freezing for sufficient duration, and using the Simple icing model estimate for the horizontal component only (i.e., wind driven deposition on the member). The 50 year potential for rime icing is estimated at 0.34" (maximum of 0.6" at 95% confidence) with a companion gust of 30 mph.

For ice fogging, the observational data was used to determine the occurrence of the events and the Simple icing model was used to estimate the rime accumulation. Only several significant events were found in the record, with the maximum being less than 0.1".

Table 1 sets out the derived extreme wind statistics for sustained (10 min) and gust (3 sec) durations as derived for the airport location and adjusted for the city location.

Table 1 Extreme wind analysis for Portland, Oregon Site
45° 30' 50.4" N 122° 40' 37.2" W

Parameter	Airport			City Site		
50 year return	Expected	95% Confidence		Expected	95% Confidence	
		Lower Bound %	Upper Bound %		Lower Bound %	Upper Bound %
Sustained wind (mph)	49.7	- 9.8	17.2	42.9	- 9.8	17.2
3 second gust (mph)	73.9	- 11.4	19.6	63.8	- 11.4	19.6
Freezing rain (in.)	0.67	- 50.0	75.0	0.67	-50.0	75.0
Companion wind (mph)	42.0	- 9.5	14.3	36.0	- 9.5	14.3
Companion gust (mph)	57.2	- 13.9	14.3	49.2	- 13.9	14.3

The profile of wind with height above ground is shown in Figure 3, corresponding to the values in Table 2.

Table 2: 50 year return wind for the site at Portland, Oregon
45° 30' 50.4" N 122° 40' 37.2" W

Height above base (ft.)	Wind Speed (mph)	
	Sustained Wind (10 min)	3 Second Gust
1968.5	91.5	102.7
1640.4	88.9	105.3
1312.3	85.7	106.8
984.3	81.6	106.7
820.2	79.0	105.8
656.2	75.8	103.8
492.1	71.7	100.4
328.1	65.9	94.4
164.0	56.0	81.9
131.2	52.8	77.6
98.4	48.7	71.8
65.6	42.9	63.5
32.8	42.9	63.8

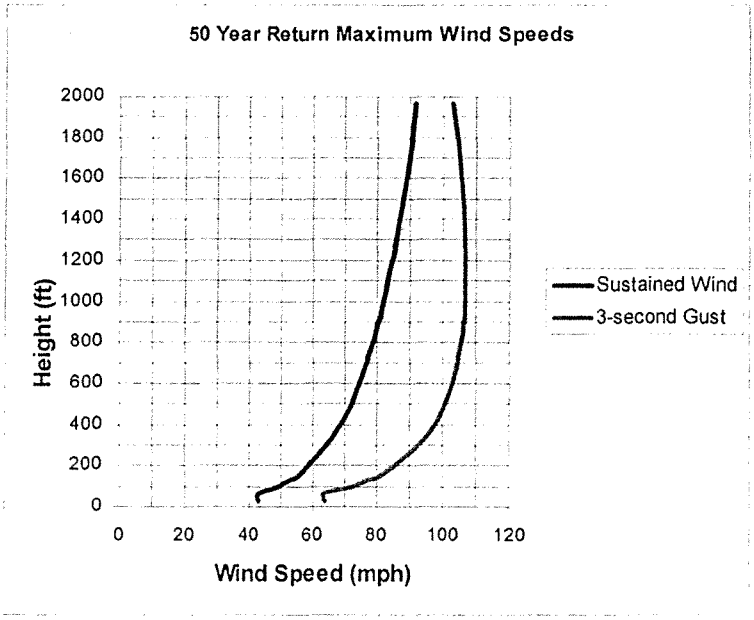


Figure 3 Wind Speed corresponding to Table 2

Please Note:

International Climatic Evaluations Inc. has used its best efforts, the best statistical climatic data made available to it, and the latest procedures accepted by the industry to make the recommendations for climatic design parameters contained in this report. Inasmuch as International Climatic Evaluations Inc. relies on climatic data supplied by others, and as the nature of the data relating to climate is subject to some uncertainty, International Climatic Evaluations Inc. cannot warranty these results nor assume any responsibility for any prejudices, loss or damage as a result of any reliance on the recommendations contained in this report.

We trust you find this satisfactory and look forward to being of service to you again in the near future.

International Climatic Evaluations Inc.

per: Simon Weisman, M.A.Sc., P.Eng.
Vice President, Engineering

SW/nwb

References:

1. evir (extreme values in R) package - Generalized Extreme Value Analysis running in R v 2.5.1 (The R Foundation for Statistical Computing).
2. Jones, K.F. (1996a) "*A simple model for freezing rain ice loads*", in Proceedings of the 7th International Workshop on Atmospheric Icing of Structures, Chicoutimi, Canada, p. 412-416. Jones, K.F. (1996b) "*Ice accretion in freezing rain*", CRREL Report 96-2, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.