Port of Klickitat DIP

Dallesport, WA

Project 2190380.01

Project Manual–Volume 2

Specifications

Bid Set

September 14, 2020

P 503.224.9560 ▪ F 503.228.1285 ▪ W MCKNZE.COM

ARCHITECTURE ▪ INTERIORS ■ STRUCTURAL, CIVIL AND TRAFFIC ENGINEERING
LAND USE AND TRANSPORTATION PLANNING ▪ LANDSCAPE ARCHITECTURE

SECTION 00 01 05

PROJECT TEAM

OWNER

PORT OF KLICKITAT
ATTN: BILL SCHMIDT
154 E BINGEN POINT WAY, SUITE A
COOK, WA 98605
TELEPHONE: (509) 261-2511

ARCHITECT

MACKENZIE
ATTN: RYAN WESTON
101 E 6TH STREET, SUITE 200
VANCOUVER, WA 98660
TELEPHONE: (360) 695-7879
FAX: (503) 228-1285

STRUCTURAL ENGINEER

MACKENZIE
ATTN: ANDREW ROBINSON
1515 SE WATER AVE., SUITE 100
PORTLAND, OR 97214
TELEPHONE: (503) 224-9560

CIVIL ENGINEER

MACKENZIE
ATTN: CHAD LAWRENCE
101 E 6TH STREET, SUITE 200
VANCOUVER, WA 98660
TELEPHONE: (360) 695-7879

GEOTECHNICAL ENGINEER (APPENDIX ONE CONTAINS GEOTECHNICAL REPORT)

EARTH ENGINEERS, INC.
ATTN: TROY HULL
2411 SE 8TH AVE
CAMAS, WA 98607
TELEPHONE: (360) 567-1806
FAX: (360) 253-8624

SURVEYOR

TENNESON ENGINEERING CORP.
ATTN: BEN BESEDA
3775 CRATES WAY
THE DALLES, OR 97058
TELEPHOHE: (541) 296-9177

END OF PROJECT TEAM PAGE

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SEALS PAGE

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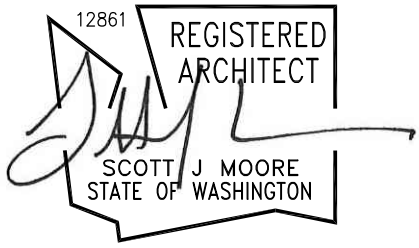

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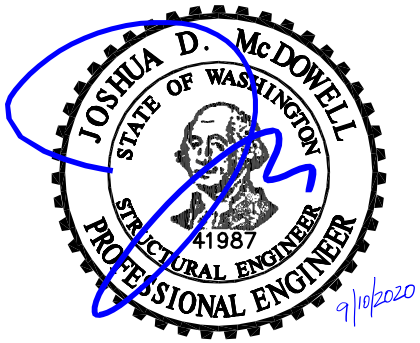

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SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Port of Klickitat - DIP 151C Building Project

B. General Contractor's Name: TBD

C. Owner's Name: Port of Klickitat.

D. Architect's Name: Mackenzie.

E. The Project consists of the construction of grading, uitilities, site work and design-build for one 5,000 SF pre-engineered metal building..

1.02 CONTRACT DESCRIPTION

A. Contract Type: Design Build by Contractor as described in bid documents provided by the Port.

B. Design Build - PEMB, Mechanical, Electrical, Plumbing, and Fire Protection (MEP): The General Contractor to provide and coordinate design, engineering, calculations, energy calcualations, drawings, submittals, permitting, and work.

1.03 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion. Some items include:
   1. Telephone

1.04 OWNER OCCUPANCY

A. Owner intends to have the Project upon Substantial Completion ready to start tenant improvements.

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

C. Schedule the Work to accommodate Owner future tenant improvements and tenants occupancy.

D. Schedule: The estimated schedule for the project is as follows:
   1. Estimated site and building permit issuance: September 30 2020
   2. Estimated start of construction: October 27, 2020
   3. Desired date of substantial completion: March 31, 2021

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: The General Contractor will have unlimited use of the site during construction operations.

B. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

1.06 VALUE ENGINEERING

A. The General Contractor and Sub Contractors are encouraged to present value engineering (VE) ideas with their Bid Submissions. These VE ideas will be kept in private. These VE ideas will be considered as "alternates" and be treated as "alternates". These VE ideas will be reviewed by the Owner and then discussed with General Contractor during the reivew of the Bids.

1.07 PERMITS AND SYSTEM DEVELOPMENT CHARGES

A. The owner will apply for, obtain and pay for Land Use Approval and Engineering Permitting for the project site work.

B. The owner will apply for, obtain and pay for "System Development Charges" for the the project. These include:
   1. Water Meters
   2. Water Connection Development Charge.
   3. Fire Marshall's Hydrant Permit.
   4. Storm Water Connection Development Charge.
   5. Sanitary Sewer Connection Development Charge.

C. The General Contractor and Sub Contractors will be responsible for the "Trade Permits" including the application fees, apply for the permits themselves and obtaining the various permits. The trade permits include, but are not limited to the following:
   1. Pre-Engineered Metal Building
   2. Site plumbing
   3. Plumbing
   4. Mechanical
   5. Electrical
   6. Fire sprinklers
   7. Fire alarms

END OF SECTION

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ALTERNATES

PART 1 GENERAL

2.01 SECTION INCLUDES

A. Alternative submission procedures.

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

C. Additional Value Engineering by the Contractor

2.02 RELATED REQUIREMENTS

A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

B. Document 00 43 23 - Alternates Form: List of alternatives as supplement to Bid Form.

2.03 ACCEPTANCE OF ALTERNATIVES

A. Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.

2.04 SCHEDULE OF ALTERNATIVES

A. Alternate No. One - Motorized Overhead Doors:
   1. Base Bid: Manual Chain Hoist Door.
   2. Alternative Item: Provide motorized OH doors see specs for requirements.

B. Alternate No. Two - Wainscot Material:
   1. Base Bid: Metal wall panel from FF to Roof, 2 profiles per A2.10 elevations.
   2. Alternative Item: Provide CMU wainscot base around entire perimeter per A2.10A elevations.

2.05 VALUE ENGINEERING

A. The General Contractor and Sub Contractors are encouraged to present additional Value Engineering (VE) ideas at time of Bid Submission. These VE ideas will be kept confidential and will not be shared with the other General Contractor. These VE ideas will be considered as 'volunteered alternates' and will be treated as alternates. These VE ideas will be reviewed by the Owner and discussed with General Contractor when the Bids are reviewed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00

CONTRACT MODIFICATIONS PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Change Procedures

1.02 RELATED SECTIONS

A. Section 01290 - Payment Procedures

1.03 CHANGE PROCEDURES

A. Supplemental Instructions:
   1. The Architect/Engineer will advise of minor changes in the work not involving an adjustment to Contract Sum/Price of Contract Time as authorized by the General Conditions by issuing Architectural Supplemental Instructions (ASI) on AIA Form G710.

B. Notice of Change by Architect/Engineer:
   1. The Architect/Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised drawings and specifications.
   2. Proposal Requests (PR) shall be issued on AIA Form G709.
   3. The Proposal Request is not a change order or a direction to proceed with the work.
   4. Prepare a construction cost estimate and respond to the Proposal Request within 10 days.
   5. After review by Architect/Engineer and Owner, the Proposal Request may or may not be issued as a Construction Change Directive (CCD) or Change Order (CO).

C. Notice of Change by Contractor:
   1. The Contractor may purpose a change by submitting request for change to the Architect/Engineer, describing the proposed change and its full effect on the work.
   2. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on work by separate or other contractors.
   3. Document any requested substitutions in accodance with Section 01600, Product Requirements.
   4. Architect/Engineer will assign a Proposal Request number for documentation purposes.
   5. A Proposal Request may or may not be issued as a Construction Change Directive (CCD) or Change Order (CO) after review by Architect/Engineer and Owner.

D. Construction Change Directive:
   1. Architect/Engineer may issue a Construction Change Directive (CCD) signed by the Architect/Engineer, Contractor and Owner, instructing the Contractor to proceed with a change in the work, for subsequent inclusion in a Change Order (CO).
   2. Construction Change Directives will be issued on AIA Form G714.
   3. A Construction Change Directive (CCD) will be used when either the Owner and Contractor cannot agree on the proposed cost and/or time delay or there is an agreement between the Owner and Contractor on the proposed cost and/or time delay and a Construction Change Directive is executed to prevent further delay prior to the issuance of the Change Order.
   4. The Construction Change Directive (CCD) will describe the changes in the work and designate a method of determining any change in Contract Sum/Price or Contract Time.
   5. Promptly execute the change.

E. Change Order:
   1. Architect/Engineer will issue Change Orders for signatures of parties as provided in General Conditions of the contract.
   2. Change Orders (CO) will be executed on AIA Document G701 standard Change Order forms.

3. Stipulated Sum Change Order: Based on Proposal Request (PR) or Construction Change Directive (CCD) and Contractor's price quotation or Contractor' request for a Change Order (CO) as approved by Architect/Engineer.
4. Unit Price Change Order:
   a. For pre-determined unit prices and quantites , the Change Order (CO) will be executed on a fixed basis.
   b. For unit costs or quantities of units of work which are not pre-determined, execute work under a Construction Change Directive (CCD).
   c. Changes in Contract Sum/Price and Contract Time will be computed as specified for Time and Materials Change Order (CO).
5. Time and Material Change Order:
   a. Submit itemized account and supporting data after completion of change, within time limits indicated in General Conditions of contract.
   b. Architect/Engineer will review and provide a recommendation to the Owner for the change allowable in Contract Sum/Price and Contract Time and Materials basis.
   c. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 01

CONTRACTOR'S REQUEST FOR INFORMATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Administrative requirements for Requests For Information (RFI).

1.02 RELATED SECTIONS

A. Section 01250 - Contract Modifications Procedure

B. Section 01300 - Administrative Requirements

1.03 DEFINITIONS

A. Request For Information (RFI):
   1. A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter refered to as RFI.

B. Improperly prepared RFIs:
   1. RFIs that are not prepared properly (not having enough information to clearly describe the question or issue associated with the question).
   2. RFIs submitted to request approval of submittals.
   3. RFIs submitted to request approval of substitutions of products.
   4. RFIs submitted to request changes which entail cost, credit or changes in contract time.

C. Frivolous RFIs:
   1. RFIs that request information that is clearly shown in the Contract Documents.

1.04 CONTRACTOR'S REQUEST FOR INFORMATION

A. Contractor shall carefully study the Contract Documents to assure that the requested information is not available in the Contract Documents.

B. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the design intent.
   1. The Contractor shall submit a written RFI to the Architect requesting the clarification. The RFI shall be on the G716 AIA form or approved Contractor's standard form and numbered sequentially. Each RFI shall bear the RFI number on the page(s) submitted. The RFI shall be fully legible after photocopying, faxing or transmitted via electronic means.
   2. If a clarification is of an item, process or system known to have been prepared by a consultant to the Architect, the Contractor may direct the RFI directly to the consultant with a copy sent to the Architect.

C. RFIs shall be originated by the Contractor.
   1. RFIs submitted from subcontractor or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
   2. RFIs sent directly to the Architect or the Architect's consultants that are not submitted through, reviewed by, and signed by the Contractor shall not be accepted and will be returned unanswered.

D. The Contractor shall endeavor to keep the number of RFIs to a minimum. In the event that a series of RFIs related to a material, process or system becomes unwieldly, in the opinion of the Architect, because of the number or frequency of RFIs submitted, the Architect may require the Contractor to submit future requests as either Submittals or Substitution Requests for change.

E. In the event that the Contractor believes that an RFI response by the Architect results in a change to contract time or cost, Contractor shall not proceed with the work indicated by the RFI until a

Construction Change Directive (CCD) or Change Order (CO) is prepared and executed. RFIs shall not in themselves justify a change in contract cost or time.

1. Answered RFIs shall not be construed as approval to perform extra work.
2. Unanswered RFIs shall be returned with a notation: "Not Reviewed".
3. Contractor shall allow up to 10 working days review and response time for RFIs.

1.05 ARCHITECT'S RESPONSE TO RFIS

A. Architect will respond to RFIs on one of the following forms.
   1. Properly prepared RFIs:
      a. AIA G716 form.
      b. AIA G710 Architect's Supplemental Instructions.
      c. Contractor's standard RFI form.
   2. Improper or Frivolous RFIs:
      a. Unanswered RFIs shall be returned with a notation: "Not Reviewed".
   3. Architect may opt to retain RFIs for discussion during regularly scheduled project meetings.
   4. All responses to RFIs from the Architect or Architect's consultants shall be distributed by the Architect.

1.06 RFI LOG AND TRACKING

A. Architect shall prepare and maintain an RFI log. The log shall indicate the RFI number, the date the RFI was received and returned.

B. The RFI log shall be distributed and reviewed at the regular project meetings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.

B. Preconstruction meeting.

C. Progress meetings.

D. Construction progress schedule.

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

F. Number of copies of submittals.

G. Submittal procedures.

H. Electronic Data Transfer

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Dates for applications for payment.

1.03 PROJECT COORDINATION

A. Project Coordinator: Bill Schmidt, Port of Klickitat and Ryan Weston, Mackenzie.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for construction access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to Mackenzie through the Project Coordinator:

1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Manufacturer's instructions and field reports.
6. Applications for payment and change order requests.
7. Progress schedules.
8. Coordination drawings.
9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
2. General Contractor and Mackenzie are required to use this service.
3. It is General Contractor's responsibility to submit documents in PDF format.
4. Subcontractors, suppliers, and Mackenzie's consultants are to be permitted to use the service at no extra charge.
5. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
6. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Cost: The cost of the service is to be paid by General Contractor; include the cost of the service in the Contract Sum.

C. Submittal Service: Use one of the following:
1. Submittal Exchange (tel: 1-800-714-0024): www.submittalexchange.com/#sle.
2. ProCore: www.procore.com.

D. Project Closeout: Mackenzie will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner. Mackenzie to provide (2) CD's to the owner of all Project record documents; As-builts (as provided by GC), O&M's (as provided by GC), Submittals, RFI's and AIA documents.

E. General Contractor to provide owner with on hard copy of the O&M Manuals and As-Built Drawings.

3.02 PRECONSTRUCTION MEETING

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

B. Attendance Required:
1. Owner.
2. Mackenzie.
3. General Contractor.
4. Geotechnical Engineer.

C. Agenda:
1. Execution of Owner-General Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
6. Scheduling.
7. Scheduling activities of a Geotechnical Engineer.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Mackenzie, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Mackenzie, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Provide safety/health/accident/injury update.
   3. Review of Work progress.
   4. Field observations, problems, and decisions.
   5. Identification of problems that impede, or will impede, planned progress.
   6. Review of submittals schedule and status of submittals.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Maintenance of quality and work standards.
   11. Effect of proposed changes on progress schedule and coordination.
   12. Other business relating to Work.

E. Record minutes and distribute copies within two days after meeting to participants, with copies to Mackenzie, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. Within 5 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.05 PROGRESS PHOTOGRAPHS

A. Submit aerial photographs with each application for payment, taken not more than one week prior to submission of application for payment.

B. Photography Type: Digital; electronic files.

C. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Mackenzie.

D. Views:
   1. Provide aerial photographs from southeast looking northwest on a monthly basis, until Date of Substantial Completion.
   2. Consult with Mackenzie for instructions on views required.
   3. Provide factual presentation.
   4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

E. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

4. Hard Copy: Printed hardcopy (grayscale) of PDF file .

3.06 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.
   5. Deferred Submittals.

B. Submit to Mackenzie for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.07 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Mackenzie's knowledge as contract administrator or for Owner. No action will be taken.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected. Apply contractor's submittal stamp to shop drawing/submittal, not coversheet.

B. Samples and Submittals not conducive to PDF transmittal: Submit the number specified in individual specification sections; one of which will be retained by Mackenzie. All physical samples must be accompanied by a cover sheet identifying the specification number, submittal number, project description, product description, submitting contractor/subcontractor, date submitted, and expected date of return. Cover sheet to bear the submittal stamp of the general contractor indicating their review and approval.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to General Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:

B. Transmit each submittal with a copy of approved submittal form.

C. Transmit each submittal with approved form.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, General Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Apply General Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

G. Deliver submittals to Mackenzie via e-mail or at business address.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from the General Contractor.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Provide space for General Contractor and Mackenzie review stamps.

L. When revised for resubmission, identify all changes made since previous submission.

M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

N. Submittals not requested will not be recognized or processed.

3.11 ELECTRONIC DATA TRANSFER

A. General: The Drawings contained in the contract documents were prepared in part of in their entirety, on computers using Computer Aided Design software.

B. Contractor’s Use of Electronic Media: Architect may make Site Plans, Floor Plans, and Reflected Ceiling Plans available to Contractor on Electronic Media Disks, after the contract is executed, to help expedite preparation of required submittal documents.

C. Conditions of use: In order to receive Electronic Media Disks, Contractor must make a written request to Architect, accompanied by a signed copy of the Data Request and Agreement for Use of Electronic Data, unaltered except for completion of required information. The agreement is included at the back of this section. A $50 fee per file is charged for the release of files.

D. Status of Electronic Media: Electronic Media Disks are NOT part of the contract. Contractor assumes full liability for information and conclusions made from them.

E. Use attached agreement of Electronic Data Transfer

END OF SECTION

SECTION 01 30 01

ELECTRONIC DATA REQUEST AND AGREEMENT

DATE:_____

PROJECT NAME: PORT OF KLICKITAT INDUSTRIAL PARK MACKENZIE PROJECT #2190380.01

REQUESTOR'S NAME:_____

REQUESTOR'S ADDRESS:_____

REQUESTOR'S PHONE:_____ E-MAIL:_____

TO: MACKENZIE

Attention: Ryan Weston

101 E 6th St, Suite 200, Vancouver, WA 98660

Phone: 360.787.7367 Fax: 503.228.1285

Email: rweston@mcknze.com

PROJECT NAME: PORT OF KLICKITAT INDUSTRIAL PARK PROJECT NUMBER: #2190380.01

Provision of Electronic Data

Dear Ryan:

Requester hereby requests the following electronic data for subject project: PROVIDE DESCRIPTION OF REQUESTED INFORMATION HERE:

1.
2.
3.

Requester understands that the information contained therein may change during the course of the project.

Requester will use the information only as follows: PROVIDE DESCRIPTION OF USE HERE:

Requester acknowledges the following: Mackenzie is not responsible for any modifications to this data, whether intentional or unintentional, without Mackenzie's participation. All copyrights assigned to this data or portions of it shall remain the property of the original copyright holders. Although Mackenzie will make every effort to ensure the accuracy and completeness of information provided, Mackenzie will not be responsible for inaccuracy or incompleteness. Because of the differences among the many available software and hardware systems and the different ways in which various systems represent drawing elements, it is not possible to ensure complete, accurate information.

Upon acceptance of the data provided herewith, Requester agrees to hold harmless and indemnify Mackenzie from all claims arising out of the use of the information provided. Requester's signature below also acknowledges Conditions of Use, as described in the Contract Documents.

_____	_____	_____
Signature	Printed Name	Company/Title

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS

A. Section 01 10 00 - Summary: Work sequence.

1.03 REFERENCES

A. AGC (CPSM) - Construction Planning and Scheduling Manual.

1.04 SUBMITTALS

A. Within 5 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Submit updated schedule (if the schedule has revised) with each Application for Payment.

D. Submit under transmittal letter form specified in Section 01 30 00.

1.05 QUALITY ASSURANCE

A. Scheduler: General Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.06 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Sheet Size: Multiples of 8-1/2 x 11 inches.

C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

D. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Mackenzie at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to General Contractor's project site file, to Subcontractors, suppliers, Mackenzie, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Mock-ups.

D. Control of installation.

E. Tolerances.

F. Testing and inspection services.

G. Manufacturers' field services.

H. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.

B. Section 01 30 00 - Administrative Requirements: Submittal procedures.

1.03 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.

B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time specialist and responsible officer.

C. Design Data: Submit for Mackenzie's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Test Reports: After each test/inspection, promptly submit two copies of report to Mackenzie (one to the Architect and a second to Engineer) and two copies to General Contractor (one to the field and a second to the main office).
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.

f. Location in the Project.
g. Type of test/inspection.
h. Date of test/inspection.
i. Results of test/inspection.
j. Conformance with Contract Documents.
k. When requested by Mackenzie, provide interpretation of results.

E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and General Contractor or installation/application subcontractor to Mackenzie, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports: Submit reports for Mackenzie's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Mackenzie before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Mackenzie shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves General Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Mackenzie before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Accepted mock-ups shall be a comparison standard for the remaining Work.

B. Mock Ups Required:
   1. Sidewalk Broom Finish (with edge "shiner")

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Mackenzie before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Mackenzie and General Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Mackenzie and General Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Mackenzie.
   6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of General Contractor.
   4. Agency has no authority to stop the Work.

D. General Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.

4. Notify Mackenzie and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by General Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by General Contractor beyond specified requirements.

E. Materials to be Inspected by the Testing Agency Include, but are not limited to (see individual sections for complete list):
1. All Reinforced Concrete (foundations, slabs, walls and tilt up panels)
2. Floor Slab Flatness and Levelness
3. Structural Steel - shop welding and field welding
4. Membrane Roofing (part time inspection)
5. Built up Roofing
6. Moisture content of wood deck (prior to installation of rigid insulation)
7. See Specifications Sections for additional requirements
8. See Plan Sheet S1.0 for additional information.

F. Materials to be Inspected by the Geotechnical Engineer include but are not limited to:
1. Stripping
2. Sub Grade
3. Building Pad
4. Trench backfill and compaction
5. Foundation Bearing
6. Cement Treating
7. Base Rock
8. Paving
9. See Specifications for additional requirements.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Materials and assemblies to be tested and observed at minimum are:
1. Built Up Roofing Installation.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Mackenzie, it is not practical to remove and replace the Work, Mackenzie will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary data, telephone and facsimile service.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

J. Removal of utilities, facilities and controls.

1.02 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY DATA, TELEPHONE AND FACSIMILE SERVICE

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Provide, maintain and pay for facsimile service and a dedicated telephone line to field office at time of project mobilization.

C. Provide, maintain and pay for data and computer service and a dedicated telephone line (or high speed wireless) to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition. Shall be maintained in accordance with Washington State and Clark County official COVID-19 guidance.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: General Contractor's option.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.08 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

F. Designate one parking space for Owner and Mackenzie use.

1.09 WASTE REMOVAL

A. See Section 01 74 19 - Waste Management, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.10 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on architectural drawings.

B. Erect on site at location indicated on site plan (coordinate with owner and architect).

C. No other signs are allowed without Owner permission except those required by law.

1.11 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rackand drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Locate offices a minimum distance of 50 feet from existing and new structures.

D. Appropriate COVID-19 protocol must be used and enforced.

1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by General Contractor.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.

B. 1200-C - Erosion Control Permit: See Drawings.

1.03 REFERENCE STANDARDS

A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with DEQ 1200c permit requirements.

B. Comply with Klickitat County Site Development Permits related to erosion and sediment control.

C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.

3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

J. Open Water: Prevent standing water that could become stagnant.

K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

PART 2 PRODUCTS

2.01 MATERIALS

A. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.
   4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632.
   6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.
   7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

B. Silt Fence Posts: One of the following, minimum 5 feet long:
   1. Softwood, 2 by 2 inches inches in cross section.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. As detailed on drawings.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

D. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

E. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

F. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.

G. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

H. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall or as required by applicable permits or jurisdictions.

B. Repair deficiencies immediately.

C. Clean out temporary sediment control structures weekly and relocate soil on site.

D. Place sediment in appropriate locations on site; do not remove from site.

3.05 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Mackenzie.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Maintenance materials, including extra materials, spare parts, tools, and software.

F. Spare parts and maintenance materials.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Use of design drawings for shop drawing submittal review is prohibited.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products having any of the following characteristics:

1. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, General Contractor shall give preference to products that:

1. Are extracted, harvested, and/or manufactured closer to the location of the project.
2. Have longer documented life span under normal use.
3. Result in less construction waste.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance and extra products of types and in quantities specified in individual specification sections

B. Deliver to Project Site; obtain receipt prior to final payment.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

D. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. Mackenzie will notify General Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 60 01

SUBSTITUTION REQUEST FORM

PROJECT: PORT OF KLICKITAT - INDUSTRIAL PARK MACKENZIE PROJECT #2190380.01

CONTRACTOR:

SPECIFIED ITEM:

Section: Page: Paragraph:

Description:

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION:

1. Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
2. Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.
3. Attached data clearly identifies deviations from the Contract Documents.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

Submitted By:

Signature: Date:

Firm:

Address:

Telephone:

Attachments:

Below for use by Design Consultant:

Accepted:
Not Accepted:
Accepted as Noted:
Received too Late:

By: Date:

Remarks:

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, except payment procedures.

I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures.

C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

D. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.

E. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

F. Section 07 84 00 - Firestopping.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

1.04 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in Washington and acceptable to Mackenzie. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

J. Contractors responsibility to provide appropriate COVID-19 safety measures and notifications on site for reference.

1.06 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupies premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Mackenzie seven to ten days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Mackenzie, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Mackenzie of any discrepancies discovered.

C. General Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on Drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Mackenzie the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Mackenzie.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

A. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

B. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

D. Restore work with new products in accordance with requirements of Contract Documents.

E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

G. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable General Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Power wash and scrub warehouse floor slabs.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Mackenzie and Owner.

B. Provide copies of temporary and final occupancy / completion obtain form the building department to both the owner and architect.

C. Notify Mackenzie when work is considered ready for Substantial Completion.

D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Mackenzie's review.

E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

F. Notify Mackenzie when work is considered finally complete.

G. Complete items of work determined by Mackenzie's final inspection.

3.14 MAINTENANCE

A. Provide as an Alternate - 12 months of additional Landscape Maintenance that will be contracted directly between the Owner and Landscape Contractor.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

2.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Land clearing debris, including brush, branches, logs, and stumps.
   6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.

E. General Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. General Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

G. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

H. Regulatory Requirements: General Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

2.02 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 PRODUCTS - NONE

PART 3 EXECUTION

4.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Mackenzie.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

E. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

F. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

G. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

H. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. General Conditions: Performance bond and labor and material payment bonds, warranty and correction of work.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Mackenzie with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Mackenzie will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Mackenzie comments. Revise content of all document sets as required prior to final submission.
   4. Submit three sets of revised final documents in final form within 10 days after final inspection. Two sets will be retained by the owner and the third set will be retained by the Architect.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Provide servicing and lubrication schedule, and list of lubricants required.

E. Include manufacturer's printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

G. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

H. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instruction manual.

C. Electronic CD's: When multiple CDs are used, correlate data into related, consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide files or subfolders for each separate product and system, with typed description of product and major component parts of equipment.

F. Drawings: Provide PDFs at native size and right side up.

G. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

H. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Mackenzie, General Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.

I. Provide a listing in Table of Contents for design data.

J. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Mackenzie, Consultants, and General Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Provide CD with PDFs of all warranty and bond information.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of General Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 32 13 13 - Site Concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

B. ACI 117 - Standard Specification for Tolerances for Concrete Construction and Materials, American Concrete Institute International.

C. ACI 301 - Specifications for Structural Concrete.

D. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

E. ACI 347R - Guide to Formwork for Concrete.

F. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); American Society for Testing and Materials.

G. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction; American Society for Testing and Materials.

1.04 DESIGN REQUIREMENTS

A. Formwork design is the responsibility of the General Contractor.

B. Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension. Provide rigidity and stability sufficient for conformance to tolerance limits of ACI 117.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.
   1. Maintain one copy of standards on project site.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

D. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS

A. Forms for Flat Exposed Smooth Concrete:
   1. APA High Density Overlay (HDO) Plyform, Class I & II.
   2. APA Plyform, Class I & II or APA Structural I Plyform.

B. Forms for Flat Concealed Smooth Concrete:
   1. Form Materials: At the discretion of the General Contractor.

2.03 FORMWORK ACCESSORIES

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

B. Form Ties for Exposed Concrete: Removable type, factory fabricated, galvanized steel, fixed length, cone type, with waterproofing washer, 1" inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.

C. Form Ties for Concealed Concrete: Removable or snap-off type, factory-fabricated, galvanized steel or bare steel, fixed or adjustable length.

D. Form Release Agent: Chemically reactive (versus "barrier type"), non-staining formulation for exposed concrete where clean stripping and compatibility with finishes, caulks, sealants or coatings is desired. Form release agent shall be selected by the Contractor, compatible with the form material used final finish required. The following manufacturers specialize in form release agents and have different products for different form material (surfaces) and various conditions. Contractor shall select their products as best suited for the conditions and finishes of this project. The Manufacturers are:
   1. Cresset Chemical Company.
   2. Nox-Crete Product Group.
   3. Approved substitution.
      a. Other manufactures including Dayton Superior (Conspec), Tamms Industries, W.R. Meadows and L&M Construction Chemicals, Inc. possibly manufacture chemically active products for limited form surfaces. Contractor may use chemically reactive products from these manufacturers only with personnel experience of prior use of the proposed chemicals by the form work providers of this project and approval of a submitted Substitution Request Form.

E. Corners: Chamfered, wood strip type; 1/2" x 1/2" size; maximum possible lengths. Provide Sylvan wood chamfer strip manufactured by Sylvan Industries Incorporated, or equal.

F. Form Joint Tape: Closed-cell PVC foam with pressure-sensitive adhesive on one side.

G. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

H. Concrete Joint Filler:
   1. Interior Use Expansion and Isolation Joint Filler: Asphalt-saturated cellulosic fiber, ASTM D 1751, 1/2" thick or as specified in the drawings.
   2. Exterior Use Expansion and Isolation Joint Filler: Granulated cork in a synthetic resin binder, ASTM D 1752, Type II, 1/2" thick or as specified in the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Permitted only for footings and where the earth is capable of maintaining its shape during concrete placement. Horizontal dimensions of the the footing shall be increased 1 inch at every vertical surface.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Align joints and make watertight. Keep form joints to a minimum. Provide solid blocking behind joints.

D. Obtain approval before framing openings in structural members that are not indicated on drawings.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

3.04 APPLICATION - FORM RELEASE AGENTS

A. Verify compliance of form release agents with local VOC regulations.

B. Verify compatibility of form release agents with aluminum, polystyrene, latex, HDO plywood or MDO plywood forms or forming accessories, if used.

C. Apply form release agents on formwork in accordance with manufacturer's recommendations.

D. Apply form release agents prior to placement of reinforcing steel, anchoring devices, and embedded items. Do not apply form release agents to reinforcing steel.

E. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.06 FORM CLEANING

A. Clean forms as erection proceeds. Remove foreign matter within forms.

B. Clear formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117. Use Class C surface tolerances for typical offsets between adjacent pieces of formwork facing material. Use Class A surface tolerances for offsets between adjacent pieces of formwork facing material for concrete exposed to view.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and superimposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - CONCRETE FORMS AND ACCESSORIES.

1.03 REFERENCES

A. ACI 117 - Standard Specification for Tolerances for Concrete Construction and Materials, American Concrete Institute International.

B. ACI 301 - Specifications for Structural Concrete.

C. ACI 315 - Details and Detailing of Concrete Reinforcement, American Concrete Institute International.

D. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

E. ACI SP-66 - ACI Detailing Manual.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

G. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

H. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.

1.04 DESIGN REQUIREMENTS

A. General Contractor is responsible for reinforcing support accessory selection and design.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with the requirements of ACI 315, making reference to ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars and locations of splices.

C. Obtain, and maintain on file, until receipt of a certificate of occupancy, mill test reports and other documentation demonstrating that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Notify testing agency and Mackenzie well in advance of concrete placement. Do not place concrete prior to completion of testing agency's or Mackenzie's representative's review of reinforcement placement.

C. Welders' Certificates: Submit certifications for welders employed on the project to the Special Inspector, verifying AWS qualification within the previous 12 months. Provide continuos inspection of all welded reinforcement in accordance with AWS D1.1 and Chapter 17 of the 2012 International Building Code with Washington Amendments.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
   1. Deformed billet-steel bars.
   2. Unfinished.

B. Reinforcing Steel for Welded Assemblies, Frame Members Resisting Earthquake-Induced Forces, and Structural Wall Boundary Elements: ASTM A 706/A 706M, deformed low-alloy steel bars or ASTM A 615/A 615M Grade 60 steel complying with ACI 318 Section 21.5.2.1 as modified by IBC Section 1908.1.3.
   1. Unfinished.

C. Reinforcement Accessories:
   1. Tie Wire: ASTM A82, double annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide plastic or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI SP-66 - ACI Detailing Manual and ACI 318.

B. Welding of reinforcement is permitted only as shown in the drawings or with the specific approval of Mackenzie. Perform welding in accordance with AWS D1.4.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress, unless shown otherwise in the drawings.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Comply with tolerance requirements of ACI 117.

B. Correct placement of reinforcement as directed by testing agency or Mackenzie's representative prior to concrete placement.

C. Clean reinforcement, removing dirt, oil, grease, paint, rust, form release agent and other materials which would impair bond strength, prior to concrete placement.

D. Conform to ACI-318 code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.

3.03 WASTE MANAGEMENT

A. Coordinate with suppliers on reducing packing material, and backhauling of reuse or recycling.

B. Fold up metal banding, flatten, and place in designated area.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete footings and grade beams.

B. Concrete slabs-on-grade.

C. Concrete walls and pilasters.

D. Miscellaneous concrete elements, including equipment pads, light pole bases, thrust blocks, and manholes.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - CONCRETE FORMS AND ACCESSORIES: Forms and accessories for formwork.

B. Section 03 20 00 - CONCRETE REINFORCEMENT.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

B. ACI 301 - Specifications for Structural Concrete.

C. ACI 302.1R - Guide for Concrete Floor and Slab Construction.

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

E. ACI 305R - Hot Weather Concreting.

F. ACI 306R - Cold Weather Concreting.

G. ACI 308R - Guide to Curing Concrete.

H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

L. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).

M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.

N. ASTM C150/C150M - Standard Specification for Portland Cement.

O. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

P. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

Q. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

R. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.

S. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 1997.

T. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Mix Design Data: Submit two copies of a mix design formula bearing the seal and signature of a Professional Engineer registered in the state of the project to the Architect/Engineer as least 14 days prior to the delivery of concrete to the site. Indicate location for each mix design.

C. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II with maximum equivalent alkalis not to exceed 0.60 percent.

B. Normal Weight Fine and Coarse Aggregates: ASTM C 33. Alkali reactivity shall be "innocuous" as determined by ASTM C 289.

C. Fly Ash: ASTM C 618, Class F. Use only fly ash obtained from sources known to produce a uniform product consistently resulting in satisfactory concrete.

D. Slag: ASTM C989, Class 100. Use only slag obtained from sources known to produce a uniform product consistently resulting in satisfactory concrete.

E. Calcined Pozzolan: ASTM C618, Class N.

F. Silica Fume: ACI 211.1.

G. Water (and Ice, when used): Clean and not detrimental to concrete. Free of deleterious quantities of oils, acids, alkalis, organic substances or other materials.

2.04 ACCESSORY MATERIALS

A. Structural Epoxy Bonding Adhesive: ASTM C 881, Type V, Grade 2, having a 100 percent solids formulation. Provide Sikadur 32 Hi-Mod LPL manufactured by Sika Corporation, or approved equivalent.

B. Underslab Vapor Retarder (at locations shown on plans): Furnish complete with tape specifically recommended in writing by vapor retarder manufacturer in a contrasting color and a minimum of 4 inches wide. Vapor Retarder to comply with ASTM E1745, Class A; Permeance less than 0.01 perms after mandatory conditioning tests (E 1745, Section 7.1.1 -7.1.5)one of the following:
   1. "Stego Wrap" by Stego Industries, LLC (877-464-7834).
   2. "Duraskrim D16WB" by Raven Industries (800-635-3456).
   3. "Griffolyn T-85" by Reef Industries, Inc. (800-231-6074).
   4. “Vapor-Mat” by WR Meadows, Inc. (847-214-2100)

5. "Florprufe 120" by WR Grace

C. Non-Shrink Grout: ASTM C 1107/C 1107M or manufacture to warrent that grout has expansive properties; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
   2. Minimum Compressive Strength at 28 Days: 5000 psi.

2.05 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059 Type II.
   1. Products:
      a. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com/#sle.
      b. W.R. Meadows, Inc.; ACRY-LOK-: www.wrmeadows.com/#sle.

B. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

D. Comply with requirements of Section 03100.

2.06 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience, as specified in ACI 318 Section 5.3. Submit documentation for review. See structural drawings for additional information.

C. Ensure that maximum aggregate sizes used in concrete comply with the ACI 318 based on the member dimensions and clear distances shown in the Drawings and in the reinforcement shop drawings. For each class of concrete, use the maximum practical aggregate size consistent with this requirement up to 1 1/2 inch.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: As indicated on drawings
   2. Fly Ash Content: a maximum 25 percent of cementitious materials by weight.
   3. Slag Content: a maximum 50 percent of cementitious materials by weight.
   4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
   5. Maximum Slump: Per Structural General Notes.

2.07 MIXING

A. Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

2. Use latex bonding agent only for non-load-bearing applications.

B. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Mackenzie not less than 24 hours prior to commencement of placement operations.

D. Do not place concrete until a representative the the Independent Testing Laboratory has examined the formwork and reinforcing steel.

E. Do not place concrete in footing forms until Geotechnical Engineer has examined the compacted soil and aggregate base materials within the forms.

F. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

G. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

H. Finish floors level and flat, unless otherwise indicated, within the tolerances specified in Section 03 35 00.

3.04 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Do not place concrete on dry, soft, muddy, or frozen subgrade. Remove ice and standing water from footing trenches and formed surfaces.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

B. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308 and with the recommendations of ACI 305R and ACI 306R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

G. Perform one air content test for each set of compressive strength specimens, complying ASTM C 31.

3.08 INADEQUATE OR DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Mackenzie and General Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Mackenzie. The cost of additional testing shall be borne by General Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Mackenzie for each individual area.

3.09 WASTE MANAGEMENT

A. Place materials defined as hazardous or toxic waste in designated containers.

B. Use trigger operated spray nozzles for water hoses.

END OF SECTION

SECTION 03 35 00

CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finishing for site-cast concrete for footings, foundation walls, retaining walls, load bearing walls, tilt-up precast concrete walls, floor slabs on grade, monolithic concrete floor slabs, stair treads, and stair landing slabs.

B. Surface treatment of concrete with sealer.

1.02 RELATED SECTIONS

A. Section 03 10 00 - Concrete Forms and Accessories.

B. Section 03 30 00 - Cast-In-Place Concrete: Prepared concrete floors ready to receive finish.

C. Section 03 39 00 - Concrete Curing.

D. Section 03 47 13 - Tilt-Up Precast Concrete: Site-cast, tilt-up concrete wall panels.

E. Section 07 90 05 - Joint Sealers.

1.03 REFERENCES

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.

C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

D. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; American Society for Testing and Materials.

E. ASTM E 1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers;.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on sealer, including information on compatibility of different products and limitations.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R.

B. Slab Flatness and Levelness Evaluation:
   1. Notify Independent Testing Agency 24 hours in advance of placing slab concrete. Arrange for slab flatness and levelness testing for each section within 72 hours after concrete placement.

1.06 PROJECT CONDITIONS

A. Coordinate the work with concrete floor placement and concrete floor curing.

PART 2 PRODUCTS

2.01 BONDING AGENT

A. Latex Bonding Agent for Dry Locations:

1. Use of these products is restricted to interior work not subject to immersion in water or high humidity.
2. Industry Standard: ASTM C 1059, Type I (Redispersable).
3. Acceptable Agents: Superior Concrete Bonder (J-41) by Dayton Superior, Quikrete by the Quikrete Companies.

B. Latex Bonding Agent for Wet Locations:
1. Use of these products is required in areas subject to high humidity or immersion in water and is permitted in other areas. Areas subject to high humidity or immersion in water include basement walls; retaining walls; exterior walls and grade beams; slabs-on-grade; parking structure walls, slabs, beams and columns; tanks and basins.
2. Industry Standard: ASTM C 1059, Type II (Non-redispersable).
3. Acceptable Agents: Flex-Con by The Euclid Chemical Company, Acrylic Additive by ChemRex Inc./Sonneborn, Day-Chem Ad Bond (J-40) by Dayton Superior, SikaLatex by Sika Corporation.

2.02 PATCHING COMPOUND

A. Two-Component Compound:
1. Composition: Cement base with acrylic polymer additive
2. Compressive Strength: 5,000 psi at 28 days.
3. Acceptable Patching Compounds: Re-Crete 20 Minute Patch by Dayton Superior used with Day-Chem Ad Bond latex additive by Dayton Superior.

2.03 COMPOUNDS - HARDENERS, SEALERS AND RETARDERS

A. Waterproofing sealers used on interior concrete to be under a VOC limit of 250 g/l. Other types of interior sealers to be under 200 g/l.

B. Hardener - Sealer: Use a penetrating Densifier Type Sealer
1. Ashford Formula
2. L.M. Seal-Hard by L.M. Chemical
3. Day-Chem Seal-Hard J-17 by Dayton Superior
4. Lucas, #7200 Cure & Seal - Water-Based
5. Lucas, #7000 Cure & Seal - Solvent-Based
6. Substitutions: See Section 01 60 00 - Product Requirements

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that floor surfaces are acceptable to receive the work of this section.

B. Prepare the floor by scrubbing/cleaning in order to receive sealer per Manufacturer's instructions.

3.02 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.

B. Power steel trowel surfaces.

C. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.

3.03 FLOOR SURFACE TREATMENT

A. Apply sealer to floor surfaces in accordance with manufacturer's instructions.

B. Verify that any previous chemical used in slab curing, sealing, or bond bearing has been removed from the slab and will not interfere with the penetrating sealer application.

C. Clean and power wash/scrub floor thoroughly, removing all stains from the slab.

D. Apply sealer in two coats. Apply the first coat as early as the construction schedule allows and a second coat (spiff coat) after substantial completion has been achieved.

3.04 FLOOR FINISH TOLERANCES

A. An Independent Testing Agency, as specified in Section 01 40 00, will inspect finished slabs for flatness.

B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E 1155-96, within 16 hours after slab installation.

C. For typical building flat slabs-on-grade , achieve the following minimum floor finish F-number tolerances:
   1. Overall area flatness, OAF(F): 35.
   2. Overall area levelness, OAF(L): 35.
   3. Minimum local flatness, MLF(F): 25.
   4. Minimum local levelness, MLF(L): 25.

3.05 SITE FINISHES (SEE MOCK-UPS SECTION 01 40 00, PART 3)

A. Sidewalk broom finish (with edge "shiner")

B. Truck dock apron - Raked Finish.

3.06 TESTING

A. All floor flatness, levelness, and grade conformity tests shall be made (at the Owner's request and expense) on each newly installed slab within 16 hours after completion of the final troweling operation, and in all cases before supporting shores (if any) are removed. FF and FL tests shall be made by a factory certified technician in accordance with ASTM E 1155 (latest revision) using a fully downloading "F-Meter" as manufactured by Allen Face & Company of Wilmington, NC. Grade conformity tests shall be made using an optical or laser level. Results of all floor tolerance tests, including a formal notice of acceptance or rejection of the work, shall be provided to the contractor within 8 hours after testing. Failure to adhere to the testing and reporting requirements set forth in this paragraph shall constitute de facto acceptance of the work.

B. The Test Section used to determine Minimum Local values shall not be greater than any bay defined by column lines.

3.07 CORRECTIVE WORK

A. All Minimum Local Floor Sections which fail to meet or exceed both the specified MLF (F) and MLF (L) numbers shall be corrected in their entirety.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified by the Owner. The particular method of correction to be employed shall be determined by the Owner. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. PS 20 - American Softwood Lumber Standard.

B. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.

C. WWPA G-5 - Western Lumber Grading Rules.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
   1. Acceptable Lumber Inspection Agencies: WCLB and WWPA.

B. Sheathing Regulatory Requirements:
   1. Comply with applicable recommendations in APA E 30, Design/Construction Guide-Residential and Commercial.
   2. Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel indicated.
   3. Furnish laminated wood panels graded by American Plywood Association (APA).

1.06 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. Sheathing acceptance at Site: Examine panels upon delivery and reject panels which are delivered with broken corners of edges crushed by bundling straps or other means.

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

A. Grading Agency: West Coast Lumber Inspection Bureau (WCLIB).

B. Grading Agency: Western Wood Products Association (WWPA).

C. Sizes: Nominal sizes as indicated on drawings, S4S.

D. Moisture Content: S-dry or MC19.

E. Miscellaneous Blocking, Furring, and Nailers:

2.03 ACCESSORIES

A. Fasteners (Nails, Staples & Sheathing Screws):
   1. Industry Standard for Nails and Staples: FS FF-N-105.
   2. Nails for Framing, Plywood Floor Sheathing and Underlayment: Common; Submit alternate nailing types to A/E for review of type and spacing.
   3. Exterior, Wet Area and Preservative Treated Wood: Hot Dip Galvanized Common wire nails, except as indicated otherwise.
   4. Interior Dry Area Wood: Cadmium plated Common wire nails, except as indicated otherwise.
   5. Fastener Lengths: As indicated in minimum nailing schedule and of size which will not penetrate framing members which will be exposed or will receive finish materials.
   6. Staples for Wood Sheathing and Underlayment: 14 gage steel.
   7. Screws: Bugle head screws, Type S or Type W, in size recommended by sheathing manufacturer for thickness of sheathing and type of framing.

B. Bolts, Nuts, Washers, and Screws:
   1. Lag Screws and Lag Bolts: FS FF-B-561, square or hex head.
   2. Wood Screws: FF-S-11D, flat head carbon steel.
   3. Bolts: FS FF-B-575.
   4. Nuts: FS FF-N-836.
   5. Machine Screws: FS FF-S-92, cadmium plated steel.
   6. Plain Washers: FS FF-W-92, round carbon steel.
   7. Lock Washers: FS FF-W-84, helical spring carbon steel.
   8. Expansion Shields: FS FF-S-325.
   9. Toggle Bolts: FS FF-B-588, tumble wing type.

C. Powder Driven Fasteners and Anchors:
   1. Acceptable Fasteners: Powder Driven Fasteners by Hilti or Ramset.
   2. Concrete Anchors: Kwik-Bolt or Sleeve Anchor by Hilti, Strong-Bolt by Simpson Strong-Tie, Trubolt or Dynabolt by ITW Red Head, Rawl-Bolt or Rawlok by Rawlplug, Parabolt by West Midlands Fasteners.
   3. Masonry Anchors: Sleeve Anchor by Hilti, Wedge-All or Sleeve0All by Simpson Strong-Tie.

D. Foundation Anchor Bolts:
   1. Type: ASTM A 307, Grade A, hexagon head.
   2. Size: As indicated on Drawings.
   3. Minimum Size for Single Story Buildings: 1/2 inch diameter, not less than 12 inches long.
   4. Minimum Size for Two Story Buildings: 5/8 inch diameter, not less than 14 inches long.

E. Anchor Finish & Type:
   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: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

F. Construction Adhesives:
   1. Industry Standard: APA, AFG-01.
   2. Industry Standard: ASTM D 3498.

2.04 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. 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. 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.
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry or concrete.
   4. Treat lumber less than 18 inches above grade.

C. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.
   1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
   2. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

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 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.

3.03 INSTALLATION OF STEEL CONNECTORS FOR WOOD FRAMING

A. Install connectors indicated with nails or bolts of sizes and types specified by manufacturer of connector.

3.04 NAILING AND BOLTING

A. Minimum nailing in accordance with IBC Table No. 2304.9.1, and as indicated in minimum nailing schedule and on Drawings.

B. Install washers under nuts and under bolt heads bearing on wood.

C. Soap threads of lag bolts prior to installing.

D. Install fasteners for plates to foundation using anchor bolts at not more than 48 inches on center or powder driven fasteners at not more than 32 inches on center.

E. Drill Lag Bolt Holes 9/16 inch diameter for 3/4 inch bolts and 1/2 inch diameter for 5/8 inch bolts.

F. Drill Machine Bolt Holes 1/16 inch larger than bolt diameter.

G. Furnish bolts with threads for nuts not bearing on wood.

H. Enlarge lag bolt holes to shank diameter for length of unthreaded shank.

I. Do not drive lag screws, wood screws, and lag bolts.

J. Predrill nail holes and screw holes when required to prevent wood splitting.

3.05 INSTALLATION OF TEMPORARY SUPPORT

A. Adequately brace structure for wind and earthquake forces until roof and wall panels have been secured.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Provide miscellaneous panels for electrical and mechanical items as may be required by their manufacturer's and authorities having jurisdiction.

3.07 MINIMUM FASTENING SCHEDULE

A. Gypsum Sheathing Fastening:
   1. Wall and Soffit Sheathing at Wood Framing: Nail or screw to wood studs, plates, joists, and solid blocking with 1-3/4 inches long, 11 gage galvanized nails with 7/16 inch diameter head spaced at 6 inches on center at panel edges and 10 inches on center at panel interior.
   2. Wall and Soffit Sheathing at Steel Framing: Screw sheathing to steel framing with bugle head screws at 6 inches on center at panel edges and 10 inches on center at panel interior.

B. Wood Panel Blocking:
   1. Blocking at Steel Framing: Screw wood panels to steel studs and runners with bugle head screws at 8 inches on center.
   2. Blocking at Wood Framing: Screw wood panels to wood studs and joists with bugle head screws at 8 inches on center

3.08 COMPLETION

A. Remove split and warped framing prior to installation of sheathing and gypsum wall panels.

B. Adjust framing to comply with location and deflection requirements of National Design Specifications.

C. Adjusting Defective Work: Remove and replace defective sheathing and underlayment panels and panels with edges split or damaged by fasteners.

D. Daily Cleaning: Remove excess wood, sawdust, and loose fasteners from the site.

E. Final Cleaning: Remove fasteners, gypsum dust, wood sawdust, and unused panel pieces from the site.

END OF SECTION

SECTION 07 54 00

MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mechanically attached system with thermoplastic roofing membrane.

B. Insulation, flat and tapered.

C. Flashings.

D. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashings .

C. Section 07 72 00 - Roof Accessories: Roof-mounted units; prefabricated curbs.

D. Section 08 62 00 - Unit Skylights: Skylight frame, integral curb, and counterflashing.

1.03 REFERENCE STANDARDS

A. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

E. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing.

F. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing.

G. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

H. FM DS 1-28 - Wind Design.

I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual.

J. UL (DIR) - Online Certifications Directory.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1. Review preparation and installation procedures and coordinating and scheduling required with related work.
2. Require attendance by all affected installers (General Contractor, roofing, sheet metal ...etc...)

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

C. Specimen Warranty: For approval.

D. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section:
   1. With minimum three years documented experience.
   2. Approved by membrane manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. **Warranty Term: 15 years.**
   2. For repair and replacement include costs of both material and labor in warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermoplastic Polyolefin Membrane Materials:
   1. Carlisle Roofing Systems, Inc; Sure-Weld TPO: www.carlisle-syntec.com/#sle.
   2. Firestone Building Products, LLC: www.firestonebpco.com/#sle.
   3. Flex Membrane International Corporation; Flex TPO Plus: www.flexroofingsystems.com/#sle.
   4. GAF; EverGuard TPO: www.gaf.com/#sle.
   5. GenFlex Roofing Systems, LLC: www.genflex.com/#sle.
   6. Johns Manville Corporation JM TPO: www.jm.com
   7. Substitutions: See Section 01 60 00 - Product Requirements.

B. PVC Membrane Materials:
   1. Carlisle Roofing Systems, Inc; Sure-Flex PVC KEE: www.carlisle-syntec.com/#sle.
   2. Flex Membrane International Corporation; Flex FB PVC: www.flexroofingsystems.com/#sle.
   3. GAF; EverGuard PVC: www.gaf.com.
   4. Johns Manville Corporation; JM TPO: www.jm.com/#sle.
   5. Sika Sarnafil, a Division of Sika Corporation; Sarnafil S327: www.sarnafilus.com/#sle.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

C. Insulation:
   1. Carlisle SynTec; SecurShield Insulation: www.carlisle-syntec.com/#sle.
   2. GAF; EnergyGuard PolyIso Insulation: www.gaf.com/#sle.
   3. Owens Corning Corp: www.owenscorning.com/#sle.
   4. Approved by roofing manufacturer and included in the roof warranty.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

D. Protection Board:
   1. Georgia Pacific: www.gp.com
   2. Substitutions: See Section 01 60 00 - Product Requirements

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, over insulation.

B. Roofing Assembly Requirements:
   1. Solar Reflectance Index (SRI): 78, minimum, calculated in accordance with ASTM E1980.
      a. Field applied coating may not be used to achieve specified SRI.
   2. Roof Covering External Fire-Resistance Classification: UL Class A.
   3. Factory Mutual Classification: Class I and windstorm resistance of I-105, in accordance with FM DS 1-28.

C. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
   1. Minimum 2 layers of polyisocyanurate board, for a minimum R value of R-38.

D. Acceptable Insulation Types - Tapered Application (Crickets - At high side of skylights, roof hatch, mechanical equipment, parapet wall w/ exposed structural straps, etc.) Any of the types specified.
   1. Tapered perlite, extruded polystyrene, or cellular glass board covered with uniform thickness polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane:
   1. Material: Thermoplastic polyolefin (TPO) complying with ASTM D6878.
   2. Reinforcing: Internal fabric.
   3. Thickness: 0.045 inch, minimum.
   4. Sheet Width: Factory fabricated into largest sheets possible.
   5. Color: White.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

D. Flexible Flashing Material: Same material as membrane.

E. Fire Retardant Slipsheets: Two layers of Atlas FR 10.

2.04 PROTECTION BOARD

A. Protection Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/4 inch thick.
   1. Products:
      a. Georgia-Pacific DensDeck, DensDeck Prime, or DensDeck DuraGuard: www.densdeck.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 INSULATION

A. Insulation shall be approved by roofing membrane manufacturer for roof warranty.

B. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1 and with the following characteristics:
   1. Compressive Strength: 20 psi
   2. Board Size: 48 x 96 inch.
   3. Thermal Resistance: R-value of R-38.
   4. Manufacturers:
      a. As approved by roof membrane manufacturer.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

C. Extruded Polystyrene Board Insulation: ASTM C 578, Type X; Extruded expanded polystyrene board with natural skin surfaces, with drainage channels one face; with the following characteristics:
   1. Tapered Board: Slope as indicated; minimum thickness 1/2 in; fabricate of fewest layers possible.

D. Cellular Glass Board Insulation: ASTM C 552, Type IV, Grade 2; cellular glass board, with the following characteristics:
   1. Tapered Board: Slope as indicated; minimum thickness 1/2 in; fabricate of fewest layers possible.

2.06 ACCESSORIES

A. Roofing Expansion Joint Flashing: Sheet metal, as specified in Section 07 62 00.

B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

C. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

D. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
   1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

E. Membrane Adhesive: As recommended by membrane manufacturer.

F. Sealants: As recommended by membrane manufacturer.

G. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
   1. Composition: Rubber with mineral granule surface.
   2. Size: 18 x 18 inch.
   3. Surface Color: White or yellow.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

3.02 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.03 WOOD DECK PREPARATION

A. Verify flatness and tightness of joints of wood decking. Fill knot holes with latex filler.

B. Verify and confirm that all structural installation of the the roof deck (nailing/strapping) is complete and has been inspected and approved, prior to start of roofing installation.

3.04 INSULATION - UNDER MEMBRANE

A. Attachment of Insulation: Mechanically fasten each layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

E. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

F. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

D. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.
   3. Install in accordance with NRCA Detail Plate TP-1.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Install roofing expansion joints where indicated. Make joints watertight.
   1. Fabricate and install in accordance with NRCA Detail Plate TP-7S.

3.06 WALKWAY PADS

A. Install walkway pads. Space pad joints to permit drainage. See roof plan for walkway pads locations.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers periodically during installation of the Work.

3.08 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.09 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 90 05

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants.

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit two samples, in size illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Completed Sealant Warranty Application including name of applicator, products to be used on manufacturer's letter head, complete with acknowledgement that warranty is acceptable and that field testing will be done as required by manufacturer. Provide application information complete with manufacturer's representative approximate schedule of site visits, name and phone number.

F. Initial Warranty Submittals:
   1. Blank copy of manufacturers Warranty Submittal.
   2. Description of required tests, approximate timing of tests, and person responsible to either do the tests or direct the testing. Document shall be standard manufacturer's on copy letter head or similiarly identified. Submit with evidence that individual is an approved authority or employee of the sealant manufacturer.

1.06 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 and approved by manufacturer.

1.07 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Warranty: Include manufacturer's warranty for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure properly.
   1. Warranty Period of ten years after the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gunnable and Pourable Sealants:
   1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   2. Dow Corning Corporation: www.dowcorning.com.
   3. Pecora Corporation: www.pecora.com.
   4. Tremco Global Sealants: www.tremcosealants.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SEALANTS

A. General Purpose Exterior Sealant: Silicone, neutral-cure; ASTM C 920, Grade NS, Class 100/50, Uses M, G, A and O; single component.
   1. Applications:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Applications:
      a. Concealed sealant bead in sheet metal work.

C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: Match adjacent finished surfaces.
   2. Applications:
      a. Interior wall and ceiling control joints.
      b. Joints between interior door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.
   3. Products:
      a. Pecora Corporation; AC-20 + Silicone Acrylic Latex Caulking Compound: www.pecora.com.

D. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
   1. Product: Pecora 898NST manufactured by Pecora Corporation.
   2. Applications:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Acoustical Sealant for Concealed Locations:
   1. Composition: Acrylic latex emulsion sealant.
   2. Products:
      a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: www.pecora.com.
      b. Tremco Global Sealants; Tremco Acoustical Sealant: www.tremcosealants.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM C 1330, oversized 30 to 50 percent larger than the joint and the following:
   1. Type B, bicellular such as "Sof Rod"as manufactured by Nomaco.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

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. Perform acoustical sealant application work in accordance with ASTM C919.

D. 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.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

3.06 SCHEDULE

A. All exterior joints between all similar and dissimilar, vertical surfaces shall receive sealant.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior steel doors.

B. Thermally insulated steel doors.

C. Steel glazing frames.

D. Accessories, including glazing and louvers.

1.02 RELATED REQUIREMENTS

A. Section 03 47 13 - Tilt Up Concrete: Frames cast into panels

B. Section 05 12 00 - Structural Steel: Steel Door frame attached to structural steel.

C. Section 08 71 00 - Door Hardware.

D. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

E. Section 09 90 00 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council.

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.

F. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames.

G. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames.

H. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.

I. NAAMM HMMA 863 - Guide Specifications for Detention Security Hollow Metal Doors and Frames.

J. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc..

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.05 QUALITY ASSURANCE

A. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Ceco Door Products: www.cecodoor.com.
   2. Republic Doors: www.republicdoor.com.
   3. Steelcraft: www.steelcraft.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Galvanizing at exterior doors: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors :
   1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
   2. Skins: 18 ga. minimum
   3. Core: Polystyrene foam.
   4. Thermal: U 0.37 Minimum
   5. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   6. Weatherstripping: Separate, see Section 08 71 00.
   7. Finish: Factory primed, for field finishing.

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door.
      a. ANSI A250.8 Level 1 Doors: 16 gage frames.
   2. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

B. Exterior Door Frames: Face welded, seamless with joints filled.
   1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
   2. Finish: Factory primed, for field finishing.

3. Weatherstripping: Separate, see Section 08 71 00.

C. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
   1. Style: Standard straight slat blade.
   2. Fasteners: Exposed, tamper proof fasteners.

B. Glazing: As specified in Section 08 80 00, factory installed.

C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

D. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

E. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Factory Finish: Complying with ANSI A 250.3, manufacturer's standard coating of color as selected.

C. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

D. Coordinate installation of glazing.

E. Touch up damaged factory finishes.

3.04 ERECTION TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and hardware Schedule on the drawings.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush Wood Doors

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

B. Section 08 71 00 - Door Hardware.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit four samples of door veneer, 12 by 12 inch in size illustrating wood grain, stain color, and sheen for review and approval.

E. Specimen warranty.

F. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Eggers Industries: www.eggersindustries.com.
   2. Graham Wood Doors: www.grahamdoors.com.
   3. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

A. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Wood veneer facing (plain sliced w/book matching white maple) with factory clear finish (see finish schedule).
      a. Quality level: Custom Grade, Standard Duty performance wood veneer.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Compatible hardwood.
   2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
   3. 5 or 7 Ply Veneer

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Clear:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 36 13

OVERHEAD SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead sectional doors, manually operated.

B. Operating hardware and supports.

1.02 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers: Perimeter sealant and backup materials.

B. Section 08 71 00 - Door Hardware: Lock cylinders.

C. Section 09 90 00 - Paints and Coatings: Finish painting.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts.

E. NEMA MG 1 - Motors and Generators.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

G. NFPA 70 - National Electrical Code.

H. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

C. Product Data: Show component construction, anchorage method, and hardware.

D. Operation Data: Include normal operation, troubleshooting, and adjusting.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three years of experience.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Door Co; Product Series 418.

B. Other Acceptable Manufacturers:
   1. Clopay Building Products Company, Inc: www.clopaydoor.com.
   2. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 STEEL DOOR COMPONENTS

A. Steel Doors: Flush steel, insulated; high lift operating style with track and hardware; complying with DASMA 102, Commercial application.
   1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330, using 10 second duration of maximum load.
   2. Door Nominal Thickness: 2 inches thick.
   3. Exterior Finish: Pre-finished with baked enamel of P-1 color.
   4. Interior Finish: Pre-finished with baked enamel of P-1 color.

B. Door Panels: Flush steel construction; 20 gage outer steel sheet , flat profile; 26 gage inner steel sheet, flat profile; core reinforcement of 16 gage sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; insulate

2.03 DOOR COMPONENTS

A. Track (for dock doors): Rolled galvanized steel, 0.090 inch thick; 2 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.

B. Track (for drive-in, larger doors): Galvanized steel angles, 0.094 inch thick; 3 inch size, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.

C. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.

D. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
   1. For Manual Operation: Requiring maximum exertion of 25 lbs force to open.
   2. Provide Alternate Cost for motorized door operator.

E. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.

F. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.

G. Head Weatherstripping: EPDM rubber seal, one piece full length.

H. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

I. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.04 MATERIALS

A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.

B. Insulation: Rigid polystyrene, .
   1. R value of 7.35 (Max U-Factor of 0.50).
   2. Same thickness as core framing members.

2.05 ELECTRIC OPERATION (ALTERNATE)

A. Electric Operators:
   1. Mounting: Side mounted on cross head shaft.
   2. Motor Enclosure:
   3. Motor Rating: 1/3 hp; continuous duty.
   4. Motor Voltage: 120 volts, single phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250, Type 1.
   7. Opening Speed: 12 inches per second.
   8. Brake: Adjustable friction clutch type, activated by motor controller.
   9. Manual override in case of power failure.

B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.

C. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
   1. 24 volt circuit.
   2. Surface mounted, at interior door jamb.
   3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
      a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

D. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

E. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor assembly to wall construction and building framing without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware.

E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.06 CLEANING

A. Clean doors and frames .

B. Remove temporary labels and visible markings.

3.07 PROTECTION

A. Protect installed products from damage during subsequent construction.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 43 13

METAL-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Storefront door and hardware.

C. Aluminum doors and frames.

D. Weatherstripping.

E. Door hardware.

F. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 03 47 13 - Tilt Up Concrete: Preparation of adjacent work to receive work of this section.

B. Section 05 12 00 - Structural Steel Framing: Steel attachment members.

C. Section 05 50 00 - Metal Fabrications: Steel attachment devices.

D. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

E. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

F. Section 08 80 00 - Glazing: Glass and glazing accessories.

G. Door Schedule - See Drawings.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site.

B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric].

1.04 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   1. Positive Design Wind Load: 30 lbs / sf.
   2. Negative Design Wind Load: 30 lbs / sf.
   3. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.

B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.

D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 8.00 lbf/sq ft.

E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

C. Design Data: Provide framing member structural and physical characteristics, dimensional limitations.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

E. Manufacturer's Certificate: Certify the product's overall U-factor and Solar Heat Gain Coefficient (SHGC), as determined in accordance with NFRC 100 and 200. The temporary label attached to fenestration products must not be removed prior to inspection

F. Report of testing for Air Inflitration in accordance with ASTM E 283. Submit one copy for review, and retain one copy on the jobsite at all times.

1.06 QUALITY ASSURANCE

A. Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at Washington.

B. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.07 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond to aluminum when exposed to sunlight or weather.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 2 year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Kawneer Company, Inc: www.kawneer.com. Trifab VG 451. Glass plane: center. 4-1/2" deep
   2. Kawneer Company, Inc: www.kawneer.com. 350 Door "Medium stile"
   3. Arcadia, Inc.: www.arcadiainc.com. AG451
   4. Arcadia, Inc.: www.arcadiainc.com. MS362 Series door.
   5. United States Aluminum Corp: www.usalum.com. Series 451.
   6. United States Aluminum Corp: www.usalum.com. Series 400 Medium Stile door
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Overall U-Value Including Glazing: 0.38, maximum.
   2. Overall Solar Heat Gain Coefficient (SHGC) Including Glazing: 0.40 maximum.
   3. Finish: Class I color anodized
   4. Finish Color: Dark bronze.
   5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

2.03 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing stops: Flush.
   3. Cross-Section: 2" x 4-1/2" nominal dimension.
   4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Swing Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 3-1/2 inches wide.
   3. Vertical Stiles: 3-1/2 inches wide.
   4. Bottom Rail: 12 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Perimeter Sealant: As specified in Section 07 90 05.

D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.

B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34 Electrolytically deposited colored anodic coating not less than 0.4 mils thick.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 HARDWARE

A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

B. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all doors.

C. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

D. Pivots: Offset type; top, intermediate, and bottom.
   1. Provide on all doors.

E. Push/Pull Set: Manufacturer's Standard.
   1. Provide on all doors.

F. Exit Devices: Manufacturer's Standard.
   1. Provide on doors.

G. Closers: Manufacturers Standard.
   1. Provide on doors.

H. Locks: Dead latch with thumbturn inside; keyed cylinder outside.
   1. Provide on all doors.
   2. Provided by door hardware supplier.

I. Door Stop: Manufacturer's Standard
   1. Provide on all doors.

2.07 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce components internally for door hardware.

G. Reinforce framing members for imposed loads.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

2.08 DISSIMILAR METAL PROTECTION

A. Apply 3-M Scotchrap 50, 10 mil, black vinyl corrosion resistant tape to separate dissimilar metals. Locate so as to be concealed after installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of mastic and secure.

J. Install hardware using templates provided.

K. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

L. Install perimeter sealant in accordance with Section 07 90 05.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2.

3.05 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING AND PROTECTION

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.07 PROTECTION

A. Protect installed products from damage during subsequent construction.

B. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

C. Protect finished work from damage.

3.08 WASTE MANAGEMENT

A. Coordinate with suppliers on reducing packing material. Recycle packing materials per waste management plan.

B. Fold up metal banding, flatten and place in designated area.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for hollow steel doors.

B. Lock cylinders for doors for which hardware is specified in other sections.

C. Thresholds.

D. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

B. Section 08 14 16 - Flush Wood Doors.

C. Section 08 36 13 - OVERHEAD SECTIONAL DOORS: Hardware for same, except cylinders; installation of cylinders.

D. Section 08 43 13 - METAL-FRAMED ENTRANCES AND STOREFRONTS: Hardware for same except cylinders; installation of cylinders.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council.

B. BHMA A156.1 - American National Standard for Butts and Hinges.

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches.

D. BHMA A156.3 - American National Standard for Exit Devices.

E. BHMA A156.4 - American National Standard for Door Controls - Closers.

F. BHMA A156.7 - American National Standard for Template Hinge Dimensions.

G. BHMA A156.14 - American National Standard for Sliding and Folding Door Hardware.

H. BHMA A156.18 - American National Standard for Materials and Finishes.

I. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association.

J. BHMA A156.23 - American National Standard for Electromagnetic Locks.

K. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators.

L. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.

M. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

O. NFPA 101 - Life Safety Code.

P. UL (DIR) - Online Certifications Directory.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

C. Convey Owner's keying requirements to manufacturers.

D. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product data: Submit product data for each item of door hardware.

C. Hardware Schedule:
   1. Submit one copy of the final hardware schedule.
   2. Comply with construction progress schedule requirements.
   3. Submit one copy of the final hardware schedule to each fabricator of doors and frames within two weeks after acceptance of hardware schedule by Architect/Engineer.

D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

E. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with two years of experience.

B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

B. Furnish templates for door and frame preparation within two weeks after final hardware schedule acceptance of final hardware schedule by Architect/Engineer.

C. Meet with Owner and Tenant as required too coordinate keying requirements during the course of the Work.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for door closers.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide all items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:

1. Applicable provisions of federal, state, and local codes.
2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
3. Applicable provisions of NFPA 101, Life Safety Code.
4. Fire-Rated Doors: NFPA 80.
5. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.
6. Hardware for Smoke and Draft Control Doors : Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.

D. Finishes: All door hardware the same finish unless otherwise indicated.
1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
2. Finish Definitions: BHMA A156.18.
3. Exceptions:
a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.

2.02 HINGES

A. Hinges: Provide hinges on every swinging door.
1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
2. Provide ball-bearing hinges at all doors having closers.
3. Provide hinges in the quantities indicated.
4. Provide non-removable pins on exterior outswinging doors.

B. Butt Hinges: Comply with BHMA A156.1 and A156.7; standard weight, unless otherwise indicated.
1. Provide hinge width required to clear surrounding trim.

C. Quantity of Hinges Per Door:
1. Doors From 60 inches High up to 90 inches High: Three hinges.
2. Doors 90 inches High up to 120 inches High: Four hinges.

D. Hinges: Basis of Design: Exterior Doors - Hager BB1191, Interior Doors - Hager BB1279
1. Hager Companies: www.hagerco.com.
2. Stanley Black & Decker: www.stanleyblackanddecker.com.

2.03 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
1. Hardware Sets indicate locking functions required for each door.
2. If no hardware set is indicated for a swinging door provide an office lockset.
3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
1. Provide cams and/or tailpieces as required for locking devices required.

C. Keying system and key quantities to be confirmed by Owner.

D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.04 CYLINDRICAL LOCKSETS

A. Cylindrical Locksets: Basis of Design is Schlage ND Series "Sparta" Levers (Exterior), Schlage AL Series "Sparta" Levers (Interior)

B. Locking Functions: As defined in BHMA A156.2, and as indicated in hardware schedule and as follows:

1. Passage: No locking, always free entry and exit.

C. Cylindrical Locks:
1. Best Access Systems, division of Stanley Security Solutions: www.bestlock.com.
2. Falcon T Series: www.bestlock.com
3. Schlage: www.schlage.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 EXIT DEVICES

A. Exit Devices: Design references based on Von Duprin

B. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
1. Entry/Exit, Always-Latched: Key outside locks and unlocks lever, no latch holdback (dogging).

C. Manufacturers:
1. DORMA Group North America: www.dorma-usa.com/usa.
2. Von Duprin: www.vonduprin.com.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 CLOSERS

A. Closers: Complying with BHMA A156.4.
1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
2. Provide a door closer on every exterior door.
3. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

B. Manufacturers - Closers:
1. DORMA Group North America: www.dorma-usa.com/usa.
2. Hager Companies: www.hagerco.com.
3. Falcon: www.falconlocks.com
4. LCN: www.lcnclosers.com.
5. Basis of Design: LCN 4041 DEL.
6. Substitutions: See Section 01 60 00 - Product Requirements.

2.07 GASKETING AND THRESHOLDS

A. Gaskets: Complying with BHMA A156.22.
1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
3. On each exterior door, provide door bottom sweep, unless otherwise indicated.
4. Provide with silicone seal.

B. Thresholds:
1. At each exterior door, provide a threshold unless otherwise indicated.
2. Provide with silicone seal.
3. Field cut threshold to frame for tight fit.
4. Basis of Design: Pemko 272A

C. Manufacturers - Gasketing and Thresholds:
1. National Guard Products, Inc: www.ngpinc.com.
2. Pemko Manufacturing Co: www.pemko.com.
3. Zero International, Inc: www.zerointernational.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.08 PROTECTION PLATES AND ARCHITECTURAL TRIM

A. Drip Guard: Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy.

B. Manufacturers - Protection Plates and Architectural Trim:
   1. Assa Abloy McKinney: www.assaabloydss.com.
   2. Hager Companies: www.hagerco.com.
   3. Hiawatha, Inc: www.hiawathainc.com.
   4. Basis of Design: Pemko 346C

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item:
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

3.03 ADJUSTING

A. Adjust work under provisions of Section 01 70 00.

B. Adjust hardware for smooth operation.

3.04 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 70 00.

B. Do not permit adjacent work to damage hardware or finish.

3.06 SCHEDULE - SEE DOOR SCHEDULE ON DRAWINGS FOR DOOR HARDWARE SCHEDULE

A. Required door hardware
   1. Furnish the following hardware groups for each door as indicated on the Door Schedule, and as required for complete and proper functioning of each door.
   2. Include items listed and required for complete and proper functioning of each door regardless of omissions or conflicts in Contract Documents

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers.

B. Section 07 90 05 - Joint Sealers: Sealant and back-up material.

C. Section 08 43 13 - METAL-FRAMED ENTRANCES AND STOREFRONTS: Glazing furnished by storefront manufacturer.

1.03 REFERENCE STANDARDS

A. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

B. ASTM C1036 - Standard Specification for Flat Glass.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

E. GANA (GM) - GANA Glazing Manual.

F. GANA (SM) - GANA Sealant Manual.

G. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use.

1.04 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
   2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Samples: Submit two samples 12 x 12 inch in size of glass units.

D. Certificates: Provide a single certificate for each site-built window indicating glazing type, special coatings, spacers, gas fills, center-of-glass and overall U-factor, and center-of-glass Solar Heat Gain Coefficient (SHGC). Submit one copy for review, and retain one copy on the jobsite at all times.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

1.08 MAINTENANCE PRODUCTS

A. Provide one of each glass size and each glass type, of insulated glass units.

PART 2 PRODUCTS

2.01 GLAZING TYPES

2.02 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.

E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I.

F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Prime surfaces scheduled to receive sealant.

C. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

D. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install glass in accordance with requirements and recommendations of glass manufacturer and fabricator and GANA Glazing Manual.

B. Do not use unshimmed glazing tapes.

C. Install setting blocks and edge spacing blocks.

D. Do not install glass with edge or face damage.

E. Be sure that installation does not block weepholes.

3.04 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Gypsum sheathing.

E. Gypsum wallboard.

F. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.

B. Section 06 10 00 - Rough Carpentry: Building framing and sheathing.

C. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

D. Section 07 21 00 - Thermal Insulation: Acoustic insulation.

E. Section 07 90 05 - Joint Sealers: Acoustic sealant.

F. Section 09 90 00 - Painting.

1.03 REFERENCE STANDARDS

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute. (replaced SG-971)

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM C 36/C 36M - Standard Specification for Gypsum Wallboard.

D. D. ASTM C 442/C 442M - Standard Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board; 1999a.

E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

F. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

J. ASTM C 931/C 931M - Standard Specification for Exterior Gypsum Soffit Board; 1998.

K. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

L. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

M. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.

N. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

O. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

P. ASTM E413 - Classification for Rating Sound Insulation.

Q. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association; 2007.

R. GA-216 - Application and Finishing of Gypsum Board.

S. GA-600 - Fire Resistance Design Manual.

T. ICC (IBC) - International Building Code.

U. UL (FRD) - Fire Resistance Directory.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum three years of documented experience.

C. Apprentice workers may be employed only under constant supervision from experienced installers or applicators.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection
   1. Store materials in dry, ventilated space, under cover and 4 inches above concrete floor slabs.
   2. Protect members from excessive stress during erection.
   3. Distribute gypsum panels throughout the building to prevent overstressing the floor structural systems during construction.
   4. Store gypsum panels on flat surface and protect panels from warp and edge damage.

1.08 SITE CONDITIONS

A. Temperature and Humidity Requirements:
   1. Maintain ambient air temperature above 55 degrees F.
   2. Maintain 70 percent maximum relative humidity.
   3. Maintain air temperature and humidity within the above limits in each work area for 48 hours prior to, during, and after installation of gypsum board systems.

B. Sequencing:
   1. Install complete piping, ducting, and heating and cooling systems above ceiling, and operate systems prior to installing ceiling panels.
   2. Install power and communications conduit above ceiling, prior to installing ceiling panels.
   3. Install fire protection system and test the system prior to installing ceiling panels.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
   2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
   3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com/#sle.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Marino: www.marinoware.com/#sle.
   4. The Steel Network Inc: www.SteelNetwork.com.
   5. Telling Industries: www.tellingindustries.com.
   6. SCAFCO Steel Stud Manufacturing Co. .
   7. Substitutions: See Section 01 60 00 - Product Requirements.

B. Metal Framing Connectors and Accessories:
   1. Same manufacturer as framing.
   2. Simpson Strong-Tie Company, Inc.: wwwstrongtie.com.

C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E72 using assemblies specified by ASTM C754.
   2. Studs: "C" shaped with flat or formed webs .
   3. Runners: U shaped, sized to match studs.
   4. Ceiling Channels: C shaped.

D. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   3. National Gypsum Company: www.nationalgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.

3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
4. Thickness:
   a. Vertical Surfaces: 5/8 inch.

C. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
1. Regular Type:
   a. Application: Use for vertical surfaces, unless otherwise indicated.
2. Thickness: 5/8 inch.
3. Edges: Tapered.

D. Fire Resistant Type: Complying with Type X requirements; UL or WH rated.
1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
2. Application: Where required for fire-rated assemblies, unless otherwise indicated.
   a. Thickness: 5/8 inch.

E. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
2. Core Type: Regular, as indicated.
3. Thickness: 5/8 inch.
4. Edges: Tapered.

2.04 ACCESSORIES

A. Metal Trim and Framing Accessories:
1. Square Corner Trim: Galvanized steel, 1-1/4 inch wide.
2. Edge Trim: Galvanized steel, 7/8 inch exposed face.
3. Crack Control Joint Trim: One piece zinc, 1-3/4 inch total width, with 1/4 inch open slot covered with plastic tape for removal after finishing.
4. Shaft Wall Framing Angles: 24 gage corrosion resistant steel and 0.063 inch thick aluminum framing angles furnished or recommended by shaft wall stud manufacturer.

B. PVC Trim for Exterior Gypsum Soffit Board:
1. Material: ASTM D 1784.
2. Profile: Manufacturer's standard profile to match Drawing details for soffit board joints and edges.

C. PVC Trim for Interior Gypsum Board:
1. Material: ASTM D 3678.
2. Profile: Manufacturer's standard profile to match Drawing details for gypsum board joints and edges.

D. Panel Adhesives and Fasteners:
1. Panel Adhesives: ASTM C 557. VOC contentent not to exceed 50 g/l.
2. Screws: ASTM C 1002.

E. Acoustic Insulation: As specified in Section 07 21 00.

F. Acoustic Sealant: As specified in Section 07 90 05.

G. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rigid plastic, unless otherwise indicated.
1. Types: As detailed or required for finished appearance.

H. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
2. Ready-mixed vinyl-based joint compound.

I. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

J. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

K. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 PERFORMANCE

A. Verify that project conditions are appropriate for work of this section to commence.
   1. Examine structural framing and conditions under which wall and ceiling systems are to be installed.
   2. Start of wall and ceiling system Work will indicate acceptance of surfaces and conditions within each area.

B. Protection: Provide temporary covering to eliminate splattering of joint compound [and spray texture] on adjacent finished surfaces.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.

C. Studs: Space studs as indicated.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.

3.03 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

3.05 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.
   1. Above Finished Ceilings Concealed From View: Level 1.
   2. Utility Areas and Areas Behind Cabinetry: Level 2.
   3. Walls and Ceilings to Receive Flat or Eggshell Paint Finish: Level 4.

3.06 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit framing.

B. Framing accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking within stud framing.

1.03 REFERENCE STANDARDS

A. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

B. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.

1. Studs: C shaped with flat or formed webs with knurled faces.
2. Runners: U shaped, sized to match studs.

PART 3 EXECUTION

3.01 INSTALLATION OF STUD FRAMING

A. Extend partition framing to structure where indicated and to ceiling in other locations.

B. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

C. Align and secure top and bottom runners at 24 inches on center.

D. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

E. Align stud web openings horizontally.

F. Secure studs to tracks using crimping method. Do not weld.

G. Fabricate corners using a minimum of three studs.

H. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.

I. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

3.02 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

END OF SECTION

SECTION 09 90 00

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings.

C. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   6. Glass.
   7. Pipes, ducts, and conduits.
   8. Galvanized stair assemblies.
   9. Galvanized dock steel channels, door jambs and track protectors.

1.02 RELATED REQUIREMENTS

A. Section 32 17 23.13 - Painted Pavement Markings: Painted pavement markings.

B. Section 05 50 00 - Metal Fabrications: Shop-primed items.

C. Section 08 11 13 - Hollow Metal doors and frames

D. Section 08 36 13 - Overhead Sectional Doors

E. Section 09 96 40 - Elastomeric Wall Coatings

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.

B. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples: Submit three paper chip samples, 8 x 10 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.

E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Paint and Coatings: Five gallons of each color; store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.06 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Provide door and frame assembly illustrating paint coating color, texture, and finish.

1.07 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 paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint 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.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. ICI Paints North America: www.icipaintsinna.com.
   2. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
   3. Parker Paint Mfg Co Inc., a Comex Group company: www.parkerpaint.com.
   4. Pratt & Lambert Paints: www.prattandlambert.com/#sle.
   5. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
   6. Miller Paint: www.millerpaint.com.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating. Prepare Pigments:
   1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each coating material in quantity required to complete entire project's work from a single production run.

4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Flammability: Comply with applicable code for surface burning characteristics.

E. Colors: As indicated on drawings
   1. Extend colors to surface edges; colors may change at any edge as directed by Mackenzie.
   2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

A. Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of latex enamel.

B. Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Semi-gloss: Two coats of latex enamel.

C. Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of latex enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Surface Appurtenances: Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Marks: Seal with shellac those which may bleed through surface finishes.

E. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

F. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

G. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

H. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

I. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

J. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand wood and metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Utility room accessories.

1.02 RELATED REQUIREMENTS

A. Section 10 21 13.13 - Metal Toilet Compartments.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

C. ASTM C1036 - Standard Specification for Flat Glass.

1.04 SUBMITTALS

A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
   1. Include a schedule listing the room numbers and number identical to the ones on the drawing and listing the amount (or number) of each component to be furnished in each room.

B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.05 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Bobrick see accessories schedule on drawings.

B. Commercial Toilet Accessories:
   1. Bobrick: www.bobrick.com
   2. Georgia-Pacific Professional: www.blue-connect.com.
   3. Substitutions: Section 01 60 00 - Product Requirements.

C. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

F. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

A. Refer to Accessories Schedule in the drawings.

2.05 UTILITY ROOM ACCESSORIES

A. Refer to Accessories Schedule in drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide.

B. NFPA 10 - Standard for Portable Fire Extinguishers.

C. UL (DIR) - Online Certifications Directory.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher ratings and classifications.

C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers:
   1. Larsen's Manufacturing Co; www.larsensmfg.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:
   1. Larsen's Manufacturing Co: www.larsensmfg.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide wall/column mounted fire extinguishers at a rate of (1) per 6,000 sq. ft. in Warehouse Areas and in a semi-recessed cabinet at a rate of (1) per 3,000 sq. ft. in the Office Areas. Provide unit pricing for extinguishers by type.
   2. Portable Fire Extinguishers: Larsen's Manufacturing Co. Model: "MP Series", multipurpose dry-chemical type with fluidized and siliconized mono ammonium= phosphate power, UL-rated as scheduled, in enameled-steel container.
   3. Color: Red.
      a. FE-1: "MP10", 4-A:80-B:C, 10-lbs nominal capacity, in semi-recessed cabinets in non-rated walls, and at surface mounted cabinets and wall locations.
      b. FE-2: MDF Room and charging areas: Provide 15.5 lb. Halatron 2A:10BC fire extinguisher with bracket and sign.
   4. Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
      a. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
   5. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.

2.03 FIRE EXTINGUISHER CABINETS

A. Fire Extinguisher Cabinets: Surface and semi-recessed mounted cabinets "Architectural Series Vertical Duo" with full clear tempered or laminated safety glass in door, round cabinet trim and standard white baked painted finish.
   1. FEC-1: "Model 2409-6R" with 2 ½" rolled edge trim. Semi-recessed mounted in interior non-rated walls.
   2. FEC-2: "Model FS2409-R3" fire-rated with 2 ½" rolled edge trim and integral "Flame Shield" option. Semi-recessed mounted in interior rated (2-hour maximum) walls

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Place extinguishers in cabinets.

END OF SECTION

SECTION 12 21 13

HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Horizontal slat louver blinds.

B. Operating hardware.

1.02 REFERENCE STANDARDS

A. WCMA A100.1 - Safety of Corded Window Covering Products.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating physical and dimensional characteristics.

C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Horizontal Louver Blinds:
   1. Levolor Contract: www.levolorcontract.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BLINDS

A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.

B. Manual Operation: Control of raising and lowering by cord with full range locking; blade angle adjustable by control wand.

C. Metal Slats: Spring tempered pre-finished aluminum; square slat corners, with manufacturing burrs removed.
   1. Width: 1 inch.
   2. Thickness: 0.006 inch.
   3. Color: As indicated on drawings.

D. Slat Support: Woven polypropylene cord, ladder configuration.

E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.

F. Headrail Attachment: Wall brackets.

PART 3 EXECUTION

3.01 INSTALLATION

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

B. Secure in place with flush countersunk fasteners.

3.02 TOLERANCES

A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.

3.03 ADJUSTING

A. Adjust blinds for smooth operation.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.

B. Insulated Metal wall and roof panels including soffits and gutters and downspouts.

C. Exterior doors, windows, skylights, overhead doors, and louvers.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing joints between accessory components and wall system.

B. Section 08 11 13 - Hollow Metal Doors and Frames.

C. Section 08 36 13 - OVERHEAD SECTIONAL DOORS.

D. Section 08 52 00 - Wood Windows.

E. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel.

G. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems.

H. MBMA (MBSM) - Metal Building Systems Manual.

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

J. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.

1.04 DESIGN REQUIREMENTS

A. Installed Thermal Resistance of Wall System: R value of R-19 ci.

B. Installed Thermal Resistance of Roof System: R value of R-25 + R-11 LS.

C. Design members to withstand dead load, additional collateral load, and design loads due to pressure and suction of wind calculated with load combinations in accordance with applicable code and the general notes. Consider vertical distribution of the building weights for multilevel portions of the structure. For rigid concrete diaphragms consider the effects of torsion.

D. Connections for masonry or concrete panels to the structure are to provide out-of-plane support but prevent in-plane forces from entering the building. The drift of the primary frames are to be compatible with the rigidity of the wall systems.

E. Design members to withstand UL 580 Uplift Class 90.

F. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of L/180 of span.

G. Lateral drift at the Eave for the Structure supporting Concrete or Masonry - H/100

H. Individual members supporting Concrete or Masonry - limit vertical deflection to L/600

I. Consider the bases of moment frames as pinned. Calculations for deflections shall be done using on the bare frame method. Reduction based on engineering judgment using the assumed composite stiffness of the building envelope shall not be permitted.

J. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

K. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees F.

L. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage, and installation; framing anchor bolt settings, sizes, locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

D. Samples: Submit two samples of precoated metal panels for each color selected, 12" by 12" inch in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

1.07 QUALITY ASSURANCE

A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
   1. Design Engineer Qualifications: Licensed in the state that the project is constructed.
   2. Conform to appliciable building code for submission of design calculations sealed and signed as required for acquiring permits.
   3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform work in accordance with AISC 360 and MBMA (MBSM).
   1. Maintain one copy on site.

C. Perform welding in accordance with AWS D1.1/D1.1M.

D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

E. Erector Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings Systems:
   1. Web Steel Buildings Northwest; www.wsbnw.com
   2. Butler Manufacturing Company: www.butlermfg.com/#sle.
   3. Ceco Building Systems: www.cecobuildings.com/#sle.
   4. Chief Buildings: www.chiefbuildings.com/#sle.
   5. Kirby Building Systems: www.kirbybuildingsystems.com/#sle.
   6. Metallic Building Company: www.metallic.com/#sle.
   7. Nucor Building Systems: www.nucorbuildingsystems.com/#sle.
   8. VP Buildings: www.vp.com/#sle.

2.02 ASSEMBLIES

A. Single span rigid frame.

B. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, and wind bracing.

C. Secondary Framing: Purlins, and other items detailed.

2.03 PERFORMANCE REQUIREMENTS

A. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

B. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees F.

2.04 MATERIALS - WALLS AND ROOF

A. Metal Building Type, Factory Applied, Vapor-Barrier Insulation Facings: Water vapor permeance no greater than 0.10 perm when tested in accordance with ASTM E96/E96M; flame spread index of 25 or less, and smoke developed index of 40 or less when tested in accordance with ASTM E84.

B. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.

C. Sealant: Manufacturer's standard type.

2.05 COMPONENTS

A. Doors and Frames: Manufacturer's standard (Base Bid).

B. Doors and Frames: Specified in Section 08 11 13 (Alternate).

C. Overhead Doors: Specified in Section 08 36 13 (Alternate).

D. Overhead Doors and Frames: Manufacturer's standard (Base Bid).

E. Windows: Specified in Section 08 52 00.

F. Wall Louvers: _____ type Z blade design, same finish as adjacent material, with steel mesh bird screen and frame, blank sheet metal at unused portions.

2.06 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

C. Provide framing for skylight openings.

2.07 FABRICATION - WALL AND ROOF PANELS

A. Siding: Minimum 0.03 inch metal thickness, two mfr standard profile indicated, 2 inch deep, lapped edges fitted with continuous gaskets.

B. Roofing: Minimum max gage/ inch metal thickness, standing seam profile, lapped edges fitted with continuous gaskets.

C. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.

D. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.08 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal.

B. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

2.09 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, standard color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.

E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Install sealant and gaskets, providing weather tight installation.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Slope gutters minimum ____ inch/ft.

3.05 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 32 13 13

SITE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, stair steps, integral curbs, gutters, roads, and concrete dolly pads.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 33 41 11 - Site Storm: Manholes and catch basins including frames.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

B. ACI 301 - Specifications for Structural Concrete.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

D. ACI 305R - Hot Weather Concreting.

E. ACI 306R - Cold Weather Concreting.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

G. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

I. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

J. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

K. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

L. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

A. Obtain cementitious materials from same source throughout.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
   1. Thickness: 1/2 inch.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 40 (280); deformed billet steel bars; unfinished finish.

B. Dowels: ASTM A615/A615M Grade 40 (280); deformed billet steel bars; unfinished finish.

2.03 CONCRETE MATERIALS

A. Concrete Materials: As specified in Section 03 30 00.

B. Air Entrainment Admixture: ASTM C260. (for dock apron slabs).

2.04 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength as specified in Section 03 32 00:
   1. Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   2. For trial mixtures method, employ independent testing agency acceptable to Mackenzie for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Concrete Properties:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3500 psi fo the truck docks and 3000 psi for curbs and sidewalks
   2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
   3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
   4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
   5. Water-Cement Ratio: Maximum 40 percent by weight.
   6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
   7. Maximum Slump: 3 inches.

2.05 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

A. Refer to Geotechnical Report.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

A. Place reinforcement at top of slabs-on-grade (with 1-1/2" clear from top of slab).

B. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

D. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.07 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
   1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
   2. Secure to resist movement by wet concrete.

C. Provide scored joints:
   1. As indicated on drawings.
   2. Between sidewalks and curbs.
   3. Between curbs and pavement.

D. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.08 FINISHING

A. Truck Dock Apron Paving: Raked Finish, perpendicular to direction of travel (run rake parallel to building).

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

B. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

3.10 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

3.11 SCHEDULES

A. Concrete Sidewalks and Curbs: 3,000 psi 28 day concrete (air entrained), 4 inches thick sidewalk , buff color Portland cement, light broom finish.

B. Truck Dock Apron Pavement: 3,500 psi 28 day concrete, 6 inches thick, #4 reinforcing at 2 ft on center each way, raked finish.

END OF SECTION

SECTION 32 17 13

PARKING BUMPERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precast concrete parking bumpers and anchorage.

1.02 REFERENCE STANDARDS

A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

B. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

C. ASTM C150/C150M - Standard Specification for Portland Cement.

D. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS

A. Parking Bumpers: Precast concrete, conforming to the following:
   1. Size and dimensions indicated on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install units without damage to shape or finish. Replace or repair damaged units.

B. Install units in alignment with adjacent work.

C. Fasten units in place with 2 dowels per unit.

END OF SECTION

SECTION 32 17 23.13

PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

1.02 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.04 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
   1. Parking Lots: White.
   2. Handicapped Symbols: Blue.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

C. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

D. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

3.03 INSTALLATION

A. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

B. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

C. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Width Tolerance: Plus or minus 1/8 inch.

D. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
   1. Mark the International Handicapped Symbol at indicated parking spaces.
   2. Hand application by pneumatic spray is acceptable.

E. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 32 84 23

DESIGN/BUILD IRRIGATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and fittings, valves, sprinklersheads, and accessories for irrigation on site.

B. Control system.

C. Design/Build Submittals and Requirements.

1.02 RELATED REQUIREMENTS

A. Section 26 00 00 - Electrical: Connection of electrical source wire and telephone line to the automatic irrigation controller shall meet all applicable codes and be performed by a licensed contractor.

B. Section 32 01 90 - Operation and Maintenance of Planting

C. Section 33 11 00 - Mechanical: for information regarding point of connection. Point of connection work shall meet all applicable codes and be performed by a licensed contractor.

D. Section 32 92 19 - Seeding

E. Section 32 93 00 - Planting: For information regarding soil preparation and installation of plants.

1.03 REFERENCE STANDARDS

A. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

B. ASTM D2282 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR).

C. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: See Design Build Irrigation Plan Submittals and Requirements.

C. Product Data: Provide component and control system and wiring diagrams.

D. Record Documents: Record actual locations of all concealed components piping system.

E. Operation and Maintenance Data:
   1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog. Provide all materials in a 3-ring binder.
   2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.

F. Zone Map: Submit an irrigation plan for the site indicating, by varying color, the area coverage for each control valve. Indicate the number and location of the valve. The numbers shall correspond to those on the controller for each zone. Each controller chart shall show the area controlled by that automatic controller.

G. Controller Chart: Controller chart shall be a reduced copy of the zone map showing the area controlled by each automatic controller. Chart shall be laminated between two pieces of 10 mil. plastic. Controller chart shall be completed and approved by the owner prior to the final site visit.

H. Winterization: The system shall be designed for winterization by high pressure air evacuation not to exceed 40 p.s.i. Submit instructions indicating proper procedure for using a high volume/low pressure compressor.

1.05 DESIGN BUILD SUBMITTALS AND REQUIREMENTS

A. Design Criteria: Submitted plan shall meet the following criteria and shall be approved for construction only upon verification that all required criteria have been met.
   1. Drawings submitted for design approval:
      a. Must clearly illustrate irrigation heads, dripline, valve, controller and point of connection locations. Individual valves and controllers shall be numbered sequentially. The size and maximum flow through each valve and capacity of each controller shall be clearly noted.
      b. Must clearly illustrate pipe sizes from all laterals and mainline pipe.
      c. Drawings must be to a standard measurable engineering scale that is at a minimum of 1”=30'-0”.
      d. Drawings must be CAD generated.
      e. Drawings must include a legend that describes all symbols and materials represented on the plan.
      f. Drawings must clearly illustrate that the proposed irrigation system meets all performance criteria described by these specifications.
      g. Must utilize graphics that clearly distinguish between lateral and mainline pipe and sleeves under pavement; dripline; manual or automatic control valves, isolation valves and drain valves; irrigation controllers and all other equipment located on the plan.

B. Irrigation system as designed and installed shall perform within the tolerances and specification of the specified manufacturers.

C. The system shall be fully adjustable to fine-tune the system performance for specific zones. Indicate water pressure and gallonage parameters at available water source on the required submittal.

D. Irrigation system shall be designed so that planting beds, sloped banks and lawn zones are on separate control valves to facilitate the different water requirements of each area.

E. System shall be designed to supply manufacturer's specified minimum operating pressure to furthest emitter from water meter. Water flow through piping shall not exceed a velocity of 5 feet per second.

F. System shall furnish components to allow operation within manufacturer's specified tolerances for optimum performance. Undersized components shall not be approved for installation.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for piping and component requirements.

1.08 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this Section.

1.09 COORDINATION

A. Coordinate the work with site backfilling, electrical connections/power to controller, placing of irrigation sleeves, landscape grading and delivery of plant life.

A. Installer's Field Services: Prepare and start systems under provisions of Section 01 70 00 and Section 32 01 90.

B. Provide one complete spring start-up and a fall shutdown.

1.10 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Furnish extra components:
   1. Two sprinkler heads of each type and size.
   2. Two valve keys for manual valves.
   3. Two valve box keys.
   4. Two keys for valve markers.
   5. Two wrenches for each type head core and for removing and installing each type head.

PART 2 PRODUCTS

2.01 IRRIGATION SYSTEM

A. Electric solenoid controlled underground irrigation system, with pressure blow-out drain.

B. Manufacturers:
   1. As shown on the drawings or specifications
      a. Rain Bird Sales, Inc: www.rainbird.com/#sle.
      b. Toro Company: www.toro.com/#sle.
      c. Hunter Irrigation: www.Hunter.com
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PIPE MATERIALS

A. PVC Pipe: ASTM D 2241, Schedule 40 pipe upstream from control valves, Class 200 downstream from control valves.

B. Fittings: Type and style of connection to match pipe.

C. Solvent Cement: ASTM D 2564 for PVC pipe and fittings.

D. Sleeve Material: PVC Schedule 40.

2.03 OUTLETS

A. Manufacturers:
   1. Rainbird.
   2. Hunter.
   3. Toro.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Underground closecased rotary or spray heads, sufficient to apply specified precipitation rates. All spray heads must be equipped with pressure compensating devices. All irrigation heads in low points must be equipped with integral check-valves.

C. Rainbird.

D. Hunter.

E. Toro.

F. Quick Coupler: Rainbird 33 DLRC .

2.04 VALVES

A. Manufacturers:
   1. Rainbird; Product PEB Series.
   2. Superior: Product 3100, for master valve

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gate Valves: Bronze construction non-rising stem.

C. Backflow Prevention Device: As approved by local authorities

D. Valve Box and Cover: AMETEK 11x17 with black lid.

2.05 CONTROLS

A. Manufacturers:
1. Hunter ; Product I-Core Metal with Solar Sync.
2. Rainbird; Product ESP LXME with ET Manager Cartridge.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Controller shall be solid state, commercial grade and have a single station for each control valve plus a minimum of one unused station for future expansion and shall be installed per manufacturer's recommended installation procedures.

C. Controller shall be capable of a minimum of 2 start times per station per day and be equipped with a minimum 7-day watering cycle. Controller shall be equipped with master valve/pump start capacity.

D. Controller shall be suitable for either indoor or outdoor mounting. The Contractor shall coordinate with the Owner to identify location for Controller mount and provide appropriate lockable cabinet for location.

E. Controller Housing: NEMA 250 Type 3; weatherproof, watertight, with lockable access door.

F. Rain Sensor: Controller shall have rain sensor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of existing utilities.

B. Verify that required utilities are available, in proper location, and ready for use.

3.02 PREPARATION

A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.

B. Layout and stake locations of system components.

C. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

3.03 TRENCHING

A. Trench Size:
1. Minimum Width: 4 inches.
2. Minimum Cover Over Installed Supply Piping: 18 inches.
3. Minimum Cover Over Installed Branch Piping: 12 inches.
4. Minimum Cover Over Installed Outlet Piping: 12 inches.

B. Trench to accommodate grade changes .

C. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.04 INSTALLATION

A. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.

B. Connect to utilities.

C. Set outlets and box covers at finish grade elevations.

D. Provide for thermal movement of components in system.

E. Install sleeves in all locations where mainline and lateral piping and/or control wiring pass under paved areas and curbs or through walls. Extend sleeve 12 inches beyond edge of paving, curb, or wall.

F. Route red control and white common wires from controller to control valves and make connections at each end. Tape control wires together at 10-foot intervals and tape bundle to adjacent pipe at min. 20 - foot minimum intervals. Provide 24 inches expansion loop of red wire every 100 feet of wire. Allow 24 inches of extra wire at controller and each valve. Splice only at the valves, not between valves or between valve and controller. Route wire below main line wherever possible. Where not routed below mainline, install 4-6 inches wide yellow plastic warning tape 6 inches above the control wire.

G. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

3.05 CONTROLLERS

A. Verify location and mounting type with Owner.

B. Install as shown on details and per Manufacturers written instructions and recommendations.

3.06 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 40 00.

B. Prior to backfilling, test system for leakage at main piping to maintain 100 psi pressure for one hour.

C. System is acceptable if no leakage or loss of pressure occurs during test period.

3.07 BACKFILLING

A. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

3.08 SYSTEMS STARTUP

A. Adjust control system to achieve time cycles required.

B. Adjust head types for full water coverage as directed.

3.09 DEMONSTRATION

A. Instruct Owner's personnel in operation and maintenance of system, including adjusting of sprinkler heads. Use operation and maintenance material as basis for demonstration.

END OF SECTION

SECTION 32 93 00

PLANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Topsoil bedding.

C. Mulch and Fertilizer.

1.02 UNIT PRICES - MEASUREMENT AND PAYMENT

A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.

B. Topsoil: By the cubic yard. Includes topsoil, placing topsoil.

1.03 REFERENCE STANDARDS

A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock.

B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices.

1.04 DEFINITIONS

A. Weeds: Any plant life not specified or scheduled.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Maintenance Data: Submit general maintenence schedule indicating frequency, application and coverage of all required maintenence procedures. Submit in 3-ring binder

C. Qualification Data: For landscape installer and herbicide installer.

D. Herbicide Program: Prior to starting herbicide and chemical control program, submit a monthly herbicide application schedule and application specification as written by manufacturer of herbicide and currently licensed herbicide applicator.

E. Agricultural Soils Report: Report listing soil characteristics required amendments and maintenance recommendations. Test shall include analysis of soil fertility, pH, salinity, sodium, USDA texture, organic content, major nutrients and micronutrients.

1.06 INSPECTIONS

A. Rough Grading- Contractor to notify Owner's Representative minimum 72 hours prior to inspection for rough grading soils. All rough grading operation shall be completed per specification and prepared for inspection. Topsoil placement or backfilling in areas to be landscaped shall not occur until the Owner's Representative has issued written approval.

B. Topsoil Inspection: No transportation or placement shall occur until written approval of import or stockpiled topsoil by Owner's Representative.

1.07 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.08 FIELD CONDITIONS

A. Prepare planting beds properly by removing material not conducive to healthy plant growth. If hard packed conditions or debris from other operations exists within plant beds remove the debris, rock, cement treated base, trash or other deleterious debris.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. Topsoil: Minimum 6" settled depth in all planting beds and seed areas. Reuse surface soil stockpiled on site as available. Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0. Amend with organic composted yard debris tilled into topsoil.

2.02 STORMWATER SOIL

A. Growing medium for vegetated stormwater systems shall consist of a blend of loamy soil, sand and compost. Medium shall conform to the stormwater quality pond requirements per the prevailing Stormwater Management Manual and procured from an approved source.

B. Growing medium shall have a pH of 5 to 8, conform to he prevailing Stormwater Management Manual, be loose and friable, well blended and free of debris, wood or other foreign matter.

C. Growing medium depth within vegetated stormwater system shall be 12".

2.03 SOIL AMENDMENT MATERIALS

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis.

B. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

C. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

D. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of plants.

E. Organic Compost: Well-composted, stable and weed free organic matter, pH range of 5.5 to 7.5; moisture content of 35 to 55 percent by weight, 100 percent passing through 1/2 inch sieve, soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plants.

2.04 MULCH MATERIALS

A. Mulching Material: Hemlock or fir species wood ground bark, free of growth or germination inhibiting ingredients.

2.05 PLANT SOIL MIX

A. As recommended in soils analysis

2.06 SOURCE QUALITY CONTROL AND TESTS

A. Provide analysis of topsoil; comply with requirements of Section 01 40 00.

B. Provide testing of imported and existing topsoil.

C. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter; pH value.

D. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared subsoil and planters is ready to receive work.

B. Saturate soil with water to test drainage.

3.02 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, cement treated base rock, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. If cement treated base rock has spilled into or exists within planting beds remove cement treated rock prior to placement of topsoil or plants. Remove cement treated base to withing six inches of curbs and fill planting bed with plant soil mix.

D. Scarify subsoil to a depth of at least 6 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

E. Apply recommended fertilizer to subgrade as recommended in soils report.

F. Excavate plant pits three times as wide as root ball diameter.

3.03 AMENDING TOPSOIL

A. Thoroughly blend topsoil with recommended amendments and fertilizer.

3.04 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 6 inches over area to be planted. Thoroughly blend with subgrade to depth of 6 inches.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Place topsoil for water quality areas as indicated on drawings.

3.05 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions and soils analysis.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

END OF SECTION

SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage, and accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 31 00 00 - Earthwork

1.03 REFERENCE STANDARDS

A. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.

B. ASTM C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections [Metric].

C. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

D. ASTM C923M - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals [Metric].

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C478 (ASTM C478M), with resilient connectors complying with ASTM C923 (ASTM C923M).

B. Concrete: As specified in Section 03 30 00.

2.02 CONFIGURATION

A. Shaft Construction: Concentric with eccentric cone top section; lipped male/female dry joints; sleeved to receive pipe sections.

B. Shape: Cylindrical.

C. Clear Inside Dimensions: 48 inch diameter or as required for pipe diameter.

D. Design Depth: As indicated.

E. Steps: 12 inches wide, 16 inches on center vertically, set into manhole wall.

F. Steps: As required by code.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify excavation for manholes is correct.

3.02 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

3.03 MANHOLES

A. Place concrete base pad, trowel top surface level.

B. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad.

C. Cut and fit for pipe.

D. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required.

E. Coordinate with other sections of work to provide correct size, shape, and location.

END OF SECTION

SECTION 33 11 16

SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water pipe for site conveyance lines.

B. Pipe valves.

C. Fire hydrants.

D. Pipe and fittings for site water lines including domestic water lines and fire water lines. NOTE: These specifications do not apply to public work.

E. Valves, Fire hydrants, and Fire Department Connections.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for thrust restraints.

B. Section 31 00 00 - Earthwork

1.03 REFERENCES

A. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

C. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

D. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

E. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

F. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

G. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

H. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

I. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

J. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.

K. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

L. AWWA C502 - Dry-Barrel Fire Hydrants.

M. AWWA C504 - Rubber-Seated Butterfly Valves 3 In. (75 mm) Through 72 In. (1,800 mm).

N. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.

O. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

P. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.

Q. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service.

R. All fire hydrants shall meet jurdictional requirements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities. Provide utility mark up to engineer recording all changes to the plans.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with Klickitat County and Uniform Plumbing Code requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe: AWWA C151:
   1. Fittings: Ductile iron, standard thickness.
   2. Joints: AWWA C111, rubber gasket with rods.

B. Copper Tubing: ASTM B88, Type K, annealed:

C. PVC Pipe: ASTM D1785, Schedule 40.
   1. Fittings: ASTM D2466, PVC.
   2. Joints: ASTM D2855, solvent weld.

D. PVC Pipe: AWWA C900 Class 100:
   1. Fittings: AWWA C111, cast iron.
   2. Joints: ASTM D3139 compression gasket ring.

E. Polyethylene Pipe: ASTM D3035, for 45 psig pressure rating:
   1. Fittings: AWWA C901, molded or fabricated.
   2. Joints: Compression.

F. Tracer Wire: Blue, 18 gauge insulated copper wire or greater, as required by the 2012 Uniform Plumbing Code.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves Up To 3 Inches:
   1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, and extension box.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

C. Gate Valves 3 Inches and Over:
   1. AWWA C500, iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, and extension box.

D. Butterfly Valves From 2 Inches to 24 Inches:
   1. AWWA C504, iron body, bronze disc, resilient replaceable seat, water or lug ends, ten position lever handle.

2.03 HYDRANTS

A. Hydrants: Type as required by Klickitat County.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 00 00 - Earthwork.

B. Cover: As specified in Section 31 00 00 - Earthwork.

2.05 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.

B. Mechanical restraint as specified on the plans.

C. Backflow Preventer: as required by Klickitat County and Uniform Plumbing Code.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

A. As specified in section 31 00 00 - Earthwork

3.04 INSTALLATION - PIPE

A. Maintain separation of water main from sewer piping in accordance with the Uniform Plumbing Code.

B. Install ductile iron piping and fittings to AWWA C600.

C. Route pipe in straight line.

D. Install pipe to allow for expansion and contraction without stressing pipe or joints.

E. Slope water pipe and position drains at low points.

3.05 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.

3.06 FIELD QUALITY CONTROL

A. Perform field inspections as required by tKlickitat County and Uniform Plumbing Code.

B. Provide pressure testing and disinfection as required by the Uniform Plumbing Code.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

SECTION 33 31 11

SITE SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories. NOTE: These specifications do not apply to public work.

B. Connection of building sanitary drainage system to municipal sewers.

C. Cleanout Access.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.

B. Section 31 00 00 - Earthwork

C. Section 33 05 13 - Manholes and Structures.

1.03 REFERENCE STANDARDS

A. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

B. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe and pipe accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Project Record Documents:
   1. Record location of pipe runs, connections, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with Klickitat County and the Uniform Plumbing Code requirements.

B. Plastic Pipe: ASTM D3034, Type PSM, Poly(Vinyl Chloride) (PVC) material; inside nominal diameter of (as shown on the plans) inches, bell and spigot style solvent sealed joint end.

C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 PIPE ACCESSORIES

A. Tracer Wire: Blue, 18 gauge insulated copper wire or greater, as required by the Uniform Plumbing Code.

2.03 CLEANOUT MANHOLE

A. Lid and Frame: Cast iron construction, hinged lid.

2.04 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 31 00 00 - Earthwork.

B. Pipe Cover Material: As specified in Section 31 00 00 - Earthwork.

PART 3 EXECUTION

3.01 GENERAL

A. Perform work in accordance with applicable Klickitat County and the Uniform Plumbing Code requirements.

3.02 TRENCHING

A. See Section 31 00 00 for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

3.04 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 FIELD QUALITY CONTROL

A. Perform field inspections as required by Klickitat County and the Uniform Plumbing Code requirements.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.06 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 41 11

SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

B. Catch basins, Plant area drains, Paved area drainage, and Site surface drainage.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.

B. Section 31 00 00 - Earthwork.

C. Section 33 05 13 - Manholes and Structures.

1.03 REFERENCE STANDARDS

A. AASHTO M 252 - Standard Specification for Corrugated Polyethylene Drainage Pipe.

B. AASHTO M 294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-MM (12- to 60-in.) Diameter.

C. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

D. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

E. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe and pipe accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Project Record Documents:
   1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe: ASTM D3034, Type PSM, Poly(Vinyl Chloride) (PVC) material; inside nominal diameter of (as shown on the plans) inches, bell and spigot style solvent sealed joint end.

C. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated wall pipe with integrally formed smooth liner; inside nominal diameter of (as shown on the plans) inch, meeting the requirements of AASHTO M252, Type S, for diameters between 3 inches and 10 inches and AASHTO M294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Tracer Wire: Blue, 18 gauge insulated copper wire or greater, as required by the Uniform Plumbing Code.

2.03 CATCH BASIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. As shown on the plans and as allowed by Klickitat County and the Uniform Plumbing Code requirements.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 00 00 - Earthwork.

B. Cover: As specified in Section 31 00 00 - Earthwork.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 00 00 for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Connect to building storm drainage system, foundation drainage system.

3.03 INSTALLATION - CATCH BASINS, TRENCH DRAINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. Perform field inspections as required by Klickitat County and the Uniform Plumbing Code requirements.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

APPENDIX ONE

Report of Geotechnical Investigation Report
By Earth Engineers, Inc.
June 15, 2020
Revised July 6, 2020

Addendum
July 31, 2020

Earth Engineers, Inc.

2411 Southeast 8th Avenue ● Camas ● WA 98607
Phone: 360-567-1806 ● Fax: 360-253-8624
www.earth-engineers.com

June 15, 2020
Revised July 6, 2020

Port of Klickitat
154 East Bingen Point Way, Suite A
Bingen, Washington 98605
Attention: Bill Schmitt

Phone: (509) 261-2511
Email: kcfd13@hotmail.com

Subject: **Geotechnical Investigation Report**
Proposed Building C – Dallesport Industrial Park, Lot 39
151 South Parallel Avenue
Dallesport, Washington
EEI Report No. 20-079-1-*R1*

Dear Mr. Schmitt,

Earth Engineers, Inc. (EEI) is pleased to transmit our Geotechnical Investigation Report for the above referenced project. This report includes the results of our field investigation, an evaluation of geotechnical factors that may influence the proposed construction, and geotechnical recommendations for the proposed structure and general site development. ***This report has been revised to reflect the fact that the project will be designed in accordance with the 2015 International Building Code and ASCE 7-10. Revision additions are noted in bold italic font.***

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office at 360-567-1806.

Sincerely,
Earth Engineers, Inc.

Troy Hull, P.E.
Principal Geotechnical Engineer

Yonggui Xie, E.I.T
Geotechnical Engineering Associate

Attachment: Geotechnical Investigation Report

Distribution (electronic copy only): Addressee

GEOTECHNICAL INVESTIGATION REPORT

for the

Proposed Building C –
Dallesport Industrial Park, Lot 39
151 South Parallel Avenue
Dallesport, Washington

Prepared for

Port of Klickitat
154 East Bingen Point Way, Suite A
Bingen, Washington 98605
Attention: Bill Schmitt

Prepared by

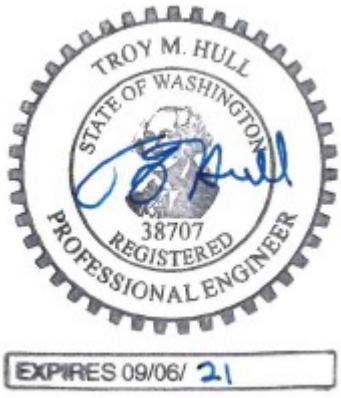
Earth Engineers, Inc.
2411 Southeast 8th Avenue
Camas, Washington 98607
Telephone (360) 567-1806
Fax (360) 253-8624

EEI Report No. 20-079-1-*R1*

June 15, 2020
Revised July 6, 2020

Earth Engineers, Inc.

Yonggui Xie, E.I.T
Geotechnical Engineering Associate



Troy Hull, P.E.
Principal Geotechnical Engineer

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1.0 PROJECT INFORMATION

1.1 Project Authorization

Earth Engineers, Inc. (EEI) has completed a geotechnical investigation for the proposed 50,000 square foot building and 10 parking spaces to be built on Lot 39 of the Dallesport Industrial Park located at 151 South Parallel Avenue in Dallesport, Klickitat County, Washington. Our services were authorized by Mr. Bill Schmitt, as a representative of the Port of Klickitat, on May 5, 2020 by signing EEI Proposal No. 20-P121, which was issued on the same date.

1.2 Project Description

Our current understanding of the project is based on the information provided to EEI by Bill Schmitt via email and phone conversations. Additionally, we were provided a drawing titled "Overall Site Plan, Port of Klickitat Speculative Industrial Development," by Mackenzie (the project architect).

Briefly, we understand the overall development plan for Lot 39 consists of 5 buildings (A through E), but the Port only plans to construct Building C at this time and our scope is to only address Building C. The proposed building will be 5,000 square feet and it will have 10 parking spaces. The location of Building C is shown in Figure 1.

The project is still in the initial design stage and there are currently no construction drawings or grading plans. For the purposes of this proposal, we are assuming maximum foundation loads of 5 kips per linear foot for wall footings, 75 kips for column footings, and 150 psf for floor slabs. With regard to design grades, we are assuming that cuts and fills will be limited to about 2 feet. Other than underground utilities, we have assumed there will be no below grade construction. Finally, we have assumed that the building will be constructed in accordance with the ***2015*** International Building Code (IBC) and ASCE ***7-10***.

As part of our due diligence, we reviewed the Washington Department of Natural Resource Maps – Washington Geologic Information Portal (https://geologyportal.dnr.wa.gov/#natural_hazards) and found that the site is located in very low to low liquefaction hazard zone and strong expected earthshaking zone. In addition, localized areas around the property are mapped as having low risk of land sliding. Finally, no mapped or historical landslides are shown on the property.

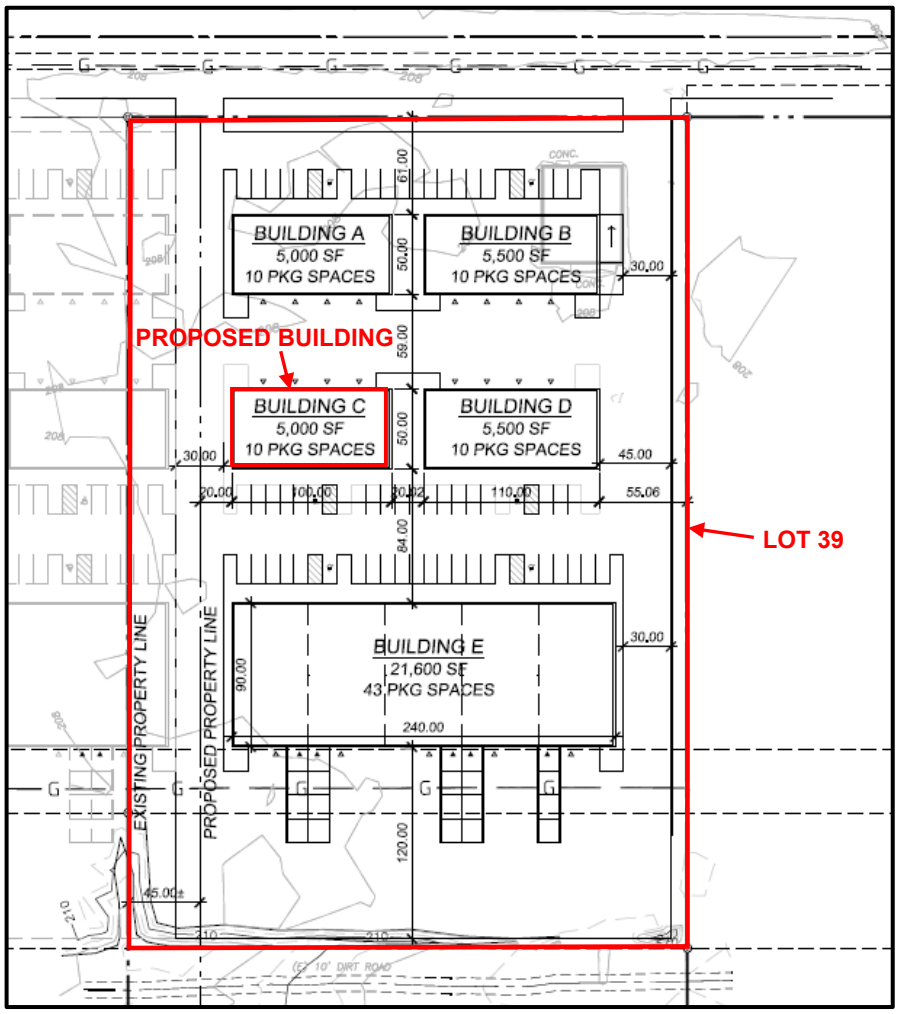


Figure 1: Proposed Building C (base drawing source: referenced above)

1.3 Purpose and Scope of Services

The purpose of our services was to explore the subsurface conditions at the site to better define the subsurface soil, rock, and groundwater properties in order to provide geotechnical related recommendations for the proposed construction. Our site investigation consisted of excavating 3 test pits (TP-1 trough TP-3) around the proposed building footprint (which had been staked prior to our arrival on site) to depths ranging between 6 to 10 feet below the existing ground surface (bgs). The test pits were excavated using a Case 590 Super L excavator with a 1.5 foot wide toothed bucket provided by the Port. Soil samples were collected at the discretion of the Geotechnical Engineer's representative and returned to our office for laboratory testing.

In addition to the test pits described above, we used test pit TP-3 for the purposes of performing an infiltration test with 3 trials (IT-1, IT-2, and IT-3).

Laboratory testing was performed on select test pit grab samples as well as a sample from the bottom of the infiltration test pit in general accordance with ASTM procedures; the testing

performed included “Moisture Content” (ASTM D2216), “Soil Particle Size” (ASTM D1140), and classification of soils “Unified Soil Classification System” (ASTM D2487 and D2488).

This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- A discussion of subsurface conditions encountered including pertinent soil and groundwater conditions.
- Seismic design parameters in accordance with ASCE ***7-10***.
- Geotechnical related recommendations for foundation design including allowable bearing capacity, minimum footing dimensions and estimated settlements.
- Structural fill recommendations, including an evaluation of whether the in-situ soils can be used as structural fill.
- Retaining wall recommendations, including earth pressures, drainage, and backfill.
- Floor slab support recommendations.
- Pavement section thickness recommendations based on an assumed CBR value and assumed traffic loading conditions.
- Other discussion on geotechnical issues that may impact the project.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The site is located on a portion of Lot 39 of Dallesport Industrial Park, at 151 South Parallel Avenue, Dallesport, Klickitat County, Washington. The site is bounded to the east by South Parallel Avenue, to the south by The Dalles Fruit Company, and to the north and west by undeveloped property. The project site is vacant and is covered by gravel. In terms of topography, the majority of the area within the footprint of the new building is generally level. The current condition can be seen from Photo 1 and 2.

Figure 2: Overview of site showing approximate Building C footprint (base aerial photo source – Google Earth)

Photo 1: Looking west at the site.

Photo 2: Looking east at the site.

2.2 Mapped Soils and Geology

The underlying geologic units at the subject property are mapped as "Tf – Freshman Springs Member. Basalt flows of Freshman Springs chemical type. Many flows contain irregularly distributed plagioclase glomerocrysts as much as 50mm across, but some flows, particularly younger ones, are virtually aphyric; generally fine to medium grained[1]."

The surface soils in the area are mapped by the USDA Soil Survey as "105-Ewall loamy sand, 0 to 8 percent slopes. The Ewall loamy sand consists of excessively drained soils formed in old alluvium and the underlying colluvium weathered from consolidated and semiconsolidated tuffaceous sandstone on uplands. Runoff is medium, and the hazard of erosion is moderate[2]."

2.3 Subsurface Materials

As stated above, our site investigation consisted of 3 test pit explorations excavated within the footprint of Building C. The test pits were excavated using a Case 590 Super L excavator with a 1.5 foot wide toothed bucket provided by the Port. For the approximate exploration locations, see Appendix B.

Gravel Fill

Gravel fill was encountered as the surficial layer in all of the exploration locations. This layer consisted of dry, dark grey gravel with silty sand. The thickness of this stratum was about 12 inches in all of our explorations.

NATIVE SILTY SAND (SM)

Beneath the gravel fill described above, we encountered native, moist, medium dense silty sand in all explorations, which extended to depth of 4 to 7 feet below ground surface (bgs). The moisture content ranged from 6 to 12 percent in this layer. Fines content (material passing the #200 sieve) of the samples tested ranged between 18 and 23 percent as reflected in the USCS classifications shown on the exploration logs.

NATIVE CLEAN SAND (SP)

Beneath the silty sand, we encountered native, moist, medium dense, medium coarse sand in all explorations, which extended to bottom of each exploration. The moisture content ranged from 5 to 9 percent in this layer. Fines content (material passing the #200 sieve) of the samples tested ranged between 1 and 6 percent as reflected in the USCS classifications shown on the exploration logs.

[1] Korosec, M.A., 1987, Geologic map of the Hood River quadrangle, Washington and Oregon: Washington Division of Geology and Earth Resources, Open File Report 87-6, scale 1:100,000.
[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/ .

The classifications noted above were made in accordance with the Unified Soil Classification System (USCS) as shown in Appendix D. The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The exploration logs included in Appendix C should be reviewed for specific information at specific locations. These records include soil descriptions, stratifications, and locations of the samples. The stratifications shown on the logs represent the conditions only at the actual exploration locations. It should be noted that the explorations performed are not adequate to accurately identify the full extent of existing fill across the site. Consequently, the actual fill extent may be much greater than that shown on the exploration logs and discussed herein. Variations may occur and should be expected between locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on these logs. The samples that were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

2.4 Groundwater Information

Groundwater was not encountered in our test pits at the time of exploration. According to local well logs (available from https://appswr.ecology.wa.gov/wellconstruction/map) drilled in Dallesport Industrial Park and The Dalles Fruit Company, which are 0.3 miles to the west and 0.2 miles to the south of the current site, those wells had static groundwater between 25 and 55 feet bgs. These well logs are included for the reader's convenience in Appendix F. Water table elevations can fluctuate seasonally, especially during periods of extended wet or dry weather or from changes in land use.

2.5 Seismicity

In accordance with ASCE ***7-10***, we recommend a Site Class D (stiff soil profile) with an average standard penetration resistance of between 15 and 50 blows per foot when considering the average of the upper 100 feet of bearing material beneath the proposed foundations. This recommendation is based on our drive probe blow counts, as well as our local knowledge of the area geology.

Inputting our recommended Site Class as well as the site latitude and longitude into the Structural Engineers Association of California (SEAOC) – OSHPD Seismic Design Maps website (http://seismicmaps.org) which is based on the United States Geological Survey, we obtained the seismic design parameters shown in Table 1 below.

Table 1: Seismic Design Parameter Recommendations (ASCE ***7-10)***

PARAMETER	RECOMMENDATION
Site Class	D
S_s	***0.479g***
S_1	***0.218g***
F_a	***1.417***
F_v	***1.963***
S_{MS} (=S_s x F_a)	***0.678g***
S_{M1} (=S_1 x F_v)	***0.429g***
S_{DS} (=2/3 x S_s x F_a)	***0.452g***
Design PGA (=S_{DS} / 2.5)	***0.181g***
MCE_G PGA	***0.197g***
F_{PGA}	***1.406***
PGA_M (MCE_G PGA * F_{PGA})	***0.277g***

Note: Site latitude = 45.6239, longitude = -121.1403

The return interval for the ground motions reported in the table above is 2 percent probability of exceedance in 50 years.

2.6 Infiltration Test Data

As part of our scope of services we performed an infiltration test at this site. One test pit (TP-3) was excavated for the testing in the northwest corner of the project site to 6 feet bgs. The location (shown in Appendix B) and depth were determined between Bill Schmitt and EEI.

The infiltration testing was conducted in general accordance with the 1980 EPA encased falling head test procedure. The test consisted of 3 trials (IT-1 through IT-3) and each trial consisted of placing one 6-inch diameter PVC pipe and seating it at least 6-inches past the terminal depth of the test pit. Samples were taken from the bottom of the test pit and returned to our laboratory for testing that included moisture content and grain size/fines content analyses. After seating the pipes, 2 to 3-inches of clean gravel was placed in the bottom of the pipes to prevent scouring and at least 24 inches of water was then placed into the pipes and allowed to pre-soak.

After the pre-soak, we placed another 12-inches of clean water in each of the pipes and timed the fall of the water until consistent results were observed. The results of our infiltration tests are shown in Table 3 below.

These results should be considered ultimate values and do not include a factor of safety. We recommend that during construction, a field verification test be performed to ensure the infiltration rates during construction are consistent with the values shown below in Table 3.

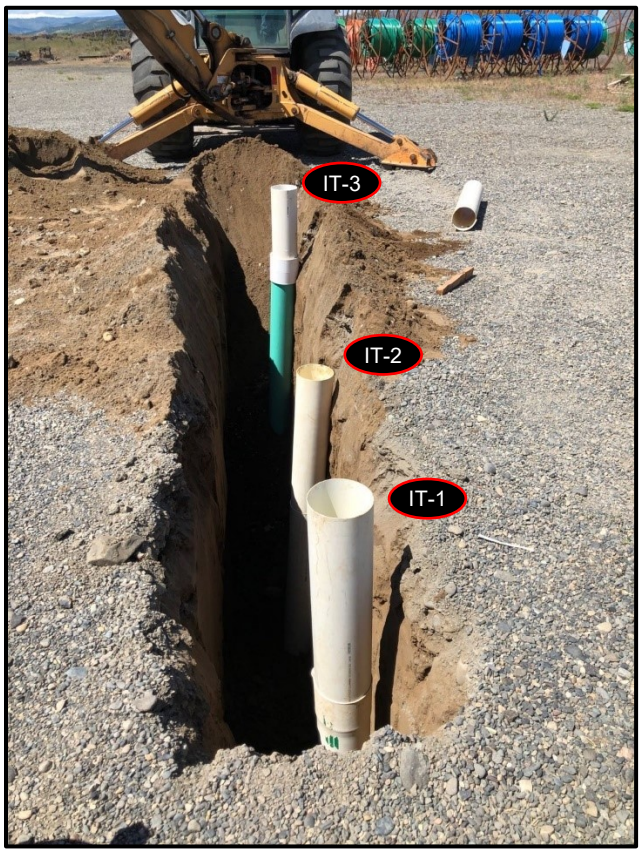


Photo 3: Infiltration test setup in test pit TP-3, looking west.

Table 3: Infiltration Test Results by Trial.

Test #	Depth (feet)	% Fines	Soil Description	% Moisture	Infiltration Rate (inches/hour)*
IT-1	6	1	Dark grey, clean sand with few silt, moist	9	>100
IT-2		5		7	>100
IT-3		5		6	>100

*No safety factors have been provided in the rates above.

3.0 EVALUATION AND FOUNDATION RECOMMENDATIONS

3.1 Geotechnical Discussion

The primary factors influencing the proposed construction include:

1. **Temporary Excavations** – Given the granular and/or fine grained nature of the soils at this site, these soils fall into OSHA Class C soils. Class C soils should be sloped at a maximum slope of 1.5H:1V.

2. **Lack of detailed design drawings –** We have not been provided with a design drawing set for Building C. We should review those drawings to determine if the design complies with our recommendations or if our recommendations need to be modified.

In summary, provided the recommendations in this report are adhered to, we do not foresee any major issues that would preclude site development or the proposed construction. The above mentioned factors are listed to draw the attention of the reader to the issues to address during design and construction of the proposed building.

3.2 Site Preparation

We envision that topsoil, any obvious fill soils containing organics or demolition debris, and any other deleterious soils will need to be stripped from beneath the proposed improvement areas. Granular soils present in the footing subgrades and/or slab areas should be wetted and heavily re-compacted to a minimum of 95% of ASTM 1557 (Modified Proctor). This is due to the fact that granular soils typically loosen when they are disturbed during the excavation process.

Any utilities present beneath the proposed construction will need to be located and rerouted as necessary and any abandoned pipes or utility conduits should be removed to inhibit the potential for subsurface erosion. Utility trench excavations should be backfilled with properly compacted structural fill in accordance with Section 3.3.

It should be noted that typically (prior to construction) it is recommended that the contractor locate the geotechnical test pits, excavate to the termination depth shown on the logs, and backfill with compacted native material and/or structural fill under the observation of the Geotechnical Engineer.

3.3 Structural Fill

Structural fill should be free of organics or other deleterious materials, have a maximum particle size less than 3 inches, be relatively well graded, and have a liquid limit less than 45 and plasticity index less than 25. In our professional opinion, the on-site granular soils are appropriate for use

as structural fill. We recommend fill be moisture conditioned to within 3 percentage points below and 2 percentage points above optimum moisture as determined by ASTM D1557 (Modified Proctor). If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

Fill should be placed in relatively uniform horizontal lifts on the prepared subgrade which has been stripped of deleterious materials (i.e. topsoil and deleterious fill) and approved by the Geotechnical Engineer or his representative. Each loose lift should be about 1-foot thick. The type of compaction equipment used will ultimately determine the maximum lift thickness. Each lift of compacted engineered fill should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557, and tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

3.4 Foundation Recommendations

Once the site has been properly prepared as discussed above, the planned construction can be supported on conventional shallow foundations bearing on properly re-compacted native, silty sands. Shallow footings for building columns and continuous footings for bearing walls can be designed for an allowable soil bearing pressure of 3,000 psf, based on dead load plus design live load, and can be increased by one-third when including short-term wind or seismic loads. Minimum footing dimensions should be 18 inches for continuous wall footings and 24 inches for isolated column footings.

Lateral frictional resistance between the base of footings and the subgrade can be expressed as the applied vertical load multiplied by a coefficient of friction of 0.35 for concrete foundations bearing directly on recompacted native, silty sands or on properly compacted structural fill placed upon that stratum. In addition, lateral loads may be resisted by passive earth pressures based on an equivalent fluid pressure of 275 pounds per cubic foot (pcf) for footings poured “neat” against the native soils, or properly backfilled structural fill. These are ultimate values—we recommend a factor of safety of 1.5 be applied to the equivalent fluid pressure, which is appropriate due to the amount of movement required to develop full passive resistance. To be clear, a safety factor has not been included with the recommended friction factor above either.

Exterior footings and foundations in unheated areas should be located at a depth of at least 24 inches below the final exterior grade to provide adequate frost protection. If the building is to be constructed during the winter months or if the foundation soils will likely be subjected to freezing temperatures after foundation construction, then the foundation soils should be adequately protected from freezing. Otherwise, interior foundations can be located at nominal depths compatible with architectural and structural considerations.

We estimate that shallow foundations designed and constructed in accordance with the above recommendations will experience total static settlements on the order of 1-inch with differential settlements on the order of ½-inch from column to column.

The foundation excavations should be observed by a representative of EEI prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Unsuitable soil zones encountered at the bottom of the foundation excavations should be removed as directed by the Geotechnical Engineer.

After opening, foundation excavations should be observed and concrete placed as quickly as possible to avoid exposure of the excavation bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. If it is required that foundation excavations be left open for more than two days, they should be protected to reduce evaporation or entry of moisture by placement of a 6-inch layer of compacted, crushed, import rock or by covering the subgrades with plastic and collecting the runoff in a low point or allowed to sheet flow non-foundation/slab areas.

3.5 Floor Slabs

Based on the existing soil conditions, the design of slabs-on-grade can be based on a subgrade modulus (k) of 150 pci. This subgrade modulus value represents an anticipated value which would be obtained in a standard in-situ plate test with a 1-foot square plate. Use of this subgrade modulus for design or other on-grade structural elements should include appropriate modification based on dimensions as necessary.

As stated above, we recommend any granular soils in the subgrade be moisture conditioned and re-compacted to 95 percent of ASTM 1557. Silt soils should not be recompacted as it may have the opposite effect of softening the subgrade. A proof-roll with a fully loaded dump truck should be performed to confirm the subgrade is suitable. It is possible that there will be areas that are yielding that will require correction prior to pavement/floor slab construction (i.e. ripping wet subgrade soils with the teeth of a dozer to dry them out, and/or re-compacting soils that are soft/loose).

In order to provide a localized (i.e. shallow) uniform subgrade reaction beneath any proposed slabs-on-grade, we recommend that a minimum 6-inch thick, free draining, granular mat be placed beneath the floor slab to enhance drainage and provide a capillary break to limit migration of moisture through the slab and provide increased subgrade strength given the likelihood the majority of the building pad will have exposed silt soils at the surface. If additional protection against moisture vapor is desired a suitable vapor retarding membrane may also be incorporated into the design and can be placed on the granular mat to act as a vapor barrier as required by codes or manufacturer requirements. Factors such as cost, special considerations for construction and the specific floor coverings suggest that decisions on the use of vapor retarding membranes be made by the architect and the owner. The floor slabs should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

3.6 Retaining Walls

At this time, we are not aware of specific retaining wall plans for the project. As such, we are providing these preliminary recommendations to assist the Structural Engineer in designing retaining walls, if required. Once more detailed plans are known about retaining walls (if any), we should be provided that information so that we can update our recommendations if determined to be necessary.

Lateral earth pressures on walls, which are not restrained at the top, may be calculated on the basis of an "active" equivalent fluid pressure of 35 pcf for level backfill, and 60 pcf for sloping backfill with a maximum 2H:1V slope. Lateral earth pressures on walls that are restrained from yielding at the top (i.e. stem walls) may be calculated on the basis of an "at-rest" equivalent fluid pressure of 55 pcf for level backfill, and 90 pcf for sloping backfill with a maximum 2H:1V slope. The stated equivalent fluid pressures do not include surcharge loads, such as foundation, vehicle, equipment, etc., adjacent to walls, hydrostatic pressure buildup, or earthquake loading. Surcharge loads on walls should be calculated based on the attached calculations/formulas shown in Appendix E.

For seismic loading on retaining walls with level backfill, new research indicates that the seismic load is to be applied at 1/3 H of the wall instead of 2/3 H, where H is the height of the wall. We recommend that a Mononobe-Okabe earthquake thrust per linear foot of 3.3 psf* H^2 be applied at 1/3 H, where H is the height of the wall measured in feet. For a maximum 2H:1V slope we recommend 13.1 psf*H^2. This assumes a granular backfill/native sandy gravel and cobbles retained by the walls.

All backfill for retaining walls should be select granular material, such as sand or crushed rock with a maximum particle size between ¾ and 1 ½ inches, having less than 5 percent material passing the No. 200 sieve. Because of their silt content, the native soils do not meet this requirement, and it will be necessary to import material to the project for backfill. Silty soils can be used for the last 18 to 24 inches of backfill, thus acting as a seal to the granular backfill. All backfill behind retaining walls should be moisture conditioned to within ± 2 percent of optimum moisture content, and compacted to a minimum of 90 percent of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Fill materials should be placed in layers that, when compacted, do not exceed about 8 inches. Care in the placement and compaction of fill behind retaining walls must be taken in order to ensure that undue lateral loads are not placed on the walls.

An adequate subsurface drain system will need to be designed and installed behind retaining walls to prevent hydrostatic buildup. A waterproofing system should also be designed for any basement walls where moisture intrusion is not desirable.

3.7 Pavement Recommendations

After pavement subgrades have been stripped, the exposed pavement subgrade soil should be proofrolled with a fully loaded dual axle dump truck before the placement of any imported granular fill base rock. Areas found to be soft or yielding under the weight of the dump truck should be overexcavated as recommended by an EEI representative and replaced with properly compacted granular structural fill.

The recommended pavement section thicknesses presented below should be considered typical and minimum for the assumed traffic loading parameters and assumed California Bearing Ratio (CBR) value of 20. Using the ASSHTO method of flexible pavement design, the following design parameters have been assumed:

- Pavement design life of 20 years.
- Terminal serviceability (P_t) of 2 (i.e. poor condition).
- A regional factor (R) of 3.0 (generally moderate weather conditions).
- 18,000-pound equivalent single axle load (ESAL) of 5 per day for parking and 10 ESALs per day for driveways.

The project Civil Engineer should review our assumptions to confirm they are appropriate for the anticipated traffic loading. Using the above assumptions, we recommend the following typical "standard" pavement section for the proposed development of the property. The tables below summarize our recommendations for asphaltic concrete and concrete pavement sections, and pervious concrete base course, respectively.

Table 4: Asphaltic Concrete Section Recommended Minimum Thicknesses

PAVEMENT MATERIAL	CAR PARKING	DRIVEWAY
Asphaltic Concrete (inches)	2	2.5
Crushed Aggregate Base Course (inches) underlain by Mirafi 500X or equivalent	6	6

Asphalt pavement base course material should consist of a well-graded 1½-inch or ¾-inch-minus crushed rock having less than 5 percent material passing the No. 200 sieve. The base course and asphaltic concrete materials should conform to the requirements set forth in the latest edition of the State of Washington Standard Specifications for Highway Construction. Base course material should be moisture conditioned to within ± 2 percent of optimum moisture content, and compacted to a minimum of 95 percent of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Fill materials should be placed in layers that, when compacted, do not exceed about 8 inches. Asphaltic concrete material should be compacted to at least 91 percent of the material's theoretical maximum density as determined in accordance ASTM D2041 (Rice Specific Gravity).

A representative of the Geotechnical Engineer should approve any selected granular fill material before importing it to the site. Each lift of compacted engineered fill should be evaluated by a

representative of the Geotechnical Engineer prior to placement of subsequent lifts. The base course fill should extend horizontally outward beyond the exterior perimeter of the pavement at least three feet, prior to sloping.

In order to achieve the assumed 20-year design life, pavement does need regular maintenance to protect the underlying subgrade from being damaged. The primary concern is subgrade saturation which can cause it to weaken. Proper site drainage should be maintained to protect pavement areas. In addition, cracks that develop in the pavement should be sealed on a regular basis.

4.0 CONSTRUCTION CONSIDERATIONS

EEI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. EEI cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of the foundations if not engaged to also provide construction observation for this project.

4.1 Moisture Sensitive Soils/Weather Related Concerns

During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Given the probability that the majority of the building pad will have exposed fine grained soils at the surface the subgrade should be proofrolled and the compacted structural fill mat placed as soon as possible if construction takes place during wet weather. Soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

4.2 Drainage and Groundwater Considerations

Water should not be allowed to collect in the foundation excavations or on prepared subgrades for the floor slab during construction. Positive site drainage should be maintained throughout construction activities. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff.

The site grading plan should be developed to provide rapid drainage of surface water away from the building areas and to inhibit infiltration of surface water around the perimeter of the building and beneath the floor slab. The grades should be sloped away from the building area.

As stated above, the stormwater is planned to be disposed of in a detention pond/infiltration facility to be constructed in the northeast corner of the lot.

4.3 Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document and subsequent updates were issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. EEI does not assume responsibility for construction site safety or the contractor's compliance with local, state, and federal safety or other regulations.

5.0 REPORT LIMITATIONS

As is standard practice in the geotechnical industry, the conclusions contained in our report are considered preliminary because they are based on assumptions made about the soil, rock, and groundwater conditions exposed at the site during our subsurface investigation. A more complete extent of the actual subsurface conditions can only be identified when they are exposed during construction. Therefore, EEI should be retained as your consultant during construction to observe the actual conditions and to provide our final conclusions. If a different geotechnical consultant is retained to perform geotechnical inspection during construction then they should be relied upon to provide final design conclusions and recommendations, and should assume the role of geotechnical engineer of record.

The geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform EEI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. EEI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

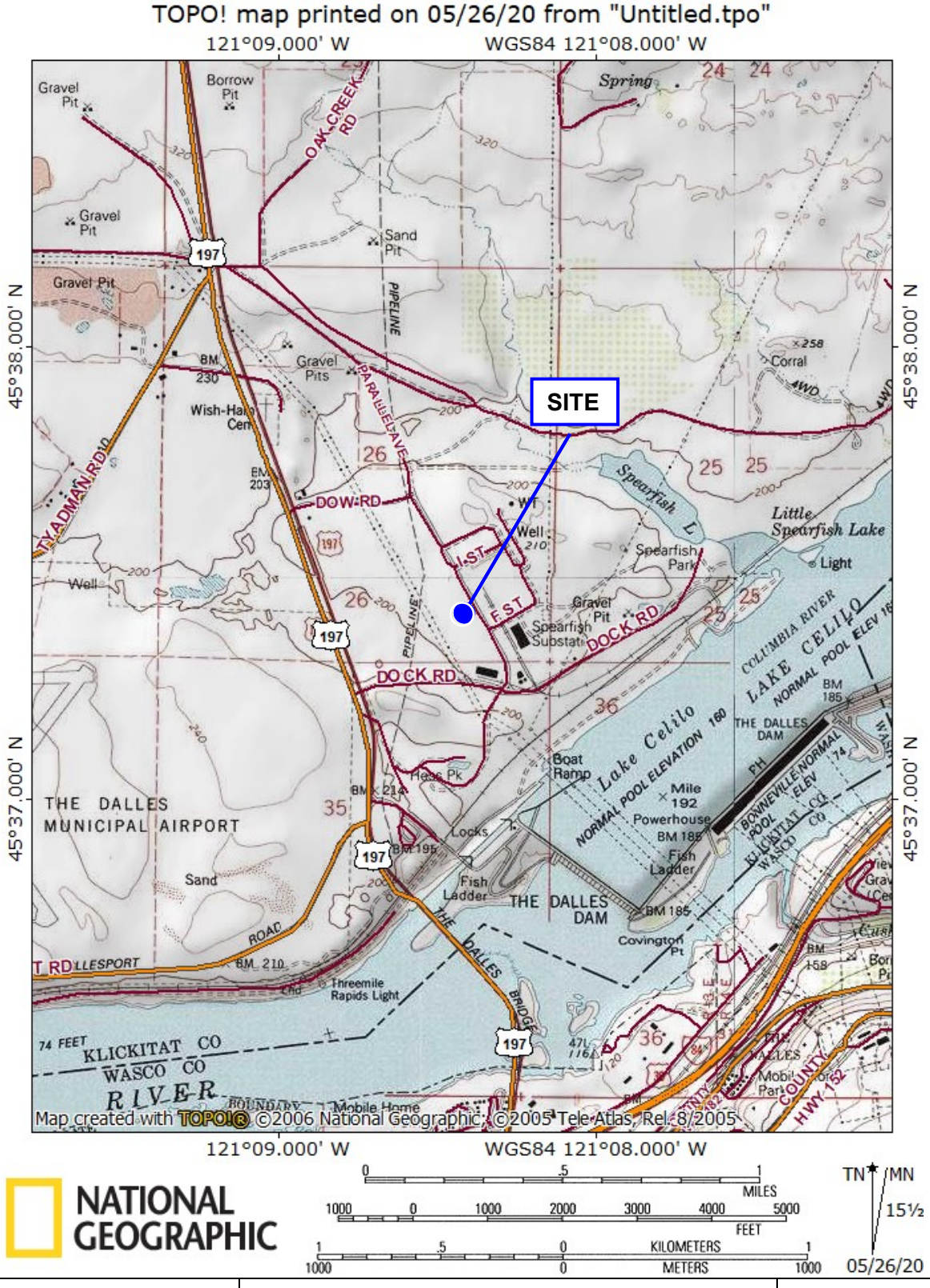
Once construction plans are finalized and a grading plan has been prepared, EEI should be retained to review those plans, and modify our existing recommendations related to the proposed construction, if determined to be necessary.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of the Port of Klickitat for the specific application to the proposed Building C development on Lot 39 of Dallesport Industrial Park, located at 151 South Parallel Avenue in Dallesport, Washington. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

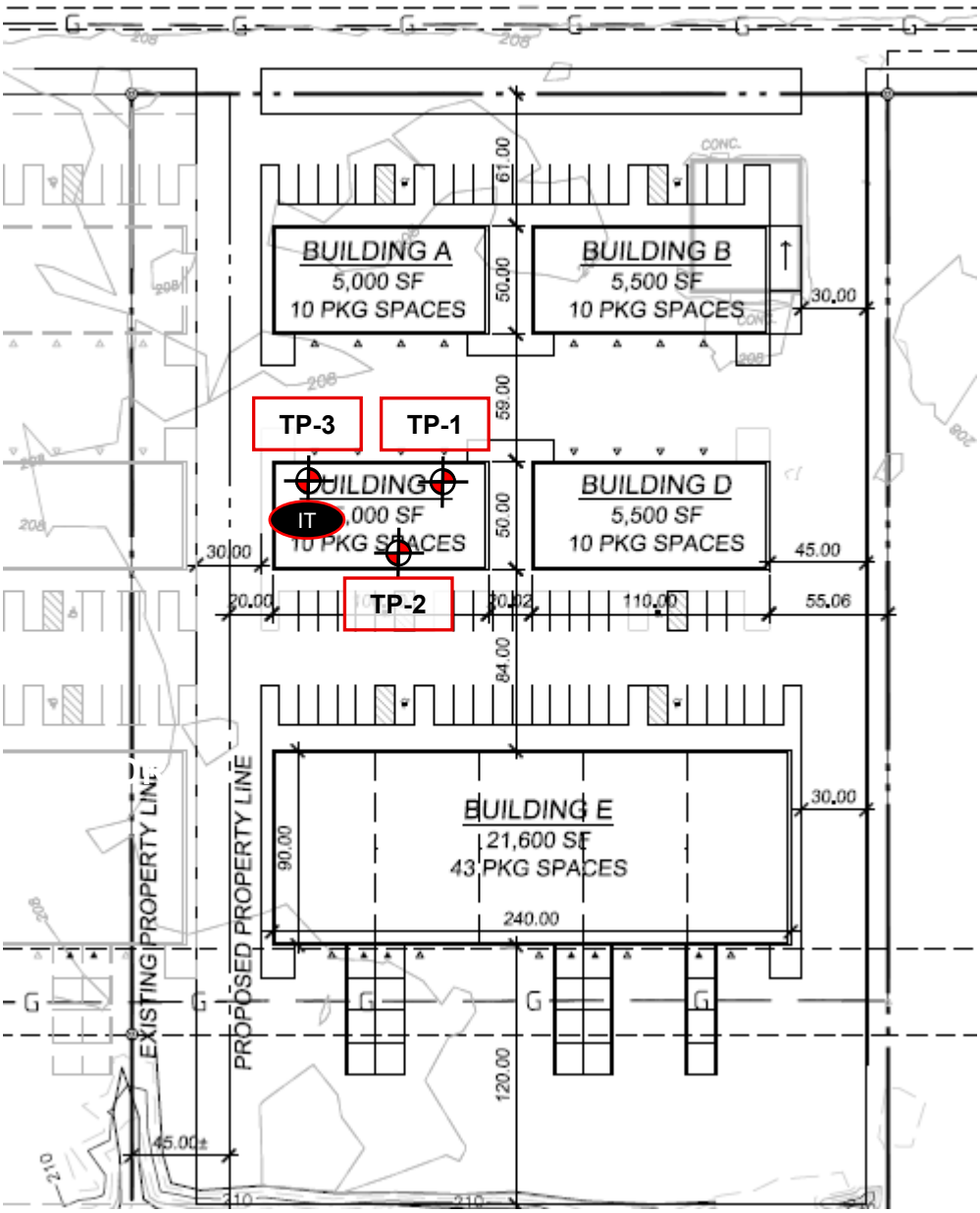
APPENDICES

APPENDIX A – SITE LOCATION PLAN



Earth Engineers, Inc.	**Proposed Building C** **Dallesport Industrial Park, Lot 39** **151 South Parallel Avenue** **Dallesport, Washington**	**Report No.** **20-079-1-*R1***
		June 15, 2020 **Revised July 6, 2020**

APPENDIX B – SITE EXPLORATION PLAN



= Approximate Exploration Location

IT = Approximate Infiltration Location

Source: Overall Site Plan

Earth Engineers, Inc.	**Proposed Building C** **Dallesport Industrial Park, Lot 39** **151 South Parallel Avenue** **Dallesport, Washington**	**Report No.** **20-079-1-*R1***
		June 15, 2020 ***Revised July 6, 2020***

Appendix C: Test Pit TP-1

Earth Engineers, Inc.

Client: Bill Schmitt
Project: Building C
Site Address: 151 Parallel Avenue, Dallesport, WA
Location of Test Pit: See Appendix B
Date Excavated: 5/22/2020
Logged By: YX

Report Number: 20-079-1
Excavation Contractor: Port of Klickitat
Excavation Method: Excavator with 1.5' toothed bucket
Excavation Equipment: Case 590 Super L
Approximate Elevation (ft msl): 200'

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Sampling Data: Drive Probe Blows Per 6 Inches	Sampling Data: % Passing #200 Sieve	Sampling Data: Liquid Limit	Sampling Data: Plastic Limit	Sampling Data: Moisture Content (%)	Remarks
0			FILL - Gravel with silty sand, dry		40, 42					
1			SM - Medium dense, brown, silty sand with a few cobbles, moist	GRAB 1	19	18			8	
2					20, 18					
3					21, 22					
4				GRAB 2	23				11	
5					27, 30, 26					
6				GRAB 3	27	1			5	
7			SP - Medium dense, dark grey, clean sand with little fines, moist		30, 26, 28					
8				GRAB 4	29				5	
9										
10				GRAB 5					5	

Notes : Test pit terminated at a depth of approximately 10 feet bgs due to cave in. Groundwater was not encountered at the time of our exploration. Test pit loosely backfilled with excavated soil on 5/22/2020. Approximate Elevation from Google Earth.

Appendix C: Test Pit TP-2

Earth Engineers, Inc.

Client: Bill Schmitt
Project: Building C
Site Address: 151 Parallel Avenue, Dallesport, WA
Location of Test Pit: See Appendix B
Date Excavated: 5/22/2020
Logged By: YX

Report Number: 20-079-1
Excavation Contractor: Port of Klickitat
Excavation Method: Excavator with 1.5' toothed bucket
Excavation Equipment: Case 590 Super L
Approximate Elevation (ft msl): 200'

Depth (ft)	Water Level	Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Drive Probe Blows Per 6 Inches	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Moisture Content (%)	Remarks
0			FILL - Gravel with silty sand, dry		40, 43					
1			SM - Medium dense, brown, silty sand with a few cobbles, moist	GRAB 1	20				12	
2					21, 23					
3					30, 24					
4				GRAB 2	23	23			11	
5					22, 21, 27					
6				GRAB 3	28, 30, 29	6			9	
7			SP - Medium dense to dense, dark grey, clean sand with little fines, moist		31					
8				GRAB 4	29				7	
9										
10				GRAB 5					5	

Notes : Test pit terminated at a depth of approximately 10 feet bgs due to cave in. Groundwater was not encountered at the time of our exploration. Test pit loosely backfilled with excavated soil on 5/22/2020. Approximate Elevation from Google Earth.

Appendix C: Test Pit TP-3

Earth Engineers, Inc.

Client: Bill Schmitt
Project: Building C
Site Address: 151 Parallel Avenue, Dallesport, WA
Location of Test Pit: See Appendix B
Date Excavated: 5/22/2020
Logged By: YX

Report Number: 20-079-1
Excavation Contractor: Port of Klickitat
Excavation Method: Excavator with 1.5' toothed bucket
Excavation Equipment: Case 590 Super L
Approximate Elevation (ft msl): 200'

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Sampling Data: Drive Probe Blows Per 6 Inches	Sampling Data: % Passing #200 Sieve	Sampling Data: Liquid Limit	Sampling Data: Plastic Limit	Sampling Data: Moisture Content (%)	Remarks
0			FILL - Gravel with silty sand, dry		39, 40					
1			SM - Medium dense, brown, silty sand with a few cobbles, moist	GRAB 1	20, 21, 23				9	
2										
3					30, 22					
4				GRAB 2	25				7	
			SP - Medium dense, dark grey, clean sand with little fines, moist		26, 28					
5					27					
6				GRAB 3	29				6	
7										
8										
9										
10										

Notes : Test pit terminated at a depth of approximately 6 feet bgs due to cave in. Groundwater was not encountered at the time of our exploration. Test pit loosely backfilled with excavated soil on 5/22/2020. Approximate Elevation from Google Earth.

APPENDIX D: SOIL CLASSIFICATION LEGEND

APPARENT CONSISTENCY OF COHESIVE SOILS (PECK, HANSON & THORNBURN 1974, AASHTO 1988)				
Descriptor	**SPT N_{60} (blows/foot)***	**Pocket Penetrometer, Qp (tsf)**	**Torvane (tsf)**	**Field Approximation**
Very Soft	< 2	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	2 – 4	0.25 – 0.50	0.12 – 0.25	Easily penetrated several inches by thumb
Medium Stiff	5 – 8	0.50 – 1.0	0.25 – 0.50	Penetrated several inches by thumb w/moderate effort
Stiff	9 – 15	1.0 – 2.0	0.50 – 1.0	Readily indented by thumbnail
Very Stiff	16 – 30	2.0 – 4.0	1.0 – 2.0	Indented by thumb but penetrated only with great effort
Hard	> 30	> 4.0	> 2.0	Indented by thumbnail with difficulty

* Using SPT N_{60} is considered a crude approximation for cohesive soils.

APPARENT DENSITY OF COHESIONLESS SOILS (AASHTO 1988)	
Descriptor	**SPT N_{60} Value (blows/foot)**
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

MOISTURE (ASTM D2488-06)	
Descriptor	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch, well below optimum moisture content (per ASTM D698 or D1557)
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table, well above optimum moisture content (per ASTM D698 or D1557)

PERCENT OR PROPORTION OF SOILS (ASTM D2488-06)	
Descriptor	**Criteria**
Trace	Particles are present but estimated < 5%
Few	5 – 10%
Little	15 – 25%
Some	30 – 45%
Mostly	50 – 100%
Percentages are estimated to nearest 5% in the field. Use "about" unless percentages are based on laboratory testing.	

SOIL PARTICLE SIZE (ASTM D2488-06)	
Descriptor	**Size**
Boulder	> 12 inches
Cobble	3 to 12 inches
Gravel - Coarse Fine	¾ inch to 3 inches No. 4 sieve to ¾ inch
Sand - Coarse Medium Fine	No. 10 to No. 4 sieve (4.75mm) No. 40 to No. 10 sieve (2mm) No. 200 to No. 40 sieve (.425mm)
Silt and Clay ("fines")	Passing No. 200 sieve (0.075mm)

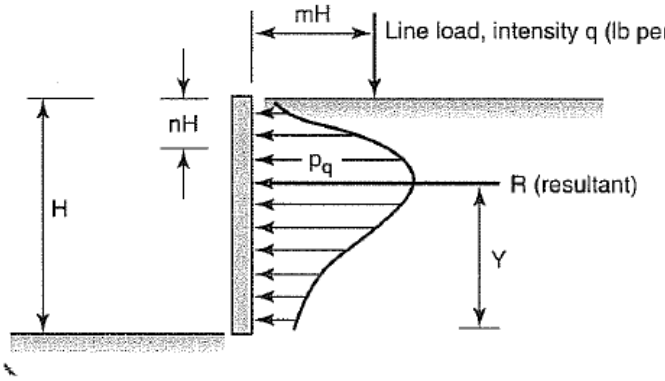
UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)				
Major Division			**Group Symbol**	**Description**
Coarse Grained Soils (more than 50% retained on #200 sieve)	**Gravel** (50% or more retained on No. 4 sieve)	Clean Gravel	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	Sand (> 50% passing No. 4 sieve)	Clean sand	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sand with fines	SM	Silty sands and sand-silt mixtures
			SC	Clayey sands and sand-clay mixtures
Fine Grained Soils (50% or more passing #200 sieve)	**Silt and Clay** (liquid limit < 50)		ML	Inorganic silts, rock flour and clayey silts
			CL	Inorganic clays of low-medium plasticity, gravelly, sandy & lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silt and Clay (liquid limit > 50)		MH	Inorganic silts and clayey silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Earth Engineers, Inc.

GRAPHIC SYMBOL LEGEND		
GRAB		Grab sample
SPT		Standard Penetration Test (2" OD), ASTM D1586
ST		Shelby Tube, ASTM D1587 (pushed)
DM		Dames and Moore ring sampler (3.25" OD and 140-pound hammer)
CORE		Rock coring

APPENDIX E: SURCHARGE-INDUCED LATERAL EARTH PRESSURES FOR WALL DESIGN

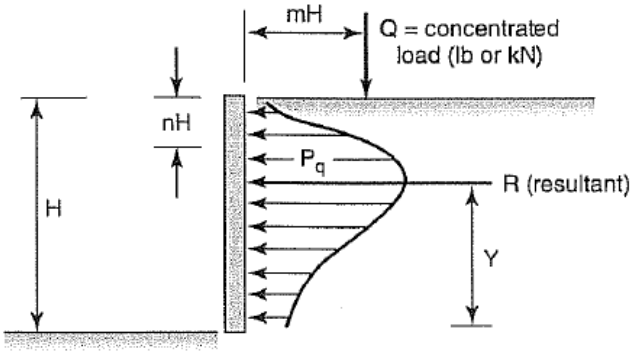
LINE LOAD (applicable for retaining walls not exceeding 20 feet in height):



m	R	Y
0.2	0.55q	0.60 H
0.4	0.55q	0.58 H
0.6	$\frac{0.64q}{m^2+1}$	0.52 H

Figure 16-28 Pressure distribution against vertical wall resulting from line load of intensity *q*.

CONCENTRATED POINT LOAD (applicable for retaining walls not exceeding 20 feet in height):



m	R	Y
0.2	$0.78\frac{Q}{H}$	0.59 H
0.4	$0.78\frac{Q}{H}$	0.59 H
0.6	$0.48\frac{Q}{H}$	0.48 H

Figure 16-27 Pressure distribution against vertical wall resulting from point load, Q.

AREAL LOAD:

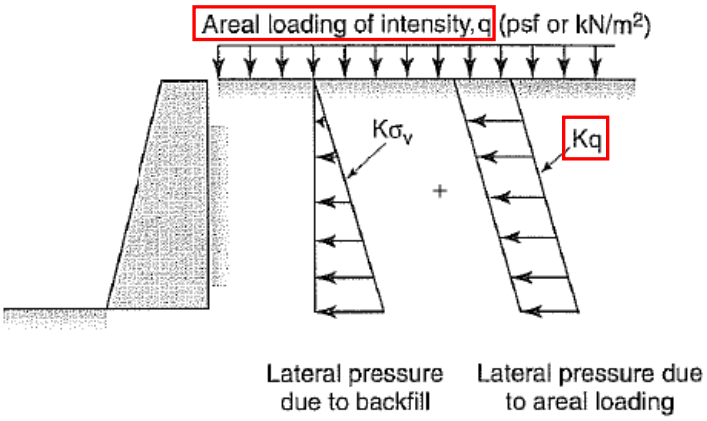
Figure 16-26 Influence of areal loading on wall pressures.

use K=0.4 for active condition (i.e. top of wall allowed to deflect laterally)

use K=0.9 for at-rest condition (i.e. top of wall not allowed to deflect laterally)

Resultant, R = K * q * H

Where H = wall height (feet)



Source of Figures: McCarthy, D.F., 1998, "Essentials of Soil Mechanics and foundations, Basic Geotechnics, Fifth Edition."

APPENDIX F

HISTORICAL WATER WELL LOGS

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. RE11137

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☒ Construction

☐ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Consulting Firm

Unique Ecology Well IDTag No. BJC611

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Crisman, Jeff

Driller/Engineer /Trainee Signature Jeff Crisman

Driller or Trainee License No. 3054

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner Dalles Fruit Co.

Site Address 111 Parallel Rd

City Dallesport County Klickitat

Location SE 1/4-1/4 SE 1/4 Sec 26 Twn 2N R 13E

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg 45 Min 37 Sec 18.23

Long Deg 121 Min 8 Sec 19.61

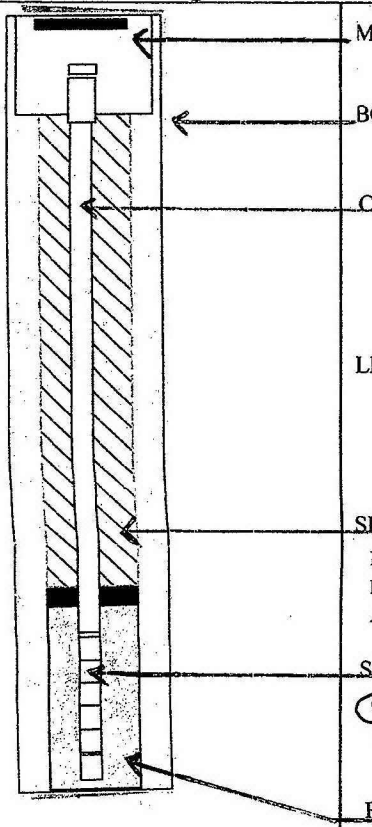
Tax Parcel No.

(Cased) or Uncased Diameter 2" Static Level 25'

Work/Decommission Start Date 3/27/15

Work/Decommission Completed Date 3/27/15

Construction Design



Well Data

MONUMENT/VAULT Below Ground From 0 To 1

BORE HOLE Diameter 6" From 0 To 30

CASING Dia. 2" From ☐ .5 To 15

Gauge 540 Wld Thrd

Material ◯Steel ⊗Plastic ☐ ☒

LINER Dia. From ☐ To

Gauge Wld Thrd

Material ◯Steel ◯Plastic ☐ ☐

SEAL From 1 To 12

Material Bent. Chips

Amount 3sacks Grout weight

SCREEN (Casing)/Liner 2" Material PVC

Diameter 2" From 15 To 30

Slot Size .010

FILTER Material Silica Sand Size of pack 10/20

From 12 To 30

Formation Description

Sand 0 - 30

DEPT OF ECOLOGY Received APR 0 6 2015 CENTRAL REGION OFFICE

SCALE: 1"= ____ PAGE ____ OF ____

ECY 050-12 (Rev. 7/06)

Ecology is an Equal Opportunity Employe

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. 27382 RECEIVED JAN - 5 1983 DEPARTMENT OF ECOLOGY

Permit No. G1-23565

(1) OWNER: Name Dallesport Industrial Park Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat SE ¼ SE ¼ Sec. 20 Twp. 2 N. R. 13 E. W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 292 ft. Depth of completed well 292 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from - ft. to 98 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 98 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 55 ft. below top of well Date Dec. 4, 82
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 1450 gpm				

Date of test Dec 4
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand & broken basalt	0	6'
Basalt, gray, med hard, fractured	6'	27'
Basalt, black, med hard, fractured	27'	56'
Basalt brown & black, vescular & Pet. wood, WB 35 gpm	56'	70'
Basalt, brown & gray, porous WB	70'	84'
Basalt, brown, crevised WB	84'	86'
Basalt gray & brown med hard	86'	89'
Basalt, gray, hard	89'	92'
Basalt gray & brown fractured WB 150	92'	96'
Basalt gray w hard brown seams	96'	115'
Basalt brown & gray, Vescular & red shale WB 480	115'	127'
Basalt, gray, hard	127'	165'
Basalt, gray & brown crevised WB	165'	167'
Basalt, gray, hard	167'	200'
Basalt, brown & quartz vescular WB	200'	203'
Basalt, gray, hard	203'	278'
Basalt black fractured & lignite	278'	284'
Basalt black vescular WB	284'	286'
Basalt, gray, med & green min.	286'	292'

Work started Oct 14, 19 82 Completed Dec. 4, 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co. (Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport WA.

[Signed] Charles L Moore (Well Driller)

License No. 0833 Date Dec 30, 19 82

(USE ADDITIONAL SHEETS IF NECESSARY) EP 2/1/83

050-1-20

WASHINGTON STATE DEPARTMENT OF ECOLOGY

UNIQUE WELL I.D. NUMBER ABS 101
X Y Z 1 2 3

WELL TAGGING FORM

Date of Field Visit 9/9/94 By SLS C. Brent

ADDITIONAL WELL IDENTIFIERS

Department of Health System ID Number 002385 Source Number SO 2

USGS Site Identification 64-23565P

RECORD VERIFICATION

☒ Well Report available *(please attach)*
☐ Well Report not available
☐ Verification inconclusive

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

Name _____

Street address _____

City _____ State _____

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address -DALLESPORT-, WASHINGTON

City DALLESPORT County KLICKITAT

T. 2 N. R. 13 E W.M. Sec. 26 NoE. ¼ of the S.E. ¼

1735 FT. North AND 650 FT. West. S.E. corner Sec 26, T2 R 13 EWM.

Latitude ____° ____' ____"
Longitude ____° ____' ____"

☐ GPS (raw data)
☐ GPS (corrected)
☐ Topographic Map
☐ Survey
☐ Computer generated
☐ Other _____

Elevation at land surface ____ feet/meters *(circle one)*

☐ Digital Altimeter
☐ Topographic Map
☐ Other _____

Additional information, if available:

☐ Location marked on topographic map *(please attach)*

☐ Location marked on air photo *(please attach)*

Water Right # _____ Priority Date _____

Circle one: Application Permit Certificate Claim Exempt

WELL CHARACTERISTICS

Physical Description of Well (size of casing, type of well, housing, etc.): _____

_____

Location of Well Identification Tag: _____

_____

Was Supplemental Tag needed for ease of identifying well?
☐ NO ☐ YES

If yes, where was tag placed? _____

Scale 1:24,000 (1"=2,000')

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Indicate the location of the well within the Section by drawing a dot at that point.

SECTION _____

COMMENTS: _____

_____

_____

Please attach this form to the Well Report and submit it to the Department of Ecology Water Resources Program Headquarters, Well Identification Program, P.O. Box 47600, Olympia, WA 98504-7600

e Original and First Copy with
partment of Ecology
ond Copy — Owner's Copy
rd Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No.
Permit No 64235-65

(1) OWNER: Name Dallesport Industrial Park Address Dallesport Wa 98617

(2) LOCATION OF WELL: County Klickitat NE ¼ SE ¼ Sec 26 T 2 N. R 13 E WM

aring and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☒ Method Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 292 ft Depth of completed well 292 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10 " Diam from ft to 98 ft
Threaded ☐ " Diam. from ft to ft
Welded ☒ " Diam from ft to ft

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in by in.
perforations from ft to ft
perforations from ft to ft
perforations from ft to ft

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam Slot size from ft to ft
Diam Slot size from ft to ft

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft to ft

Surface seal: Yes ☒ No ☐ To what depth? 98 ft
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type H.P

(8) WATER LEVELS: Land-surface elevation above mean sea level ft
Static level 55 ft below top of well Date Dec 4, 82
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap, valve etc)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
yield gal/min with ft drawdown after hrs
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 1450 gpm				

Date of test Dec 4
Bailer test gal/min with ft drawdown after hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG.

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand & broken basalt	0	6
Basalt, gray, med hard, fractured	6	27
Basalt, black, med hard, fractured	27	56
Basalt brown & black, vescular & Pet. wood, WB 35 gpm	56	70
Basalt, brown & gray, porous WB	70	84
Basalt, brown, crevised WB	84	86
Basalt gray & brown med hard	86	89
Basalt, gray, hard	89	92
Basalt gray & brown fractured WB 150	92	96
Basalt gray w hard brown seams	96	115
Basalt brown & gray, Vescular & red shale WB 400	115	127
Basalt, gray, hard	127	165
Basalt, gray & brown crevised WB	165	167
Basalt, gray, hard	167	200
Basalt, brown & quartz vescular WB	200	203
Basalt, gray, hard	203	278
Basalt black fractured & lignite	278	284
Basalt black vescular WB	284	286
Basalt, gray, med & green min	286	292

Work started Oct 14 1982 Completed Dec 4 1982

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

NAME M. K. Drilling Co.
(Person, firm, or corporation) (Type or print)

Address P. O. Box 373 Dallesport WA

[Signed] Charles L Moore
(Well Driller)

License No 0833 Date Dec 30, 1982

PWSID # 00238 Source # 02

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Well Tagging Form

Unique Well Tag No: AFL-871

RECORD VERIFICATION (check ✓ one)

- ☐ Well Report available *(please attach this form to the well report and submit it to the Ecology Regional Office near you)*
- ☐ Verification inconclusive
- ☐ Well Report not available

Dallesport Ind Park

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

rst Name: _____ Last Name: _____

reet Address: _____

ty: _____ State: _____

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

ell Address: _____

y: _____ County: _____

_____ N. R. _____ _____ W.M. Sec. _____ _____ 1/4 of the _____

FOR AGENCY USE ONLY

itude _____ ' _____ " ☐ GPS ☐ Topographic Map

igitude _____ ' _____ " ☐ Survey ☐ Computer generated

evation at land surface _____ feet/meters *(circle one)* ☐ Digital Altimeter ☐ Topographic Map ☐ Other _____

ditional information, if available:

☐ Location marked on topographic map *(please attach)*

☐ Location marked on air photo *(please attach)*

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report. I Report.

Earth Engineers, Inc.

2411 Southeast 8th Avenue ● Camas ● WA 98607
Phone: 360-567-1806 ● Fax: 360-253-8624
www.earth-engineers.com

July 31, 2020

Port of Klickitat
154 East Bingen Point Way, Suite A
Bingen, Washington 98605
Attention: Bill Schmitt

Phone: (509) 261-2511
Email: kcfd13@hotmail.com

Subject: **Pavement Section Thickness Recommendations**
151 South Parallel Avenue – In Front of Lot 39
Dallesport, Washington
EEI Report No. 20-079-2

Dear Mr. Schmitt,

Earth Engineers, Inc. (EEI) is issuing this report in response to your request for pavement section thickness recommendations for the section of South Parallel Avenue fronting Lot 39, see Figure 1. As requested, our recommendations are not based on subsurface explorations performed in the area of the road improvements. Instead, we are relying on the subsurface data obtained in the test pits performed for the proposed Building C on Lot 39 (reference EEI Report No. 20-089-1-R1 dated July 6, 2020). We have also not been provided any specific traffic loading conditions and have based our design recommendations on assumed traffic loading conditions.

The recommended pavement section thicknesses presented below should be considered typical and minimum for the assumed traffic loading parameters and an assumed California Bearing Ratio (CBR) value of 20 for medium dense to very dense granular sols (i.e. silty sand or gravel). In order to ensure the granular subgrade has a CBR value of 20, we recommend the surface be heavily recompacted to at least 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor). The recompacted subgrade should be proofrolled with a fully loaded, rubber tire dump truck and compaction tested with a nuclear density gauge by a representative of EEI.

Using the ASSHTO method of flexible pavement design, the following design parameters have been assumed:

- Pavement design life of 20 years.
- Terminal serviceability (P_t) of 2 (i.e. poor condition).

- A regional factor (R) of 3.0 (generally moderate weather conditions).
- An 18,000-pound equivalent single axle load (ESAL) of 100 ESALs per day for this road. This equates to an average of roughly 25 heavy, large trucks or 360 cars per day.

The project Civil Engineer should review our assumptions to confirm they are appropriate for the anticipated traffic loading. Using the above assumptions, we recommend the following typical "standard" pavement section for the proposed development of the property. The tables below summarize our recommendations for asphaltic concrete.

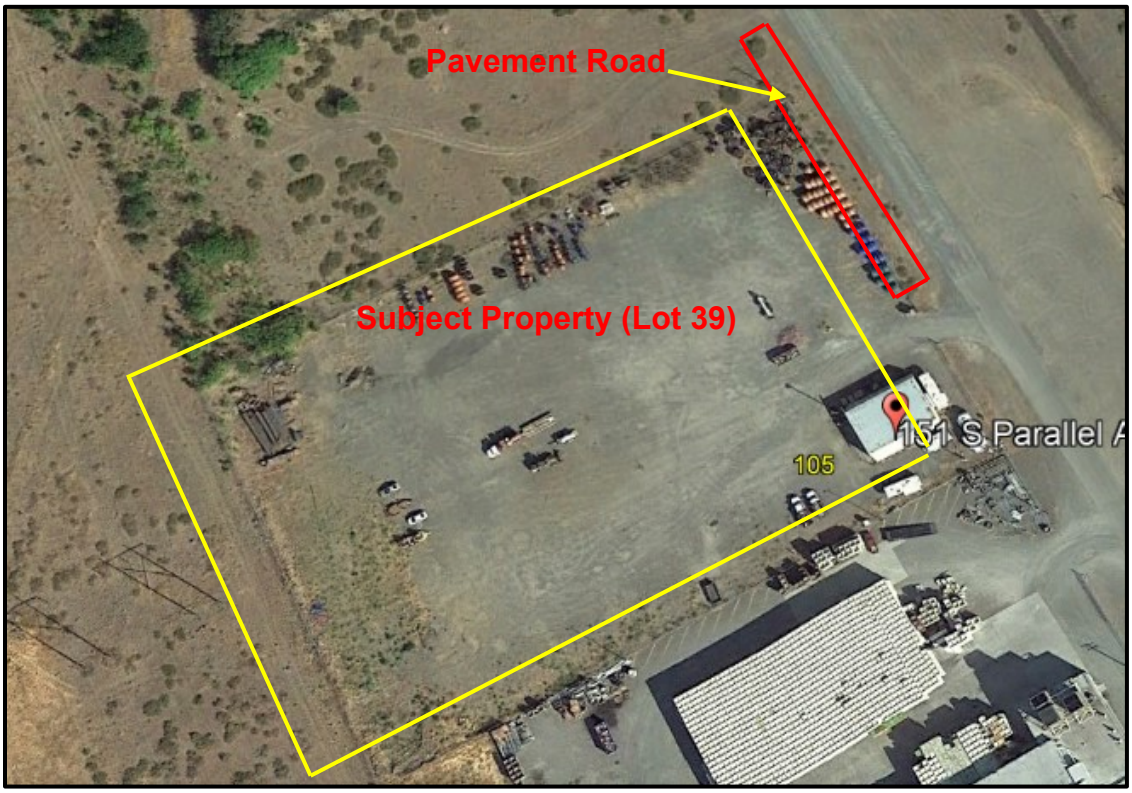


Figure 1: Current conditions and location of proposed asphalt paved road.

Table 1: Asphaltic Concrete Section Recommended Minimum Thicknesses

PAVEMENT MATERIAL	DRIVEWAY
Asphaltic Concrete (inches)	3.5
Crushed Aggregate Base Course (inches)	6

Asphalt pavement base course material should consist of a well-graded 1½-inch or ¾-inch-minus crushed rock having less than 5 percent material passing the No. 200 sieve. The base course and asphaltic concrete materials should conform to the requirements set forth in the latest edition of the State of Washington Standard Specifications for Highway Construction. Base course

material should be moisture conditioned to within ± 2 percent of optimum moisture content, and compacted to a minimum of 95 percent of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Fill materials should be placed in layers that, when compacted, do not exceed about 8 inches. Asphaltic concrete material should be compacted to at least 91 percent of the material's theoretical maximum density as determined in accordance ASTM D2041 (Rice Specific Gravity).

A representative of the Geotechnical Engineer should approve any selected granular fill material before importing it to the site. Each lift of compacted engineered fill should be evaluated by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. The base course fill should extend horizontally outward beyond the exterior perimeter of the pavement at least three feet, prior to sloping.

In order to achieve the assumed 20-year design life, pavement does need regular maintenance to protect the underlying subgrade from being damaged. The primary concern is subgrade saturation which can cause it to weaken. Proper site drainage should be maintained to protect pavement areas. In addition, cracks that develop in the pavement should be sealed on a regular basis.

If you have any questions pertaining to this report, or if we may be of further service, please contact our office at 360-567-1806.

Respectfully submitted,
Earth Engineers, Inc.

Yonggui Xie, E.I.T.
Geotechnical Engineering Associate

Troy Hull, P.E.
Principal Geotechnical Engineer

Distribution (electronic copy only):
Addressee
Bill Schmitt, Commissioner (kcfd13@hotmail.com)
Ryan Weston, Mackenzie (rweston@mcknze.com)