

**Project:** SMART – Yard Expansion

**Date:** July 8, 2024

**To:** Interested Bidders

**Prepared by:** Burke Wardle, AIA

This Addendum modifies the Project Manual, Specifications, and Drawings as follows:

**1. General Information**

- 1.1. Bid Proposal form: (Reissued) Line 3 – revised project duration and mobilization timeline to allow for procurement of long lead items.
- 1.2. Pre-Bid Meeting Sign-in sheet attached.

**2. Changes to the Project Manual**

- 2.1. Section 00 0110 Table of Content
  - 2.1.1. (Reissued) Added sections for Anti-graffiti coatings.
- 2.2. Section 04 2000 Unit Masonry
  - 2.2.1. (Reissued) Revised masonry to plain face block.
- 2.3. Section 09 9623 Anti-Graffiti Coatings
  - 2.3.1. (Added) New section for Anti-graffiti coatings.
- 2.4. Section 22 1005 Plumbing Piping
  - 2.4.1. (Reissued) - Updated specification to include below ground, beyond 5 ft. of building sanitary and domestic cold-water piping.
- 2.5. Section 22 1500 General Service Compressed-Air Systems
  - 2.5.1. (Reissued) Section 2.01.E.1 Revised Electrical requirements.
- 2.6. Section 32 31 33 Gate Operators
  - 2.6.1. (Reissued) Section 2.01.A Revised operator model type.

**3. Changes to the Drawings**

- 3.1. Sheet C108 Existing Site Plan (Added)
  - 3.1.1. New sheet showing existing grading plan.
- 3.2. Sheet C200 Equipment Plan (Reissued)
  - 3.2.1. Updated sizing and noted for underground tanks.

- 3.3. Sheet A201 Exterior Elevations (Reissued)
  - 3.3.1. Revised exterior finish to sealer, anti-graffiti coating instead of paint.
- 3.4. Sheet P600 Schedules (Reissued)
  - 3.4.1. Added plumbing piping and insulation schedule.
- 3.5. Sheet E010 Site Plan (Reissued)
  - 3.5.1. Revised utility primary routing and new transformer pad-vault position to align with constructable conduit route.
  - 3.5.2. Added protective bollard requirements at new transformer pad-vault.
  - 3.5.3. Relocating existing secondary underground to allow installation of new transformer pad-vault where proposed.
  - 3.5.4. Shifted main switchboard 4MDS toward north property line.
  - 3.5.5. Added power feed requirements to CNG equipment
- 3.6. Sheet E300 Electrical Diagrams (Reissued)
  - 3.6.1. Clarification of service electrical load summaries.
  - 3.6.2. Added future spare conduit provision out of switchboard 4MDS.
  - 3.6.3. Clarification of switchboard lineup and utility incoming section.
  - 3.6.4. Added distribution to feed CNG equipment.

#### 4. Substitution Approvals

- 4.1. None.

#### 5. Pre-Bid Questions

- 5.1. Q: Please provide subsurface or geologic investigation information per Special Provision 00120.25.
  - 5.1.1. A: See attached Geotech report.
- 5.2. Q: The specs reference ground face CMU on exposed faces yet, the drawings call for CMU to be painted on both interior and exterior. Would it be acceptable to allow the masonry contractors to bid the project using regular grey block – assumed to be primed and painted?
  - 5.2.1. A: Revised exterior finish to sealer, anti-graffiti coating instead of paint, see attached A201 and Section 04 2000 Unit Masonry.
- 5.3. Q: Spec Section 04 2000 Unit Masonry paragraph 1.02 Related Requirements lists Section 07 1900 Water Repellents, 07 2100 Thermal Insulation and 07 2500 Weather Barriers. Those spec sections are not included in the current spec book.
  - 5.3.1. A: Sections 07 1900 Water Repellents, 07 2100 Thermal Insulation and 07 2500 Weather Barriers are not applicable to the project and can be disregarded.
- 5.4. Q: Is the bus wash system OFOI, CFCI, or OFCI and are the MEP trades to assume all final connections in this bid without any approved shop drawings or quantities of equipment?
  - 5.4.1. A: Bus Wash system and equipment is CFCI, shown on C200 that was included with Addendum 1. All final MEP connections to be included with bid.

- 5.5. Q: On Sheet S100, details 5 and 11/S504 are called out, but do not exist. We believe these are details 6 & 12 on S504. Please confirm if that is the correct inference.  
5.5.1. A: Confirmed – 5/S504 that is cut on S100 should be 6/S504. 11/S504 that is cut on S100 should be 12/S504.
- 5.6. Q: The retaining wall footing widths on when scaled on S100 do not match the 8'-6" width shown on 6/S504. Our assumption would be to use the 8'-6" width as it is a called-out dimension.  
5.6.1. A: Correct.
- 5.7. Q: There is a note on S101 "10" S.O.G, SEE DET. 8B/S502". There is no detail 8B/S502. Our assumption would be to use a 10" thickness for the building SOG.  
5.7.1. A: Correct, 10" for SOG.
- 5.8. Q: S001 - I. PLACEMENT 7. describes concrete finish to be filled, brushed and sacked. Spec section 03 3000 CAST-IN-PLACE CONCRETE 3.06 CONCRETE FINISHING C. Exposed Form Finish describes finish as rubbed with carborundum brick. Please verify finish for concrete retaining wall.  
5.8.1. A: Brushed and sacked finish is correct.
- 5.9. Q: Will specifications be provided for site utilities (sanitary and water)?  
5.9.1. A: Yes, see attached Section 22 1005 Plumbing Piping, and updates to sheet P600.
- 5.10. Q: P010 shows the 3 underground tanks and 3/C200 further clarifies what these tanks are (Solids, Clarified Water and Oil / Water Separator). 1/C200 says to "See Civil Dwgs" for the underground tanks, however nothing is shown on the civil drawings. Looking for size, depth, etc. Will this be clarified via addendum?  
5.10.1. A: Sizing and notes added to C200, see attached sheet.
- 5.11. Q: The drawings show footing drains, but type and size are not shown. Please clarify.  
5.11.1. A: Footing drain pipe size and type shown on C104, Pipe Drain Detail.
- 5.12. Q: Can an existing grading plan be provided?  
5.12.1. A: Yes, see attached sheet C108.
- 5.13. Q: Section 11 1126 Vehicle Ash Equipment, Paragraph 2.01.E indicates Natural Gas (Provided in Water Reclaim Equipment Room). However, Paragraph 2.01.D.7.d indicates the water heating system is electric and the site plans do not indicate routing a natural gas line to the building. Please confirm a natural gas line will not be need for future use.  
5.13.1. A: Natural gas is not needed.
- 5.14. Q: The contract terms define final completion no later than 3/1/2025. Please confirm this completion date is accurate. The electrical gear has a 24 week lead time. Free Standing Switchgear for EV Charging can be up to one year lead time.  
5.14.1. A: Project schedule changed to allow for long lead items, see attached Bid Proposal form.

- 5.15. Q: E300 One line states new panels 2BW and 2BWA to be Main Lug Only, panel schedules call out for Main Circuit breaker for both panels. Please confirm we are to make 2BW a MCB to meet NEC and 2BWA to be main lug only?  
5.15.1. A: Yes, Panel 2BW should have a main circuit breaker, and Panel 2BWA should be main lugs only.
- 5.16. Q: Please confirm intention for all wiring in new building to be concealed within block? Please confirm conduit larger than 1" can be surface mounted? Notes state concealed only, details shows surface mounted interior piping.  
5.16.1. A: Exposed conduit is acceptable at interior of block wall construction.
- 5.17. Q: Please clarify notes for Access control/Security Management and Video Management. Matrix has all items other than raceways as owner furnished owner installed. Notes state CFCI for Extending existing system, All New System and Dynamic Map Creation?  
5.17.1. A: Disregard notes for CFCI, the low voltage system is intended to be OFOI as shown in the Matrix.
- 5.18. Q: Intrusion System appears to be CFCI is this not integrated with the access control/security system which calls out as OFOI?  
5.18.1. A: Intrusion systems to be OFOI.
- 5.19. Q: Confirm the only LV Cabling provided and installed by Contractor to be backbone fiber optic and data cable to WAP? All other low voltage cabling by owner?  
5.19.1. A: Yes, matrix shows all data cabling to be in the contractors scope, all security cabling to not be in scope.
- 5.20. Q: Is Innerduct required in existing 4" conduit for fiber?  
5.20.1. A: No
- 5.21. Q: Can Gate Controls be manually operated while under construction or do they need to be temporarily re-installed same day after modification of underground?  
5.21.1. A: Gate controls can be manually operated during construction until driveway expansion work is completed. Site will need to be secured & closed during off hours.
- 5.22. Q: Is Equipment room 102 going to be a corrosive environment due to chemicals used or stored? If Corrosive use PVC sch 80 or does it need to be PVC coated GRC?  
5.22.1. A: Equipment 102 is not expected to be a corrosive or wash-down environment, can falls into the category of mechanical room/storage room as defined in the conduit specifications.
- 5.23. Q: Is Wash Bay going to be a corrosive equipment? notes call out for 4x devices should raceway be PVC coated GRC or Sch 80 PVC?  
5.23.1. A: Yes, corrosive environment at the bus wash bay. Expected to be mixed needs of PVC and PVC-coated GRC depending on which installations are subject to damage, bus wash shop drawings should help inform.

- 5.24. Q: T101 has all raceways stubbing into Equipment 102 is it assumed Owner will run open cabling from stub to Security/Access control panel or Telecom Wall Rack?  
5.24.1. A: Correct.
- 5.25. Q: Is there a spec for the wall mounted IT rack size or minimum RMU? Does it need to be NEMA 4X?  
5.25.1. A: Rack per telecom specifications.
- 5.26. Q: Do the electrical panels need to be NEMA 4X in equipment room 102?  
5.26.1. A: No, NEMA 1 as scheduled.
- 5.27. Q: E010 Note 10 states new proposed bus charging equipment, one line shows on 300A circuit to single point connection. No information is shown beyond one line. It appears (3) relocated charging connection points are shown, at site walk configuration of existing equipment appears that Switchgear feeds 3 pieces of equipment on concrete pad with assumed 3 60kw charging controllers which feed the relocated charge connection points. The 3 charging controllers show to be turned over to owner per note 8 on E010? Please confirm desired end product possibly update one line? Also confirm allowable outage time for this equipment? Is there an outside vendor we need to utilize for startup or commissioning?  
5.27.1. A: Note that the charging equipment will receive the 300A feed, and then conduit infrastructure with cabling per manufacturer's requirements will be provided to each charging dispenser. Revised one-line diagram provided for additional requirements related to switchboard 4MDS and spare/future provisions. Confirm outage time with Owner and coordinate with PGE/Utility.
- 5.28. Q: Please confirm desired size for Future EV Charge Dispenser concrete pull box, Note 3 E010. 3'x5' would appear to be excessive for the raceways shown.  
5.28.1. A: Coordinate requirements with architectural drawings and civil, spare conduits to terminate at concrete pad for charge dispensers.
- 5.29. Q: Note 6- E010 due to unknown bends in existing conduit runs should a traffic rated handhole be used to allow for extension of conduits and feeders to new building? Minimum Size?  
5.29.1. A: Number of bends not expected to exceed code requirements, so no box anticipated in base design.
- 5.30. Q: 800amp electrical panels have an approximate lead time of 40 weeks from approved submittal. Under the best circumstances, ordering mid-August 2024, the panels would not expect to arrive until June of 2025. Panel 2BW appears to be fully committed with the inclusion of the future bus was equipment circuits. Is it possible to balance the circuits more evenly between the two panels and reduce the panel sizing? 400amp panels have a better lead time that would likely fit the project schedule.  
5.30.1. A: Project schedule changed to allow for long lead items, see attached Bid Proposal form.
- 5.31. Q: With the long lead of the 800amp panels, the bus wash station cannot be commissioned. Would the City of Wilsonville consider a spring start date to align

with electrical gear procurement? Would the City be willing to accept a longer project duration to alleviate logistical challenges?

5.31.1. A: Project schedule changed to allow for long lead items, see attached Bid Proposal form.

5.32. Q: Please provide the schedule of the bus fleet yard for each day of the week. This information will help with site logistics coordination.

5.32.1. A: Access to the yard needs to be available throughout the project construction. The general the operating hours: the yard is open 4:30 am to 9:00 pm, M-F, excluding holidays. Additionally, yard access is available Saturdays, 8:00 am through 6:30 pm. While some level of traffic should be expected throughout the day, heavier bus traffic occurs in the yard at the following times:

4:30am-6:00 am

10:00 am-11:00 am

1:30 pm- 3:00 pm

6:30 pm-9:00 pm

5.33. Q: The detail on sheet A010 shows a wood-style cantilever and vertical wood boards, but the specifications call for a wire infill, and the existing gate has a 2" chain link. Which are we supposed to bid on? Are we trying to match the horizontal wood fence with steel posts on-site?

5.33.1. A: The existing cantilever gate will be re-used for the south side, the new gate for the north side should match the existing chain-link. The wood slat fence on the north side of the aisle will require modifications which should match the current wood with steel posts.

5.34. Would the City of Wilsonville be willing to swap out these forms with the AIA industry standard forms?

5.34.1. The City of Wilsonville does not accept AIA bond forms.

-----End of Addenda-----

## 6. Attachments

- 6.1. Bid Proposal Form
- 6.2. Geotechnical Report
- 6.3. Pre-Bid Sign in Sheet
- 6.4. 00 0110 - Table of Content
- 6.5. 04 2000 - Unit Masonry
- 6.6. 09 9623 - Anti-Graffiti Coatings
- 6.7. 22 1005 - Plumbing Piping
- 6.8. 22 1500 - General Service Compressed-Air Systems
- 6.9. 32 3133 - Gate Operators
- 6.10. Sheet C108 - Existing Site Plan
- 6.11. Sheet C200 - Equipment Plan
- 6.12. Sheet A201 - Exterior Elevations
- 6.13. Sheet P600 - Schedules

- 6.14. Sheet E010 - Site Plan
- 6.15. Sheet E300 - Electrical Diagrams

## BID PROPOSAL

City Council  
City of Wilsonville  
29799 SW Town Center Loop East  
Wilsonville, OR 97070

This Bid Proposal is submitted as an offer by the undersigned to enter into a contract ("Contract") with the City of Wilsonville ("the City") to furnish all labor, material, equipment, and services required for the construction of the SMART Yard Expansion, as more particularly described in the Contract Documents. This offer is conditioned on the following declarations as to the acts, intentions, and understandings of the undersigned and the agreement of the City to the term and prices herein submitted.

1. The undersigned, hereinafter called the "Bidder," declares that the only persons or parties interested in this Bid Proposal are those named herein, that the Bid Proposal is in all respects fair and without fraud, and that it is made without any connection or collusion with any person making another Bid Proposal on this Contract.
2. The Bidder further declares that Bidder has carefully examined the Specifications for the construction of the proposed improvements; that Bidder has personally inspected the contemplated construction area or areas; that Bidder is satisfied as to the quantities of materials, items of equipment, and conditions of Work involved, including the fact that the description of Work and materials as included herein is brief and is intended only to indicate the general nature of such items and to identify the said quantities with the detailed requirements of the Specifications; and that this Bid Proposal is made according to the provisions and under the terms of the Specifications which are hereto attached and are hereby made a part of this Bid Proposal.
3. The Bidder agrees that if this Bid Proposal is accepted, Bidder will, within ten (10) calendar days after the notification of acceptance, execute the Contract with the City in the form of Contract specified, and will, at the time of execution of the Contract, deliver to the City the Performance and Payment Bonds required herein, and will, to the extent of this Bid Proposal, furnish all the materials necessary to complete the Work by 5:00 p.m. **not later than 210 calendar days from Construction Mobilization on-site**, according to methods as specified in the Specifications and required by the City's Project Engineer. **Contractor mobilization for processing of submittals and ordering of long-lead items shall commence immediately after Notice to Proceed and in advance of Construction Mobilization on-site.**
4. All of the Specifications and Plans, which are contained in the Contract Documents, have been examined by the Bidder and their terms and conditions are hereby accepted.
5. The Bidder understands that the Specifications and Plans may be supplemented by additional drawings and specifications in explanation and elaboration of those listed herein. It is agreed that such supplemental drawings will have the same force and effect as if completed and attached hereto, and that, when received, they will be considered a part of the Contract Documents.



6. The Bidder understands that all Work shall be performed under the Bid Schedule attached hereto and that, for said prices, all services, material, labor, equipment, and all Work necessary to complete the Project, in accordance with the Plans and Specifications, shall be furnished for the said prices named. After contract award, if there will be an increase in the Scope of Work or a decrease in the Scope of Work covered by the Bid Schedule, it shall be made only as a result of negotiation between the Bidder and the City and documented by a written Change Order. Furthermore, it is understood that any estimate with respect to time, materials, equipment, or service which may appear on the Plans or in the Specifications is for the sole purpose of assisting the Bidder in checking its own independent calculations and at no time shall the Bidder attempt to hold the City, the City's Project Engineer, or any other person, firm, or corporation responsible for any errors or omissions that may appear in any estimate.
7. The cash, certified check, or Bid Bond accompanying this Bid Proposal shall be payable to the City of Wilsonville in an amount equal to ten percent (10%) of the total bid. The Bid Bond will be forfeited if Bidder's Bid Proposal is accepted by the City and the Bidder shall fail or refuse to execute the Contract and furnish a Performance and Payment Bond, as required by the Contract Documents, within the time limit named therein after notification that said Bid Proposal is accepted, all in accordance with the provisions of this Bid Proposal and the Contract Documents.

## 8. QUALIFICATIONS FOR INSURANCE AND BONDING COMPANIES

**Minimum Financial Security Requirements.** The Bidder understands all bonding and insurance companies providing insurance or bonds required by the Contract must meet certain minimum financial security requirements. These requirements conform to the rating published by A.M. Best & Co. and a current Bests Key Rating Guide-Property-Casualty. All companies providing bonds or insurance under this Contract must:

- Have a current A.M. Best Rating of not less than A;
- Have a current A.M. Best Financial Size Category of not less than Class IX;
- Be authorized to conduct and transact insurance and surety contracts in the State of Oregon; and
- Be a U.S. Treasury Circular 570 listed company, if providing payment or performance bonds.

**Failure to Meet Minimum Financial Security Requirements.** If the issuing company does not meet these minimal requirements, or for any other reason is unsatisfactory to the City, written notification will be made by the City to the Contractor, who must promptly obtain and submit a new policy or bond issued by an insurer/surety acceptable to the City.

## 9. CONTRACTOR QUALIFICATIONS

The Bidder agrees that for a bid to be responsive, the following documentation must be included with the bid submittal. Absence of any item may render the bid nonresponsive.

All completed Bid Forms;

The Bidder firm's most recent approved or audited financial statement;

A list of at least three (3) references who can attest to your firm's successful completion of similar projects within the last three (3) years (please include company/agency names, contact names, position titles, phone numbers, and e-mail addresses);

Resumes or biographical summaries for those who will be assigned to this project, including the design professional and construction manager;

10. The Bidder agrees that for a bid to be considered responsible, the Contractor must meet the following minimum requirements:

Contractor must have at least three (3) years' experience working with projects of similar size and complexity with verifiable references;

An average OSHA Total Case Incidence Rate (TCIR) for the most recent three (3) years, which is equal to or less than the average for your industry (<http://www.bls.gov/iif/oshwc/osh/os/ostb3191.pdf>);

Sufficient financial resources to complete this project;

A qualified design professional who is licensed in Oregon, as well as qualified project staff to complete this project in accordance with scheduling parameters and targeted substantial completion date;

Contractor must be properly licensed, bonded, and insured;

Contractor and its Subcontractors must not be included on the State of Oregon's "Contractors Ineligible to Receive Public Works Contracts" listing; and

Contractor must not be debarred or suspended by the federal government, as revealed by a search of the System for Award Management ([www.sam.gov](http://www.sam.gov)).

11. The Bidder declares that all items on the Bid Schedule have been completed in full by the showing of lump sum price or unit prices and item total for each and every item thereof, and for the showing of other information indicated by the Bid Schedule form.
12. The Bidder agrees that Bidder will substantially complete the Work within the specified time frames after "Notice to Proceed" has been issued by the City.
13. The Bidder agrees that Final Completion and Acceptance shall occur when all Contract Work is completed and approved, in writing, by the City. The final punch list, provided at the time of substantial completion, must be completed and approved, in writing, by the City's Project Engineer.

- 14. The Bidder further proposes to accept as payment in full for the Work proposed herein the amount computed under the Bid Schedule and as further provided by the provisions of the Contract Documents.
- 15. As required by OAR 137-049-440(3), the undersigned Bidder certifies that Bidder has not discriminated and will not discriminate against any disadvantaged business enterprise, minority owned business, women-owned business, emerging small business, or veteran-owned business in obtaining any required subcontracts.
- 16. The name of the Bidder who is submitting this bid is:

Bidder Co. Name: \_\_\_\_\_  
 Contact Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_  
 Fax No.: \_\_\_\_\_  
 Email: \_\_\_\_\_

This is the address to which all communications concerned with this bid and with the Contract shall be sent.

- 17. The Bidder proposes that if the Bidder is awarded the Contract for this bid, the Surety who will provide the Performance Bond will be:

Surety Co. Name: \_\_\_\_\_  
 Agent Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_  
 Fax No.: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Bond No.: \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

A.M. Best Finance Size Category: \_\_\_\_\_

Conduct Business in Oregon:      \_\_\_\_\_ Yes                      \_\_\_\_\_ No

U.S. Treasury Circular 507 List  
 (Payment or Performance Bond only):                      \_\_\_\_\_ Yes                      \_\_\_\_\_ No

- 18. The name of the Insurance Company is:

Insurance Co. Name: \_\_\_\_\_  
 Contact Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_  
 Fax No.: \_\_\_\_\_  
 Email: \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

A.M. Best Finance Size Category: \_\_\_\_\_

Conduct Business in Oregon: \_\_\_\_\_ Yes \_\_\_\_\_ No

19. The name(s) of the principal officer(s) of the entity are as follows:

_____	_____
_____	_____
_____	_____
_____	_____

20. In the prosecution of this Work, the Bidder proposes to use the following subcontractors. The subcontractors, by name and specialty of work, are as follows:

Full Legal Name	Specialty
_____	_____
_____	_____
_____	_____
_____	_____

21. The Bidder agrees to be bound by and will comply with the provisions of ORS 279C.838, 279C.840, or 40 USC 3141 to 3148. Signing of the Bid Proposal constitutes compliance, and a separate statement is not necessary.

22. In accordance with ORS 279C.505(2), the Contractor shall demonstrate that an employee drug-testing program is in place. The **Contractor shall provide a copy of the drug testing policy** to demonstrate that such a program is in place.

23. Declaration of Residency

I \_\_\_\_\_ a "resident bidder"\* as defined by ORS 279A.120.  
 ("am" or "am not")

I \_\_\_\_\_ a licensed contractor pursuant to ORS 701.026.  
 ("am" or "am not")

\*"Resident Bidder" means a Bidder that has paid unemployment taxes or income taxes in Oregon during the twelve (12) calendar months immediately preceding submission of the bid, has a business address in the state, and has stated in the bid whether the Bidder is a "Resident Bidder" pursuant to ORS 279A.120(1)(b).

24. The Bidder understands that Oregon law requires all contractors must be registered with the Construction Contractors Board or licensed by the State Landscape Contractors Board in order to submit a bid to do work as a contractor. Bidder's Construction Contractors Board registration number is: \_\_\_\_\_. Bidder's State Landscape Contractors Board license number is: \_\_\_\_\_.

25. Bidder hereby certifies that Bidder will meet the requirements of ORS 279C.838 and 279C.840 in performance of the Contract, if awarded.

The undersigned hereby represents that he/she is fully authorized to sign this Bid Proposal on behalf of Bidder and to bind Bidder hereby as provided herein.

In witness hereto, the undersigned has set his/her hand this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
*Signature of Bidder*

\_\_\_\_\_  
*Title*

26. The Bidder acknowledges the following Addenda are included as part of these Contract Documents. Initial and date as acknowledging receipt of Addenda.

No. \_\_\_\_\_ Date: \_\_\_\_\_

No. \_\_\_\_\_ Date: \_\_\_\_\_

No. \_\_\_\_\_ Date: \_\_\_\_\_

No. \_\_\_\_\_ Date: \_\_\_\_\_

**-End of Section-**

# SMART - Yard Expansion

Pre-Bid Meeting  
July 2, 2024

Name	Company	Email	Phone
MIKE BRADT	JES	MICHAEL.BRADT@JESCORP.COM	503-400-1474
LYNN MATTEO	JES	lynn.matteo@jescorp.com	503-421-3319
Keith Wagner	LBC	Keith@lbrunn.com	971-998-4184
Paul Medvedes	RLP	andy@rivercityprintingllc.com	503-317-9917
Matt Byko	Coffman	mbyko@coffman.com	971-202-3049
RT Kind	DEG	Rolph.Kind@deg.us.com	503-969-3283
Jeff Ruk	INLINE	Bids@inline-llc.com	503-939-3430
Grant Wilks	ZKS	Bids@zkscontractors.com	503-499-2060
Jerod Martin	Santiam Electric	Scott@SantiamElectric.com	503-932-5749
Beth Stengen	ICE Co Electric	beth@icecoelectric.com	503-902-0271
NISHANT VADLAMURI	ESSEX	BIDS@ESSEXGC.COM	503-867-6035
Ron Kelley	PLC	RKELLEY@BUILTBYPANDC.COM	8 //
TIM KONEV	ATK Const.	Tim@ATKConstructioninc.com	503-951-3084
Darrell Gore	Gore Electric	darrell@goreec.com	971-297-8198
Kyle Marston	JE John	Kmarston@jejohn.com bidse@jejohn.com	360-954-0950
Tyler Leathers	Oregon Heating/AC	TLeathers@oregonheating.com	503-260-7255
ELLIOT LOWE	SCHOMMER & SONS	ELowe@SCHOMMER-SONS.COM	503-894-1519
Chris Palmera	Distinct Painting	Chris@DistinctPaintingco.com	971-666-2137
Steve Braft	Woodburn Const.	Bids@woodburnconstruction.com	503-981-9504
Dave Morris	Team -	avym@teamlectr.com	503-956-7051
Bob Davies	PECI	bob.davies@portlandelectrics.com	



*Geotechnical Assessment  
Wilsonville SMART OPS/Fleet Facility  
Wilsonville, Oregon*

Prepared for:  
City of Wilsonville

November 16, 2011  
1814-00





Ash Creek Associates, Inc.  
Environmental and Geotechnical Consultants

# **Geotechnical Assessment Wilsonville SMART OPS/Fleet Facility Wilsonville, Oregon**

**Prepared for:  
City of Wilsonville**

**November 16, 2011  
1814-00**

  
For

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*Jeff Duquette, P.E.  
Project Engineer, Ash Creek Associates*



EXPIRES: 12/31/11

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*Stuart Albright, P.E.  
Principal Engineer, Ash Creek Associates*

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www.washcreekassociates.com

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- A Subsurface Exploration Logs



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## **1.0 Introduction and Limitations**

This report presents Ash Creek Associates' (Ash Creek's) geologic and geotechnical engineering evaluation and recommendations for the proposed City of Wilsonville SMART OPS/Fleet Facility. The project site is located on the west side of Boberg Road, approximately 400 feet north of the intersection of Boberg Road and Barber Street, in the City of Wilsonville, Oregon, (Figure 1). The proposed project includes the development of a bus maintenance building. The new building and surrounding parking and access drive areas will be constructed over several feet of new structural fill. The building will be slab-on-grade, and tilt-up panel construction. We also understand that the majority of the site will be paved with asphalt concrete and Portland cement concrete. Other site improvements will encompass construction of utilities to service the facility and access drives as well as a storm water feature along the southwestern side of the site.

The purpose of our work was to provide geotechnical engineering recommendations for the design and construction of the proposed project. Our recommendations include:

- Site preparation;
- Grading and fill construction; and
- Other pertinent geotechnical design criteria and construction considerations.

The work was performed for the exclusive use of the City of Wilsonville, their consultants, and their agents for geotechnical-related applications to this project. This work was conducted in accordance with generally accepted professional practices in the same or similar localities related to the nature of the work accomplished at the time the services were performed. No other warranty, express or implied, is made.

## **2.0 Project Understanding and Site Description**

The site is located west of and adjacent to Boberg Road in Wilsonville, Oregon (Figure 1). A large drainage ditch is located along the north side of the property. The new Wilsonville Westside Express Service Train Station is located on the western side of the property.

Subsequent to the explorations documented in this report, the site was rough-graded under the Phase I earthwork contract. Under that contract, topsoil and unsuitable fills were removed from the site and imported, compacted fill was placed. Imported crushed rock was then placed and compacted over the fills. Prior to the site work, the site consisted of a vacant grassy field with some areas of tree and brush coverage.

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We understand that major aspects of the project will include:

- Site grading and paving;
- Construction of a single story maintenance garage with accompanying office space; and
- Installation of new utilities and pavement construction.

### **3.0 Subsurface Conditions**

The subsurface exploration consisted of drilling six exploratory borings on November 22, 2010. Drilling was completed using a track-mounted CME drill rig utilizing either 4.5-inch-diameter (OD) mud rotary or 8.5-inch-diameter (OD) solid-stem auger. The maximum depth of our explorations was approximately 21.5 feet below the existing ground surface (bgs).

The locations of our subsurface explorations are shown on the accompanying exploration plan (Figure 1). The locations of these explorations were established by pacing from existing features and should therefore be considered approximate.

We have included exploration logs in Appendix A of this report, which describe soil and subsurface conditions encountered during Ash Creek's subsurface exploration. Descriptions are based upon field classification of soil samples.

It should be emphasized that our exploration revealed subsurface conditions only at widely spaced, discrete locations on the project site, and that actual conditions could vary at other locations. Furthermore, the nature and extent of any such variations may not become evident until construction activities have begun. If significant variations are observed at that time, we may need to modify our conclusions and recommendations to reflect actual site conditions. For ease of outside interpretation, subsurface conditions have been generalized into the major categories described below.

**New Fill.** The majority of the site was filled during the Phase I site grading activities. The overall fill thickness was generally less than 3 feet from original grade and trends deeper to the west. The imported fills consisted of silts and fine sands with variable contents of gravels, cobbles, and clays. The fills were placed and compacted under control. The surface of the site was then covered with compacted crushed rock. The crushed rock layer thickness placed was 16 inches within and adjacent to the building pad and 12 inches elsewhere. Further, a geotextile was placed under the rock in the 16-inch areas, with the exception of the building pad footprint.

**Topsoil.** The majority of the site was mantled in approximately 4 to 6 inches of silty topsoil. Deeper areas of organic-rich soil are located in areas of heavy brush coverage. During the Phase I site grading, topsoil was excavated from all structural areas.

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**Fill.** A mound of what appeared to be landscaping refuse was located in the middle of the property. This material was also removed from structural areas in Phase II. Further, random unsuitable fills encountered during grading were excavated prior to placing fill.

**Native Silt.** Stiff to very stiff, damp, yellow-brown, silt was encountered beneath the near-surface topsoil layer over the majority of the property. This soil unit was observed in our borings to extend to approximate depths of 7 feet along the north side of the site, and approximately 8 to 9 feet along the south side of the site.

The native silt soils underlying the site can function as bearing strata for light or moderately loaded foundation elements if the foundation subgrade areas are uniformly firm and are prepared in accordance with the recommendations provided within the body of this report.

The native silts underlying the site can function as structural fill if placed during extended periods of warm, dry weather. The native silts will not function adequately as structural fills if placed and compacted during the wet season. During the wet season, it is impossible to maintain optimal moisture levels within the silt soils underlying the site. Structural fill placement during wet weather should be restricted to clean granular soils.

**Native Silty Gravel.** The site is underlain at depths of between 7 and 9 feet by very dense, dry, gray, silty gravel. The gravels are very dense but should be able to be excavated by heavier/larger track hoes. Rates of digging will invariably be slower with the dense gravels vs. similar excavation work with the near ground surface silt soils.

Earthwork and utility contractors should therefore be prepared for excavation and trench work within dense gravels and prepare their bids accordingly.

**Groundwater.** Groundwater was not observed within any of our borings to depths of 21.5 feet bgs. However, any excavation or trench work being conducted along the north side of the property will likely encounter shallow perched water and/or seepage associated with the large drain ditch located on this side of the site. Earthwork and utility contractors which will be conducting either excavation work or trenching along the north side of the site near the existing drainage ditch should be prepared for trench dewatering in this area and should prepare their bids accordingly.

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## **4.0 Conclusions and Recommendations**

Our recommendations are based on our current understanding of the project. If the nature or location of the planned construction changes, Ash Creek should be contacted so that we may confirm or revise our recommendations.

### **4.1 Site Preparation**

The site has already been rough graded and covered in imported crushed rock. As such, we anticipate that site preparation activities will be minimal. It is important to note that the majority of the site has not been stabilized to support construction equipment during prolonged wet weather. The 12-inch thickness of rock placed over most of the future pavement areas will not support heavy equipment during wet weather.

**Removal of Old Pavements, Old Fills, and Other Buried Features.** In general, the site has been stripped of topsoil and unsuitable fill. If encountered during construction, old landscaping and other unsuitable fills should be removed from slab-on-grade subgrade areas, new pavement subgrade areas, foundation subgrade areas, etc. Old utilities and structural features associated with past developments such as footings, retaining walls, etc., should also be removed if encountered during initial site work. Over-excavated areas should be backfilled with compacted structural fill.

**Proof-Rolling and Subgrade Condition Assessment.** We recommend that, prior to fill placement or base course installation, the subgrade of new pavements and slab-on-grade areas or granular working blankets be proof-rolled with a loaded 10- to 12-yard dump truck or other suitable equipment. This pertains to all pavement and structural fill subgrade areas. Any areas of subgrade that pump, weave, or appear soft and muddy should be scarified, dried, and compacted, or over-excavated and backfilled with compacted granular fill. If a significant length of time passes between fill placement and commencement of construction operations, or if significant traffic has been routed over these areas, we recommend that the subgrade be similarly proof-rolled again before any foundation or pavement installation is allowed. We recommend that we be retained to observe this operation in order to evaluate preparation of structural grades.

Foundation subgrade areas should also be observed by the Geotechnical Engineer or his or her representative prior to construction of form work.

### **4.2 Structural Fills**

Structural fill should be installed on a subgrade that has been prepared in accordance with the above recommendations. Fills should be installed in horizontal lifts not exceeding 8 inches in thickness (loose – prior to compaction). Actual lift thickness will likely be a function of construction methods and compaction equipment employed, and the ability of the equipment to achieve specified compaction levels. Typically, this applies to lightweight compaction equipment that often requires thin lifts be employed in order for specified

levels of compaction to be achieved. Engineered fills should be compacted to at least 92 percent of the maximum dry density for fine-grained native soils. The final 6 to 8 inches of fill immediately below pavement section subgrades should be compacted to at least 95 percent of the material's maximum dry density. The maximum dry densities should be determined in accordance with ASTM D 1557. The compaction criteria may be reduced to 85 percent in non-structural landscape or planter areas. A summary of recommended compaction specifications is provided in the table below.

**Recommended Fill Compaction Specifications**

Material	Percent of Maximum Dry Density ASTM D 1557
Fine-Grained Fill	92
Landscaping Fill	85
Imported Granular Fill	95
Pavement Subgrade	95

During dry weather, structural fills may consist of virtually any relatively well-graded soil that is free of debris, organic matter, and high percentages of clay or clay lumps, and that can be compacted to the preceding specifications. However, if excess moisture causes the fill to pump or weave, these areas should be dried and re-compacted, or removed and backfilled with compacted granular fill. We recommend that these fills consist of well-graded granular soils (sand or sand and gravel) that do not contain more than 5 percent material by weight passing the No. 200 sieve. In addition, it is usually desirable to limit this material to a maximum 6 inches in diameter for ease of compaction and future installation of utilities.

Adequate compaction levels for structural fills can usually be obtained within fine-grained native soils at +/- 3 or 4 percent of the optimum moisture content. Typically, the biggest challenge in obtaining specified compaction levels within fine-grained soils can be traced to excessive soil moisture levels. If excess soil moisture is present in potential fill soils, soil drying via aeration should be conducted. Soil drying is commonly performed by turning soils in order to remove excess moisture within the soil via evaporation. Air drying of fine-grained soils is generally only possible during extended periods of warm, dry weather. Optimal time for this type of operation is from early July through mid-October.

We recommend that regular fill inspections be scheduled during site work. Inspections should include periodic observation of spreading as well as compaction techniques. Regular density testing should also be conducted during site work to determine compaction levels of engineered fill.

### **4.3 Suitable Fill Materials**

**Structural Fills during Summer Grading.** As noted previously, during dry weather, structural fills may consist of virtually any relatively well-graded soil that is free of debris, organic matter, and high percentages of clay or clay lumps, and that can be compacted to the preceding specifications.

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**Wet Weather Grading.** We anticipate that the majority of the site work for this project will be accomplished during the wet season. Due to the fine-grained nature of the site soils and imported fills, the site would ideally be constructed during the summer. However, due to scheduling constraints, this is not feasible. Because moisture levels are difficult to control in fine-grained soils, and soil drying via aeration is not realistically an option, structural fill constructed during wet conditions should consist of clean, durable crushed rock, or clean granular fill. Ideally, structural fill material placed during the wet season will contain less than 5 percent fines by weight passing a standard No. 200 sieve. Wet weather grading conditions should be assumed between mid-October and late June. Working blankets for subgrade protection and haul roads employed during wet weather grading should consist of a minimum of 12 inches of clean granular fill. Periodic maintenance of the working pad and graveled haul roads will be required during wet weather construction. This routine maintenance would typically consist of over-excavating subgrade areas disturbed as a result of construction traffic, and subsequent backfilling with clean granular fill.

**Pavement Base Rock.** Crushed rock used in these areas should consist of clean, 5/8- to 1.5-inch (minus), durable crushed rock. The material's fines content should not exceed levels recommended within Oregon State Department of Transportation (ODOT) material standards for pavement base rock.

**Trench Backfill.** Utility conduits should be bedded in sand or 5/8-inch (minus) crushed rock within one conduit diameter. Bedding should surround the pipe in all directions. Trench backfill should be lightly compacted above breakable conduits within two pipe diameters or 18 inches, whichever is greater. Trench backfill underlying pavements, building lots, or other settlement-sensitive structures or features should consist of durable, clean crushed rock with nominal size between 5/8 inch (minus) and 1.5 inches (minus). This material should contain less than 5 to 7 percent fines by weight passing a standard No. 200 sieve.

**Working Pad or Haul Roads for Wet Weather Grading.** The majority of the site has been covered with compacted crushed rock. However, with the exception of the area directly around the proposed building pad, the total rock thickness is 12 inches. This rock section will not support construction traffic during wet weather.

The area adjacent to the proposed building pad has been covered with 16 inches of rock with a geotextile for the areas outside the building pad. While this section is likely to be more durable during construction, it will still be possible to damage the section with prolonged traffic. Heavily trafficked haul roads should feature additional haul road sections that should consist of durable, clean crushed rock, bank-run, or pit-run material. This would also apply to any areas of the stabilized site that begin to deflect under construction loads. The maintenance of the site stabilization is dependent on the means and methods of the Contractor and is typically the responsibility of the Contractor. Failure to respond to surface deflection in a timely manner or to control traffic on site could result in significant additional cost.



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**Retaining Wall Backfill.** Backfill behind retaining walls should consist of free-draining granular material. To minimize pressures on retaining walls, we recommend the use of well-graded, crushed rock backfill with less than 6 or 7 percent fines content by weight passing the No. 200 sieve. Use of other material will considerably increase wall fluid pressures.

#### 4.4 Areal Fill Settlements

Areal settlements within fills constructed to maximum heights of 4 feet or less are estimated to be less than approximately 1 inch. If fills are constructed in accordance with Ash Creek's recommendations regarding fill compaction and optimal moisture levels for fill placement, the majority of areal fill settlement is expected to occur during fill construction.

#### 4.5 Finished Cut and Fill Slopes

Finished cut and fill slopes should not exceed gradients of 2H:1V. Because of the erodible nature of the native soils, cut and fill slopes should be protected from erosion immediately following completion of grading. Erosion protection can consist of placement of jute mesh and seeding with erosion-resistant vegetation or other Engineer-approved erosion control methods. Deep cuts and fills should be assessed for global stability. Any cuts that exceed about 15 feet in height should be analyzed for their potential effect on slope stability for the project site and areas adjacent to the project site.

#### 4.6 Retaining Walls

**Non-Restrained Walls.** Non-restrained walls have no restraint at the top and are free to rotate about their bases. Most cantilever retaining walls fall into this category. We recommend that non-restrained walls be designed for pressures developed from the equivalent fluid weights shown in the following table.

**Non-Restrained Retaining Wall Pressure Design Recommendations**

Backfill Slope Horizontal:Vertical	Equivalent Fluid Weight (pounds per cubic foot [pcf])
Level	35
3H:1V	45
2H:1V	85

These pressures represent our best estimate of actual pressures that may develop from lateral soil loading alone and do not contain a factor of safety. These pressures do not include either hydraulic loading from poorly drained backfill, or lateral stresses resultant from structures or other features located above the wall. These pressures assume retaining wall backfill material is clean, durable, well-drained granular backfill as described in the Structural Fills Section 4.2 of this report.

If traffic loads are expected within a horizontal distance from the top of the wall equal to the wall height, a uniform lateral earth pressure acting horizontally on non-restrained walls equal to 60 pounds per square foot (psf) should be added to earth loads acting on the wall.

**Restrained Walls.** Restrained walls are any walls that are prevented from rotation during backfilling. Walls with corners and jogs, and those that are restrained by a floor slab, floor diaphragm, or roof fall into the category of restrained walls. We recommend that restrained walls be designed for pressures developed from the equivalent fluid weights shown in the following table.

**Restrained Wall Pressure Design Recommendations**

Backfill Slope Horizontal:Vertical	Equivalent Fluid Weight (pcf)
Level	55
3H:1V	65
2H:1V	105

These pressures represent our best estimates of actual pressures that may develop and do not contain a factor of safety. These pressures do not include either hydraulic loading from poorly drained backfill, or lateral stresses resultant from structures or other features located above the wall. These pressures are assumed to act horizontally (normal to the wall). This is based on the assumption that drainage membranes or impervious wall coatings will prevent friction between the wall and backfill. These pressures assume retaining wall backfill material is high shear-strength gravel backfill that is well drained.

If traffic loads are expected within a horizontal distance from the top of the wall equal to the wall height, an additional uniform lateral earth pressure acting horizontally on restrained walls equal to 80 psf should be added to earth loads acting on the wall.

**Seismic Lateral Earth Pressure.** Lateral earth pressure acting on retaining walls should be increased to account for seismic loadings. These pressures may be approximated by a uniformly distributed rectangular pressure which is applied over the entire back of the wall. "H" represents the height of the wall in feet. The resultant force acts at a distance of approximately 0.6H above the base of the wall.

**Seismic Surcharge Design Pressure Recommendations**

Design Condition	Seismic Pressure Surcharge (psf)
Active Earth Pressure (Non-Restrained Walls)	6H
At-Rest Earth Pressure (Restrained Walls)	14H

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These pressures represent our best estimate of actual pressures that may develop and do not contain a factor of safety. These pressures assume retaining wall backfill material is well drained.

**Retaining Wall Backfill.** The backfill behind and within 4 feet of the retaining walls should consist of free-draining granular material and should meet recommended specifications provided in the Suitable Fill Materials Section 4.3 of this report.

**Retaining Wall Drainage.** Retaining walls will require drainage in order to alleviate lateral fluid forces on the walls. The drains should be protected by a filter fabric to prevent internal soil erosion and potential clogging.

**Wall Stability.** We recommend using a factor of safety of at least 1.5 for sliding and overturning under static loading conditions. We recommend using a factor of safety of at least 1.1 for sliding and overturning under seismic loading conditions.

#### **4.7 Foundation Design Considerations**

The near-surface native silts underlying the site will function adequately as bearing strata for conventional spread footings for light to moderately loaded foundations. The type of foundation support for the proposed project will likely vary, depending on the anticipated structural loading conditions.

We have developed an allowable bearing capacity assuming structural foundation load will not exceed the following:

- Typical continuous footing loads for the structure are in the range of 4 kips per lineal foot (Klf); and
- Typical column foundation loads are in the range of 150 kips.

**Shallow Spread Footings.** Firm native silts and structural fill constructed in accordance with our above recommendations are capable of developing an allowable bearing pressure of 3 kips per square foot (Ksf). This capacity may be increased by 1/3 for short-term transitory loading conditions such as seismic or wind loading. For sliding resistance, an ultimate sliding coefficient of friction of 0.33 can be utilized. Passive soil pressure can be developed along the sides of footings if granular backfill is used around footings and the backfill is compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557. An ultimate equivalent passive fluid weight of 300 pcf can be used for resistance against sliding. These sliding coefficient and passive pressures represent our best estimates, and neither value contains a factor of safety.

**Foundation Settlement.** Total settlement of foundations designed under the above conditions should be less than about 1 inch and differential settlements between individual footing elements are not expected to

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exceed approximately 1/2 inch. If structural loading conditions are higher than the above assumptions by more than about 10 percent, Ash Creek should be contacted for additional recommendations.

**Site Work Observation.** We recommend that Ash Creek be closely involved with the project General Contractor and Earthwork Contractor during initial site work and preparation of foundation subgrade areas. All structural fill placement and compaction should be monitored routinely with regular density testing conducted and documented by a registered testing laboratory. There a number of materials testing laboratories in the area that could potentially be utilized for fill control testing. Ash Creek does not provide field compaction testing, but we would be happy to provide a list of qualified testing laboratories.

#### **4.8 Drainage**

We recommend that building designs include perimeter footing drains around each structure. Perimeter drains should be installed around the exterior foundations at or below the base of the foundation grade and should be designed to drain water away from structures by gravity. Drains should consist of a 4- to 6-inch-diameter perforated pipe surrounded on all sides by approximately 8 inches of clean drain rock.

#### **4.9 Floor Slabs and Vapor Retarder**

For slab-on-grade construction, we recommend installation of at least 6 inches of clean crushed rock between the bottom of the slab and the subgrade. For the gravel to be defined as “clean”, it should contain less than 6 percent fines by weight passing a standard No. 200 sieve.

Either a vapor retarder employed beneath the slab, or a slab surface treatment should also be utilized to minimize water vapor migration into finished areas of the structure. Ash Creek defines “finished areas” as portions of the building that might be employed as office space or the like and will have carpeting or adhesive flooring placed on the slab (or any other flooring materials that might be sensitive to water vapor migration and accumulation of water vapor on the interior side of the slab).

#### **4.10 Excavations and Utilities**

**Excavations.** Subsurface conditions encountered during the site investigation indicate that precautions in utility excavations will be required due to the potential for caving/sloughing within the near-surface soils underlying the site, particularly in the presence of seepage. Any excavations deeper than 4 feet should be sloped or shored in accordance with Occupational Safety and Health Act (OSHA) regulations. Normally, shoring systems (for excavations less than 20 feet in depth) are Contractor-designed and -installed items.

The site is underlain at depths of between 7 and 9 feet by very dense, dry, gray, silty gravel. The gravels are very dense but should be able to be excavated by heavier/larger track hoes. Rates of digging will invariably be slower with the dense gravels vs. similar excavation work with the near ground surface silt

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soils. Earthwork and utility contractors should therefore be prepared for excavation and trench work within dense to very dense gravels and prepare their bids accordingly.

Groundwater was not observed within any of our borings to depths of 21.5 feet bgs. However, any excavation or trench work being conducted along the north side of the property will likely encounter shallow perched water and/or seepage associated with the large drain ditch located on this side of the site. Earthwork and utility contractors which will be conducting either excavation work or trenching along the north side of the site near the existing drainage ditch should be prepared for trench dewatering in this area and should prepare their bids accordingly.

**Temporary Excavation Slopes and Shoring.** In general, temporary excavation slopes may be suitable in areas where adjacent improvements are not located within a horizontal distance equal to the depth of the excavation (measured from the top of the excavation). Unsupported temporary excavation slopes within native soils or fill soils should not exceed slopes of 1H:1V. Actual slopes used during construction should be determined by the Contractor on a case-by-case basis. If sloping excavations are not possible (due to space constraints or the locations of existing structures, pavements, utilities, etc.), then shoring or under-pinning will be required.

**Utilities.** Moisture-sensitive utilities should be placed in watertight conduits. Utility conduits should be bedded within one conduit diameter in sand, or 1/2-inch (minus) or 5/8-inch (minus) crushed rock. Bedding should surround the pipe in all directions. Trench backfill should be lightly compacted above breakable conduits within two diameters or 18 inches, whichever is greater. The remaining backfill should be compacted to 95 percent of the material's maximum dry density as determined by ASTM D 1557 for granular/crushed rock backfill.

#### **4.11 Erosion Control**

The near-surface soils are highly erodible. Erosion protection and silt migration off of the construction site should be controlled via silt fences, bio-bags, and settlement ponds.

#### **4.12 Pavement Design**

We have prepared a pavement design for Portland cement concrete pavements. All pavement designs have been prepared in accordance with the widely accepted AASHTO methods (American Association of State Highway and Transportation Officials).

Design thicknesses were generally based upon the 2007 ODOT Pavement Design Guide and the 1993 edition of the AASHTO Guide for Design of Pavement Structures. The proposed materials for the project consist of Asphalt Cement Concrete (AC) over crushed rock base for the majority of the project. We understand that Jointed Plain Concrete Pavement (JPCP) is proposed for the site.

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We obtained design traffic based on discussions with the design team. We understand that 300 bus trips per day are anticipated. These trips will occur with buses being both fully fueled and partially fueled. Since the site will function as a maintenance and storage facility, passenger loads will be zero. We have calculated a 30-year design traffic level for the site pavements for Portland cement concrete. The total calculated design traffic level for the intersection is 3.3M ESALs.

The pavement subgrade resilient modulus ( $M_R$ ) was developed from a review of available fill materials including the material available from the adjacent borrow site. Based upon our site observations, we anticipate that the imported fill soils consist of silts and sands with some gravels and cobbles. Based upon this information, we have estimated a conservative design k value of 150 pci.

The following values were used in our analyses and were developed from the ODOT Pavement Design Guide:

Pavement Design Parameters

Parameter	Value
Initial Serviceability Rigid	4.5
Terminal Serviceability	2.5
Reliability Level (%)	85
Overall Standard Deviation	0.34
Edge Support Factor	0.92
Design Joint Spacing	12 feet

**Recommended Pavement Design.** Based on our analysis, we recommend the use of a design pavement section of 8 inches of Portland cement concrete over a minimum of 6 inches of crushed rock base over a minimum of 6 inches of crushed asphalt.

## **5.0 Recommendations for Additional Services**

Prior to construction, we recommend that Ash Creek be retained to review the final design plans and specifications. This review will allow us to evaluate whether any change in concept may affect the validity of our recommendations, and whether our recommendations have been correctly interpreted. In order to correlate preliminary soil data with the actual soil conditions encountered during construction, and to assess construction conformance to our report, we recommend that we be retained for construction observation of the following:

- Site preparation activities, including stripping and key and bench construction;
- Subgrade areas for pavements, slabs, and foundations; and
- Other geotechnical considerations that may arise during the course of construction.

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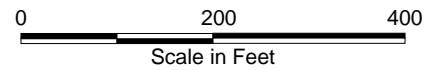
As stated previously, Ash Creek does not provide field density testing, so an independent testing laboratory should be contacted to provide these services.

## **6.0 Closing**


This report presented Ash Creek's geotechnical engineering evaluation and recommendations for the proposed project. We trust that this report meets your needs. If you have any questions, or if we can be of further assistance, please call. We look forward to working with you in the future.







**Legend:**

**B-1**  Soil Boring Location



**Site Vicinity Plan**  
 Geotechnical Evaluation  
 City of Wilsonville SMART OPS/Fleet Facility  
 Wilsonville, Oregon

 **Ash Creek Associates, Inc.**  
 Environmental and Geotechnical Consultants

Project Number	<b>1814-00</b>
<b>December 2010</b>	

Figure  
**1**



***Appendix A***

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**Boring Logs**

## Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

### Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and Geoprobe® explorations is estimated based on visual observation and is presented parenthetically on test pit and Geoprobe® exploration logs.

SAND and GRAVEL	Standard Penetration Resistance in Blows/Foot	SILT or CLAY	Standard Penetration Resistance in Blows/Foot
<u>Density</u>		<u>Density</u>	
Very loose	0 - 4	Very soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium dense	10 - 30	Medium stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very dense	>50	Very Stiff	15 - 30
		Hard	>30

### Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

### Minor Constituents

	<u>Estimated Percentage</u>
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

## Sampling Symbols

### BORING AND PUSH-PROBE SYMBOLS

- Split Spoon
- Sonic
- Tube (Shelby, Push-Probe)
- Cuttings
- Core Run
- \* No Sample Recovery
- SSA Solid Stem Auger
- HSA Hollow Stem Auger
- MR Mud Rotary

### TEST PIT SOIL SAMPLES

- Grab
- Bag
- Shelby Tube

## Key to Exploration Logs

Geotechnical Evaluation  
Wilsonville SMART OPS/Fleet Facility  
Wilsonville, Oregon



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

Depth, feet

Sample ID

Sample

### Lithologic Description

Silty TOPSOIL (~6") and grass roots.

SILT; yellow-brown, moist, medium stiff to stiff.

Silty GRAVEL; gray, dry to moist, very dense.

Bottom of boring at 11.5' BGS.  
No groundwater observed at time of drilling.

66▲



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

Depth, feet

Sample ID

Sample

### Lithologic Description

Silty TOPSOIL (~8") and grass roots.

SILT; yellow-brown, moist, medium stiff to very stiff.

Silty GRAVEL; gray, dry to moist, medium dense to very dense.

Bottom of boring at 11.5' BGS.  
No groundwater observed at time of drilling.

65▲



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

Depth, feet

Sample ID

Sample

### Lithologic Description

Silty TOPSOIL (~8") and grass roots.

SILT; yellow-brown, moist, stiff to very stiff.

Silty GRAVEL; gray, dry to moist, medium dense to very dense.

Bottom of boring at 11.5' BGS.  
No groundwater observed at time of drilling.

52▲



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

## Lithologic Description

Depth, feet	Sample ID	Sample		
5		☒	<p>Silty TOPSOIL (~6") and blackberry roots.</p> <p>Silt FILL; gray and dark brown, dry to moist, stiff</p> <p>SILT; yellow-brown, moist, stiff to very stiff.</p>	▲
10		☒	Silty GRAVEL; gray, dry to moist, medium dense to very dense.	▲
15			Bottom of boring at 11.5' BGS. No groundwater observed at time of drilling.	
20				
25				
30				
35				



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

Depth, feet	Sample ID	Sample	<b>Lithologic Description</b>	Standard Penetration Resistance (Blows per Foot)			
				10	20	30	40
			Silty TOPSOIL (~8") and blackberry roots.				
			SILT; yellow-brown, moist, stiff.				
5		☒					
		☒					
		☒					
10			Silty GRAVEL; gray, dry to moist, medium dense to very dense.				62▲
			Bottom of boring at 11.5' BGS. No groundwater observed at time of drilling.				
15							
20							
25							
30							
35							



▲ Standard Penetration Resistance  
(Blows per Foot)

10      20      30      40

Depth, feet

Sample ID

Sample

### Lithologic Description

Silty TOPSOIL (~8") and blackberry roots.

SILT; yellow-brown, moist, stiff.

Silty GRAVEL; gray, dry to moist, medium dense to very dense.

Bottom of boring at 21.5' BGS.  
Groundwater depth could not be determined due to use of Mud Rotary drilling method.

65▲



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**SECTION 04 2000**  
**UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Accessories.
- F. Masonry Cleaning.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 1000 - Concrete Forming and Accessories: Dovetail slots for masonry anchors.
- B. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- C. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- D. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2022.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2021.
- D. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- E. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2022a.
- F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.
- H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- I. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- K. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- L. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.
- M. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength; 2019.
- N. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2014).
- O. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2021.
- P. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.
- Q. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- R. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- S. Oregon Structural Specialty Code, Latest edition

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Include reinforcing bars schedules, shapes of bent bars, spacing of bars, location of splices, and wall elevations.
- D. Samples: Submit two samples of decorative block units to illustrate color, texture, and extremes of color range.
- E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- F. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- G. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- C. Installer: Company specializing in performing the work of this Section with minimum three years documented experience.
- D. Advance notices: Notify Architect and Testing Lab at least 48 hours before Grout placement.
- E. Reinforcing steel shall not be permitted to rust where there is danger of staining exposed surface of adjacent concrete. The contractor shall replace rust-stained concrete and/or masonry at no additional cost to Owner.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. At the time of delivery to the job site, concrete block units shall not exceed a value in weight of contained water in excess of 30% of full saturated water content total for the unit tested. Units shall be shipped and stored with protection to prevent increase in water content from rain or other sources.

### **PART 2 PRODUCTS**

#### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard open end units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
    - a. Use single open ended blocks at corners, wall ends, and jambs.
    - b. Use closed ended blocks where plain face is called for on drawings.
  - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions. Field cut stretchers to make Bond Beams in CMU to assure color uniformity.
  - 3. Load-Bearing Units: ASTM C90, medium weight.
    - a. Hollow block, as indicated.
    - b. Grade N, Type 1, 2,000 psi Unit Strength, F'm = 2,000 psi.

- c. Maximum moisture content 40 percent.
  - d. Exposed faces: Plain face as indicated on Drawings.
  - e. Medium weight blocks, Grade N, Type 1, 2,000 psi Unit Strength, F'm=2,000 psi.
  - f. Shrinkage of blocks shall not exceed 0.065 percent when tested per ASTM C426.
  - g. Block shall be cured a minimum of 28 days at time of placement.
4. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
- a. Performance of Units with Integral Water Repellent:
    - 1) Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours.
      - (a) No water visible on back of wall above flashing at the end of 24 hours.
      - (b) No flow of water from flashing equal to or greater than 0.032 gallons per hour (0.05 L per hour) at the end of 24 hours.
      - (c) No more than 25 percent of wall area above flashing visibly damp at end of test.
    - 2) Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
    - 3) Compressive Strength: ASTM C1314; maximum 5 percent decrease.
    - 4) Drying Shrinkage: ASTM C1148; maximum 5 percent increase in shrinkage.
  - b. Use only in combination with mortar that also has integral water repellent admixture.
  - c. Use water repellent admixtures for masonry units and mortar by a single manufacturer.
  - d. Manufacturers:
    - 1) ACM Chemistries; RainBloc Water Repellent Masonry Unit Admixture.
    - 2) BASF Aktiengesellschaft; Rheopel Plus.
    - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Block Admixture.
    - 4) Substitutions: See Section 01 6000 - Product Requirements.
  - e. Extent of Work: Provide units with integral water repellent:
    - 1) Where finished surfaces will be exposed to weather.
    - 2) At any below grade masonry.

## 2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type II.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
  - 1. Use only in combination with masonry units manufactured with integral water repellent admixture.
  - 2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
  - 3. Meet or exceed performance specified for water repellent admixture used in masonry units.

## 2.03 FLASHINGS

- A. Metal Flashing Materials:
  - 1. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gage, 0.0187 inch (0.48 mm) thick; finish 2B to 2D.
- B. Combination Non-Asphaltic Flashing Materials - Stainless Steel:

1. Stainless Steel Flashing - Self-adhering: ASTM A240/A240M; 2 mil (0.05 mm) type 304 stainless steel sheet with 8 mil (0.20 mm) of butyl adhesive and a removable release liner.
  - a. Manufacturers:
    - 1) STS Coatings, Inc: [www.stscoatings.com/#sle](http://www.stscoatings.com/#sle).
    - 2) VaproShield, LLC: [www.vaproshield.com/#sle](http://www.vaproshield.com/#sle).
    - 3) WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - 4) York Manufacturing, Inc; York 304: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - 5) Substitutions: See Section 01 6000 - Product Requirements.
- C. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil (.05 mm) type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
  1. Manufacturers:
    - a. Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - b. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - c. York Manufacturing, Inc; Multi-Flash SS: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Stainless Steel/Polymer Fabric Drainage Plane Flashing: ASTM A240/A240M; 2 mil (.05 mm) type 304 stainless steel sheet bonded between one sheet of polymer fabric and one sheet of non-woven drainage material.
  1. Manufacturers:
    - a. STS Coatings, Inc: [www.stscoatings.com/#sle](http://www.stscoatings.com/#sle).
    - b. York Manufacturing, Inc; Flash-Vent SS: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- E. Stainless Steel/Polymer Fabric Drainage Plane Flashing - Self-Adhering: ASTM A240/A240M; 2 mil (.05 mm) type 304 stainless steel sheet with co-polymer butyl adhesive and a removable release liner on one side and a sheet of non-woven drainage material bonded to the other side.
  1. Manufacturers:
    - a. York Manufacturing, Inc; Flash-Vent SA: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.
  1. Manufacturers:
    - a. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - b. Mortar Net Solutions; CompleteFlash: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
    - c. York Manufacturing, Inc: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- G. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
  1. Manufacturers, Synthetic Rubber Products:
    - a. Mortar Net Solutions; BTL-1 Butyl Sealant: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  2. Manufacturers, Modified Polyether Products:
    - a. Mortar Net Solutions: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
    - b. York Manufacturing, Inc; UniverSeal US-100 Liquid Tape: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- H. Termination Bars: Stainless steel; compatible with membrane and adhesives.
  1. Manufacturers:
    - a. York Manufacturing, Inc; Termination Bar: [www.yorkmfg.com/#sle](http://www.yorkmfg.com/#sle).
    - b. Mortar Net Solutions; Termination Bars: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- I. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
  1. Manufacturers:



- a. Mortar Net Solutions; Metal Drip Edges: [www.mortarnet.com/#sle](http://www.mortarnet.com/#sle).
  - b. York Manufacturing, Inc..
  - c. Substitutions: See Section 01 6000 - Product Requirements.
- J. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

## **2.04 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  - 1. Manufacturers:
    - a. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
    - b. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - c. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials; approved by masonry manufacturer, compatible with water repellent specified in Section 07 1900.

## **2.05 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
  - 1. Loadbearing masonry: Type M (2,000 psi).
  - 2. Color: Natural Gray.
- B. Grout for Unit Masonry: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).
  - 1. Compressive Strength of 2,000 psi at 28 days.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly. Mix materials for at least three minutes with minimum of water to produce workable consistency.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.
- E. Use and place mortar in final position within 2 1/2 hours after mixing. Mortar that has stiffened as a result of evaporation of water may be retempered with water as frequently as required to restore required consistency during this time period.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Coordinate masonry work with installation of windows, doors, louvers, anchors, concrete slabs, and mechanical and electrical work.
- D. Verify foundation surface is level to permit bed joint within range of 1/4 to 3/4 inch.
- E. Verify projecting dowels are free from loose scale, dirt, concrete, or other bond-inhibiting substances and properly located.
- F. Clean concrete surfaces to receive masonry. Remove laitance or other foreign material lodge in surface by sandblasting or other means as required.

- G. Ensure masonry units are clean and free from dust, dirt, or other foreign materials before laying.
- H. Roughen concrete below walls to expose aggregate; remove loose particles and saturate before laying blocks.

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave. Unless noted otherwise.

### **3.05 PLACING AND BONDING**

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Install anchors, bolts, and other embedded items accurately as work progresses.
- I. Cut mortar joints flush at the following locations:
  - 1. At exterior walls shown to receive fluid applied weather barrier.
  - 2. Interior sides of walls where wall tile is scheduled.
  - 3. Interior sides of walls where resilient base is scheduled.
  - 4. Interior sides of walls where Gypsum Veneer Plaster finish is scheduled.
- J. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

### **3.06 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY**

- A. Install reinforcement as indicated on Drawings.

### **3.07 ROUTING CONDUIT AND PIPING IN GROUTED CELLS**

- A. Do not run conduit or pipe horizontally in CMU walls to be grouted.
- B. Maximum size of conduit or pipe to be 1" outside diameter.
- C. Do not run conduit or pipe in vertical cells shown to receive reinforcing.
- D. Limit of one conduit or pipe in any single vertical grouted cell.
- E. Neatly cut openings for recessed wall boxes without overcutting holes.

### **3.08 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at non-masonry construction.
  2. Remove or cover protrusions or sharp edges that could puncture flashings.
  3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:
1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
  2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
  3. Anchor vertical leg of flashing into backing with a termination bar and sealant.
  4. Apply cap bead of sealant on top edge of self-adhered flashing.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.
- E. Support flexible flashings across gaps and openings.
- F. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.
- G. Thru-Wall Flashing
1. Extend flashings through veneer, turn up minimum of 6 inches above top of concrete curb/base, and seal to exterior wall sheathing. Use flashing manufacturer's recommended adhesive and sealer.
  2. Lap weather barrier over vertical leg of flashing
  3. Lap thru-wall flashings over stainless steel flashing as shown on Drawings, to within 1/4 inch of exterior face of masonry.

### **3.09 REQUIREMENTS FOR WALLS TO BE GROUTED BY HIGH-LIFT METHOD:**

- A. Lay up walls full story prior to grouting.
- B. Build vertical grout barriers or dam of solid masonry across grout space at no more than 25 feet on centers to control horizontal flow of grout.
- C. Provide cleanouts by leaving out every other unit in bottom course; seal after inspection and before grouting.
- D. During laying up, remove mortar fins and other foreign matter from grout space with high-pressure jet stream or stick and compressed air.

### **3.10 GROUTING**

- A. General Requirements:
1. Use high-lift or low-lift grouting, at Contractor's option.
  2. Grout voids between wythes and cells of concrete block.
  3. Ensure grout flows into voids and completely surrounds reinforcing steel.
  4. Stop grout approximately 1 inch below top of last course, except at top course; bring grout flush with top of block.
  5. Grout from inside face of masonry wherever possible.
  6. Where necessary to stop longitudinal run, provide suitable dam to retain grout in place.
  7. Do not wet down grout spaces prior to grouting.
- B. Low-Lift Grouting:
1. Pour grout to a maximum height of 4 feet, stopping ½ inch below top of unit or over horizontal steel which shall be fully embedded in grout.
  2. Delay 3 to 5 minutes allowing the excess of water to be absorbed by the masonry unit, then consolidate by vibrating.
  3. Layup and grout next 4 feet of walls.
- C. High Lift Grouting

1. Ensure cleanout has been sealed before grouting.
2. If grout pour is 8 feet or less, it may be placed in one lift. If total pour exceeds 8 feet, the grout shall be placed in 4-foot lifts.
3. Pour first lift to a depth not in excess of 4 feet.
4. Delay 3 to 5 minutes allowing the excess of water to be absorbed by the masonry units, then consolidate by vibrating.
5. Complete pour in sequence with other lifts not in excess at 4 feet. Combined reconsolidation of previous lift with consolidation of following pours.

### **3.11 LINTELS**

- A. Install reinforced unit masonry lintels as shown on the structural drawings.
  1. Do not splice reinforcing bars.
  2. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
  3. Place and consolidate grout fill without displacing reinforcing.
  4. Allow masonry lintels to attain specified strength before removing temporary supports.
- B. Maintain minimum 8 inch (\_\_\_\_ mm) bearing on each side of opening unless otherwise shown.

### **3.12 GROUTED COMPONENTS**

- A. Vertical and horizontal reinforcing at bond beams as shown on drawings.

### **3.13 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints unless otherwise noted.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.
- D. Form expansion joint as detailed on drawings.
- E. Joint Spacing: Locate control joints in unit masonry walls where shown on drawings unless otherwise noted.

### **3.14 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames, glazed frames, fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### **3.15 TOLERANCES**

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

### **3.16 CUTTING AND FITTING**

- A. Cut and fit for chases, pipes, conduit, and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.17 PARGING**

- A. Dampen masonry walls prior to parging.
- B. Scarify each parging coat to ensure full bond to subsequent coat.
- C. Parge masonry walls in two uniform coats of mortar to a total thickness of 3/4 inch (19 mm).
- D. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot (1 mm/m).
- E. Strike top edge of parging at 45 degrees.
- F. Extent of Work: Where shown on drawings.

### **3.18 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. An independent testing agency will perform special inspection, as specified in Section 01 4000, to observe placement of reinforcing for masonry construction required to have Special Inspection as indicated on the Drawings.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

### **3.19 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

### **3.20 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

**SECTION 09 9623**  
**ANTI-GRAFFITI COATINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Integral Anti-Graffiti and Water Repellent coatings.
- B. Special preparation of surfaces

**1.02 RELATED SECTIONS**

- A. Section 04 20 00 - Unit Masonry: Cleaning of masonry.
- B. Section 07 90 05 - Joint Sealers

**1.03 PERFORMANCE REQUIREMENTS**

- A. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified
  - 1. Scrubbability: Excellent, when tested in accordance with manufacturer's instructions.

**1.04 SUBMITTALS**

- A. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements, including compatibility with Water Repellent specified under 07 1900.
- C. Maintenance Data: Include cleaning procedures and repair and patching techniques.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

**1.06 ADVANCE NOTICE**

- A. Notify Architect at least 48 hours prior to completing the work of this section.

**1.07 MOCK-UP**

- A. Provide test panel 10 feet long by 4 feet wide, illustrating complete application and coverage for each substrate.
- B. Locate where directed and under observation of manufacturer's representative.
- C. Verify that Anti-Graffiti Protection System will effectively repel paint and other markings from Surface, and will produce no surface stains when cleaned.
- D. Mock-up may remain as part of the Work.

**1.08 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

**1.09 DELIVERY, STORAGE, AND PROTECTION**

- 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. Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.
- D. Store products of this section in manufacturer's unopened packaging until installation.

- E. Establish and maintain storage area conditions for products of this section in accordance with manufacturer's instructions until installation.
- F. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction over project.

#### **1.10 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- C. Restrict traffic from area where coating is being applied or is curing.
- D. The surfaces should be visibly dry, and ambient conditions, including relative humidity, should be such that condensation does not form on the surface during application.
- E. In hot weather, avoid applying the coatings in the direct sunlight during the hottest parts of the day.
- F. In cold weather, apply the coating later in the day when the surface temperature is higher.
- G. Perform no work when weather exceeds Manufacturer's specified limits.

#### **1.11 EXTRA MATERIALS**

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Supply two gallons for Owner's use in maintenance of project.
- C. Supply two containers of paint removal products for Owner's use in maintaining anti-graffiti coating.
- D. Store where directed by Architect.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Prosoco - "Bloc-Guard & Graffiti Control", water and graffiti repellent.
- B. Evonik Industries; Protectosil water repellent and Anti graffiti .
- C. Substitutions: See Section 01600 - Product Requirements.

#### **2.02 MATERIALS**

- A. Non-gloss, non-yellowing, clear and colorless, hydrophobic coating.
- B. Provide complete system formulated and recommended by manufacturer for the applications indicated, in the coverage rates as determined by substrate specific conditions.
  - 1. Maximum volatile organic compound (VOC) content: As required by applicable regulations.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- C. Verify that the anti-graffiti coating is compatible with dampproofing and other sealers previously applied or to be applied to the wall surfaces.

#### **3.02 PREPARATION**

- A. Clean surfaces of loose foreign matter, pressure wash if necessary. Remove all foreign materials which would inhibit penetration and adhesion of the product.
- B. Protect adjacent surfaces and materials not receiving coating from overspray; mask if necessary to provide adequate protection. Repair damage.

### **3.03 COATING APPLICATION**

- A. Apply coatings in accordance with manufacturer's instructions , to coverage rate determined by test panel.
- B. Apply in uniform thickness coats, without variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.
- C. Apply Coatings without adulteration.
- D. Take precautions to avoid harm to building occupants and others on site from fumes. Cover any air intakes and other building openings that may come in contact with the product or fumes from the application. Keep coverings in place until odors have dissipated.
- E. Applicators shall wear appropriate Safety Equipment when working with or installing this material. Follow Manufacturer's recommendations.
- F. Start application at surface top and work downward. Apply at rate sufficient to thoroughly wet surface in accordance with Manufacturer's Instructions.

### **3.04 CLEANING**

- A. Immediately after application, remove any overspray on adjacent Materials.
- B. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- C. Clean surfaces immediately of overspray, splatter, and excess material

### **3.05 SCHEDULES**

- A. Apply to all Concrete Masonry Unit Veneer.
- B. Apply to all vertical surfaces of pre-cast and cast-in-place concrete on the parking garage.

**END OF SECTION**



**SECTION 22 1005  
PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Domestic water.
  - 3. Flanges, unions, and couplings.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C. Section 22 0719 - Plumbing Piping Insulation.

**1.03 REFERENCE STANDARDS**

- A. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2021.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- D. ASME B31.9 - Building Services Piping; 2020.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- F. ASTM B32 - Standard Specification for Solder Metal; 2020.
- G. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2020.
- H. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- I. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- J. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- K. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
- L. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.
- M. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.
- N. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2020.
- O. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2023.
- P. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
- Q. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
- R. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
- S. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
- T. NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- U. NSF 372 - Drinking Water System Components - Lead Content; 2022.

#### 1.04 SUBMITTALS

- A. See Section 01 33 00 for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### PART 2 PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

#### 2.02 SANITARY SEWER PIPING, ABOVE & BELOW GRADE

- A. PVC Pipe: ASTM D2665.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.
- B. PVC Pipe: ASTM D1785 Schedule 80, or ASTM D2241 SDR 26 with not less than 150 psi pressure rating.
  - 1. Fittings: ASTM D2466, PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

#### 2.03 DOMESTIC WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn.
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
  - 2. Joints: AWS A5.8M/A5.8, BCuP copper/silver braze.

#### 2.04 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn.
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
  - 2. Joints: AWS A5.8M/A5.8, BCuP copper/silver braze.

#### 2.05 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  - 2. Joints: ASTM B32, alloy Sn95 solder.
- B. Steel Pipe: ASTM A53/A53M Schedule 40, galvanized, using one of the following joint types:
  - 1. Threaded Joints: ASME B16.4 cast iron fittings.

#### 2.06 FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch and Under:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
  - 2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

### PART 3 EXECUTION

### **3.01 EXAMINATION**

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### **3.02 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- G. Provide access where valves and fittings are not exposed.
- H. Install water piping to ASME B31.9.
- I. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- J. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- K. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

### **3.04 APPLICATION**

- A. Install unions downstream of valves and at equipment or apparatus connections.

**END OF SECTION**

**SECTION 22 1500**  
**GENERAL SERVICE COMPRESSED-AIR SYSTEMS**

**PART 1 GENERAL**

The General Provisions of the Contract, including General and Special Conditions and the requirements of Division 1, apply to the Work in this Section.

**1.01 SECTION INCLUDES**

- A. Equipment items as listed below by Equipment Mark Number:
  - 1. COMPRESSOR, AIR, RECEIVER MOUNTED, 30 HP ROTARY SCREW  
Equipment Mark Number: 2172
- B. Roughing-in, installation of equipment, and final connection of utilities, with labor, services, and incidentals necessary for complete and operational equipment installation.
- C. Piping, wiring, and switching between equipment and utilities.

**1.02 ALTERNATIVE BIDS**

- A. Refer to Division 1 - General Requirements for possible effect on Work of this Section.

**1.03 QUALITY ASSURANCE**

- A. Experience: Equipment shall be produced by a manufacturer of established reputation with a minimum of five years experience supplying specified equipment in similar transit applications.
- B. Manufacturer's Representative:
  - 1. Installation: Provide a qualified manufacturer's representative at site to supervise work related to equipment installation, check out and start up.
  - 2. Training: Provide qualified manufacturer's technical representative to provide training to Owner's maintenance personnel in operation and maintenance of specified equipment.

**1.04 STANDARD AND REGULATORY REQUIREMENTS**

- A. Equipment indicated within this specification section shall comply with all applicable national, state, and local codes and regulations, including seismic, fire, and racking codes and regulations. Additional, more specific compliance requirements may be listed under individual equipment headings.
- B. Permitting: Any individual equipment permits required by the local authority having jurisdiction (AHJ) shall be responsibility of the Contractor. The contractor shall obtain all necessary information, provide all necessary documents, and submit for any and all individual equipment permit as required by the AHJ. Individual equipment permits shall include, but not necessarily be limited to, any deferred equipment submittals, seismic permitting, fire marshal approvals, and equipment installation/start-up permitting.
- C. 'Buy America' Requirements: All manufactured products listed within this specification section are part of a federally assisted procurement involving funds granted by the Federal Transit Administration (FTA), and shall comply with Buy America requirements as delineated by Title 49 Code of Federal Regulations (CFR) Subsection 661.

**1.05 SUBMITTALS**

- A. Refer to the Equipment Schedule shown on the Drawings for submittal requirements listed in the "Submittals" column of that Schedule. In the event of conflict between this Specification Section and the Equipment Schedule, the Equipment Schedule is to govern.
- B. Product Data:
  - 1. Submit Product Data in accordance with Division 1 - General Requirements of these specifications.

2. All Product Data submittals shall identify proposed project specific items marked by arrow, circle, underline, reproducible highlight, or other markings clearly discernable by the reviewer, to show which specific items, parts and accessories are being submitted for the project product data review. Non-marked or generic product data submittals with no marks indicating specific items, parts and accessories will be a cause for rejection.
  3. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalog when pertinent information is contained on a single page.
- C. Operation and Maintenance Manual:
1. Prior to installation, provide a complete parts list, operating instructions, and maintenance manual covering all wash equipment including, but not limited to:
    - a. Description of system and components.
    - b. Schematic diagrams of electrical, plumbing and compressed air systems.
    - c. Manufacturer's printed operating instructions.
    - d. Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance information will indicate that preventive maintenance is not a condition for validation of warranties.
    - e. List of original manufacturer's parts, including suppliers' part numbers and cuts, recommended spare parts stockage quantity and local parts and service source.
  2. Assemble and provide copies of manual in 8-1/2 by 11 inch format. Foldout diagrams and illustrations are acceptable. Manual to be reproducible by dry copy method. PDFs are acceptable. Provide copies per provisions of Division 1 - General Requirements.
- D. Shop Drawings: Submit in accordance with Division 1 -General Requirements of these specifications. Refer to the Equipment Schedule shown on the Drawings for the equipment mark numbers requiring shop drawings.
1. Submitted shop drawings shall be project specific and shall include a minimum 1/8 inch to 1 foot scaled (or larger standard architectural imperial scale), dimensioned, graphical representation of the size, orientation, and location for the submitted equipment. The drawings shall further include dimensions from structural elements or Architectural grid lines, operational clearances, locations of any utility service connection points, mounting requirements, and structural supports required for the submitted equipment.
- E. Required Documents for Permit and Local Jurisdictional Approval: Where required by local jurisdiction and/or code officials, the contractor/supplier shall be responsible for producing and submitting all documentation required for obtaining any and all applicable approvals related to the specified equipment. This documentation may include, but may not be limited to, engineered signed and stamped plans, details, anchorage layouts, as well as other documents to show compliance with locally adopted codes. A copy of these required documents shall be included with the product submittal to the Owner's Representative /consultant team for their review.
- F. 'Buy America' Certificates: 'Buy America' certificates required during bidding shall also be required as part of each product submittal. Certificates shall be complete and accurate. Certificates shall indicate either compliance or non-compliance with the 'Buy America' regulations. Certificates of non-compliance shall also include copies of any granted waivers.

## **1.06 PRODUCT SUBSTITUTIONS**

- A. Follow requirements specified in Division 1 - General Requirements.
- B. Additional costs resulting from substitution of products other than those specified, including drawing changes and construction, will be at the expense of the Contractor.
- C. Substitution Approval: Manufacturers listed for each equipment item may bid without submittal for that item. Manufacturers not listed shall submit for approval in accordance with "Instructions

to Bidders". Prior to procurement, submittals for each equipment item by Mark Number shall be provided in accordance with Division 1 - General Requirements.

#### **1.07 WARRANTY**

- A. Warrant work specified herein for one year from acceptance by Owner against defects in materials, function and workmanship.
- B. Warranty shall include materials and labor necessary to correct defects.
- C. Defects shall include, but not be limited to noisy, rough, or substandard operation; loose, damaged, and missing parts; and abnormal deterioration of finish.
- D. Submit warranties in accordance with Division 1 - General Requirements of these specifications.
- E. All parts shall be readily available locally in the United States.

#### **1.08 PRODUCTION DELIVERY, STORAGE, AND HANDLING**

- A. Deliver equipment in manufacturer's containers, appropriately packaged and/or crated for protection during shipment and storage in humid, dusty conditions.
- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title and Mark Number of this specification.
- C. Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

#### **1.09 LABELING**

- A. Manufacturer shall securely attach in a prominent location on each major item of equipment a non-corrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.
- B. All electrical equipment and materials shall be new and shall be listed by Underwriter's Laboratories, Inc. (U.L.), or other National Recognized Testing Laboratory (NRTL), in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

### **PART 2 PRODUCTS**

#### **2.01 COMPRESSOR, AIR, RECEIVER MOUNTED, 30 HP ROTARY SCREW Equipment Mark Number: 2172**

- A. Capacities and Dimensions:
  - 1. Compressor:
    - a. Displacement: 103 CFM total.
    - b. Motor: 30 HP.
    - c. Motor speed: 3550 RPM.
    - d. Pressure (Full load/Unloaded): 140/150 PSI.
  - 2. Aftercooler:
    - a. Fan air flow: 2600 CFM, nominal.
    - b. Duct loss (H<sub>2</sub>O): 1/4 inch, maximum.
    - c. Approach: 15 degrees F.
    - d. Heat rejection: 71,600 BTU/hr.
    - e. Fluid capacity: 2-1/2 gallons.
  - 3. Receiver:
    - a. Capacity: 120 gallons.
    - b. Rating: 200 PSI, minimum.

- c. Discharge piping: 1 inch NPT.
    - d. Drain: 1/2 inch NPT.
  - 4. Noise level: 90 dBA, maximum.
  - 5. Overall dimensions, nominal:
    - a. Length: 72 inches.
    - b. Depth: 30 inches.
    - c. Height: 61 inches.
  - 6. Weight, nominal: 1095 pounds.
- B. Features and Construction:
  - 1. Type: Oil flooded rotary screw, continuous duty, horizontally receiver tank mounted compressor.
  - 2. Motor: High efficient NEMA T-frame, C-face, design-B with class-F insulation and B temperature rise with TEFC drip proof type enclosure.
  - 3. Motor starter: Full voltage magnetic starter with 115 volt controls, NEMA-4 enclosure, solid state circuit breaker protection for controls and three-phase overload protection with manual reset.
  - 4. Coupling and drive: Flange mounted to motor C-face for positive alignment and direct driven by a maintenance free coupling
  - 5. Air intake filter: Two stage oversized dry type with replaceable element.
  - 6. Separator tank: ASME coded 200 PSIG sump tank, minimum pressure/check valve, safety relief valve, high efficiency replaceable air/lube separator element, oil return flow fluid level sight indicator and vented fill cap.
  - 7. Cooling system: Air cooled with air cooled aftercooler, spin on oil filter, and factory filled with synthetic lubricoolant.
  - 8. Instrumentation: Air pressure gauge, hour meter, and discharge temperature gauge.
  - 9. Protection devices: Class 20 solid state overload relay, high temperature and over pressure shutdown switches, anti-restart pressure switch preventing starting while air compressor is pressurized, and anti-reversing feature.
- C. Controls: Full modulation, solenoid controlled with automatic start/stop or constant speed timed dual control. Compressor to include NEMA-4 starter enclosure for general indoor use.
- D. Accessories:
  - 1. Maintenance kit: 5 gallons of coolant, 2 air filters, 4 oil filters, and separator. Model No. K00060-036, one each.
  - 2. Auto restart: Resets the compressor following a power failure shutdown, one each.
  - 3. Coalescing filter: Oil coalescing filter (.01 Micron) with auto drain, differential pressure slide indicator, and liquid level indicator.
- E. Utilities Available:
  - 1. Electrical: 230/460 VAC, 3 phase, 30 HP.
  - 2. Drain: 1 inch NPT.
- F. Finish: Durable enamel in manufacturer's standard color.
- G. Manufacturers Reference:
  - 1. Prime Manufacturer: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features and construction.

- a. Sullivan Palatek  
1201 West US Highway 20  
Michigan City, IN 46360  
Phone: (219) 874-2497  
Fax: (219) 809-0203  
Website: www.sullivan-palatek.com
- b. Model: D7-H30 Tank Mount with Auto Drain and Accessories.
- 2. Other manufacturers: Contingent upon compliance with these specifications and documentation requirements set forth in SUBMITTALS, equipment produced by other manufacturers, including the following, may be considered as equal.
  - a. Ingersoll-Rand, Air Solutions  
800-D Beaty Street  
Davidson, NC 28036  
Phone: (704) 896-4000  
Fax: (704) 896-4537  
Website: www.air.ingersoll-rand.com
  - b. Saylor-Beall Manufacturing Company  
400 N. Kibbee Street  
St. Johns, MI 48879  
Phone: (989) 224-2371, (800) 572-4498  
Fax: (989) 224-1873  
Website: www.saylorbe-all.com

## **PART 3 EXECUTION**

### **3.01 INSPECTION**

- A. Coordinate location of rough-in work and utility stub-outs to assure match with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather.
- C. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

### **3.02 INSTALLATION**

- A. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Owner's Representative .
- B. Install equipment in accordance with plans, shop drawings and manufacturer's instructions:
  - 1. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work.
  - 2. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
  - 3. Anchorage: Attach equipment securely to prevent damage resulting from inadequate fastenings. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces.
  - 4. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

### **3.03 TESTING**

- A. After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with the specifications in the presence of the Owner's Representative using acceptance procedures provided by the manufacturer.

### **3.04 CLEAN UP**

- A. Touch-up damage to painted finishes.



- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify Owner's Representative for acceptance inspection.

**END OF SECTION**

**SECTION 32 3133  
GATE OPERATORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sliding Gate Operators
- B. Gate Control Equipment
- C. Gate Operator Pad

**1.02 RELATED SECTIONS**

- A. Section 32 3113 - Chain Link Fencing and Gates
- B. Division 26 - Electrical

**1.03 QUALITY ASSURANCE**

- A. Upon completion of installation, check equipment and components to ensure proper and safe function; correct any defects or deficiencies.
- B. Installer must have at least 3 years previous experience in gate operator installations.
- C. A licensed electrician must perform all electrical connections.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Installation Instructions: Manufacturers printed instructions, installation procedures and details of equipment manufacturers and suppliers.
- C. Product Data: Components, materials, colors, attachments, fittings, electrical characteristics.
- D. Shop Drawings: Indicate design and placement of gate operator pad, layout and typical locations for all equipment being provided.

**1.05 REFERENCE STANDARDS**

- A. Sliding gate operator shall be in conformance with Underwriter Laboratories Inc. (UL) Standard for Safety, UL 325 Seventh Edition

**1.06 DELIVERY, STORAGE AND PROTECTION**

- A. Protect against damage and discoloration.
- B. Deliver with manufacturer's tags and labels intact and legible.
- C. Labels or tags shall identify manufacturer, brand name, material, size and applicable standards.

**1.07 WARRANTY**

- A. Provide a five-year limited warranty against all defects in materials or workmanship. Defective materials shall be replaced with comparable materials furnished by the manufacturer, at no additional cost to the Owner.

**PART 2 PRODUCTS**

**2.01 OPERATORS**

- A. Slide Gate Operator: Hy-Security, "SD50F", or approved.
  - 1. Motor: 2 h.p.
  - 2. Voltage: 208-230V, single phase.
  - 3. Speed: 2.2 feet per second.
  - 4. Options:
    - a. Inherent Obstruction Sensing
    - b. Delay on Reverse
  - 5. Gate Capacity: 3,000 pounds.
  - 6. Cover: 16 gage zinc plated sheet metal with powder-coated finish; color to match fencing.
- B. Vehicle Detection:

1. Vehicle Detection Loops:
  - a. "High-temperature" vehicle detection loops cut into pavement or between pavement lifts at the following location:
    - i. For exiting site: one loop inside of gate - to open gate; one loop outside of gate - to begin delay timer to close gate.
  - b. Additional detection loops for safety and entrapment protection.
  - c. Detection loop connections.
2. Time delay control to close gate after entry or exit.
3. Provide steel pedestal and housing for proximity card reader mounting (reader by access control contractor) as shown on the Plans.
4. Provide exterior-rated 10 digit keypad control station for recessed mounting on steel pedestal.
5. Provide photo eyes on inside, outside, and at tail of sliding gates in accordance with UL352 requirements for sensing obstructions.
6. Provide connection and 3-button control inside building. Coordinate with Owner on location.
7. Time delay control to close gate after entry or exit.
8. Provide painted metal sign: "CAUTION AUTOMATIC GATE".

## **2.02 CONTROLS**

- A. Coordinate level of access control required with Owner, specify computer operating system.
- B. Timer: 7 day weekly timers to hold gates open for peak traffic or other special functions on individual days or 5 days a week programmable up to 6 functions a day.
- C. Provide radio control system compatible with Owner's radio control. Verify proper line-of-sight between operators and incoming vehicles using radio control. Provide auxiliary antenna location and wiring as required.
- D. Provide "click-to-enter" feature, with all components required for operation.

## **2.03 CONCRETE PAD FOR GATE OPERATOR**

- A. Concrete: ASTM C 94/C 94M, ready-mixed; Normal Portland Cement, 3,000 psi strength at 28 days, 3/4 inch nominal sized coarse aggregate.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Make field measurements and verify locations before installation.
- B. Verify that electrical power is available and of the correct characteristics.
- C. Verify the gate operates smoothly prior to installation of operators.

### **3.02 INSTALLATION**

- A. Install in a workmanlike manner in conformance with manufacturer's printed instructions and details.
- B. Install Gate Operator Pad in conformance with gate manufacturer's recommendations.
- C. Anchor or install electric operator on a concrete foundation. Using 1/2x4 1/2 Hilti Quick bolt concrete stud type anchors.
- D. Cut grooves in pavement, install vehicle detection loops and lead-in wires; fill grooves with loop filler.
- E. Install internal electrical wiring, conduit, junction boxes, transformers, and auxiliary components required for complete system operation.
- F. Licensed electrician must perform all electrical connections.

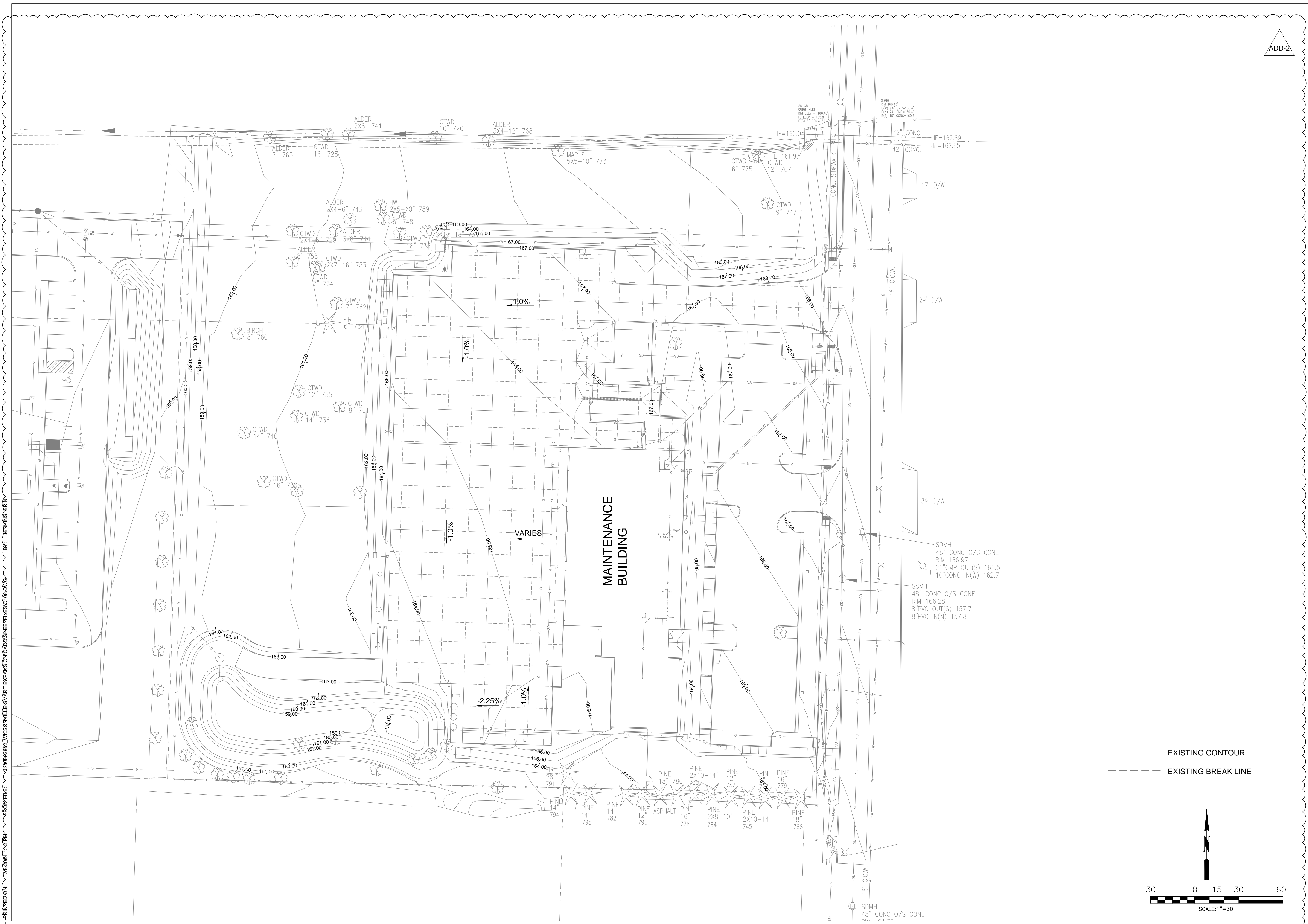
G. Supply electrical power to operator through its own dedicated circuit breaker.

**3.03 CLEANING AND ADJUSTING**

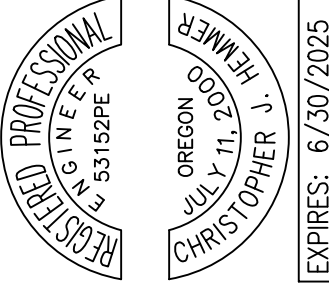
A. Clean up debris and unused material, and remove from the site.

B. Adjust system components for smooth operation.

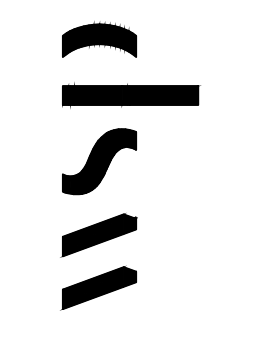
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WSP USA INC.  
1300 SW 5th Ave  
Suite 3100  
Portland, OR 97201  
Tel: 1.503.274.8772



100% CONSTRUCTION DOCUMENTS  
S.M.A.R.T. FACILITY IMPROVEMENTS  
CITY OF WILSONVILLE

CIVIL SITE  
EXISTING CONDITIONS

PROJECT NO.	REVISIONS:
4/28/2024	ADD-2
DATE:	07/08/2024
DRAWN:	EM
CHECKED:	CM

C108

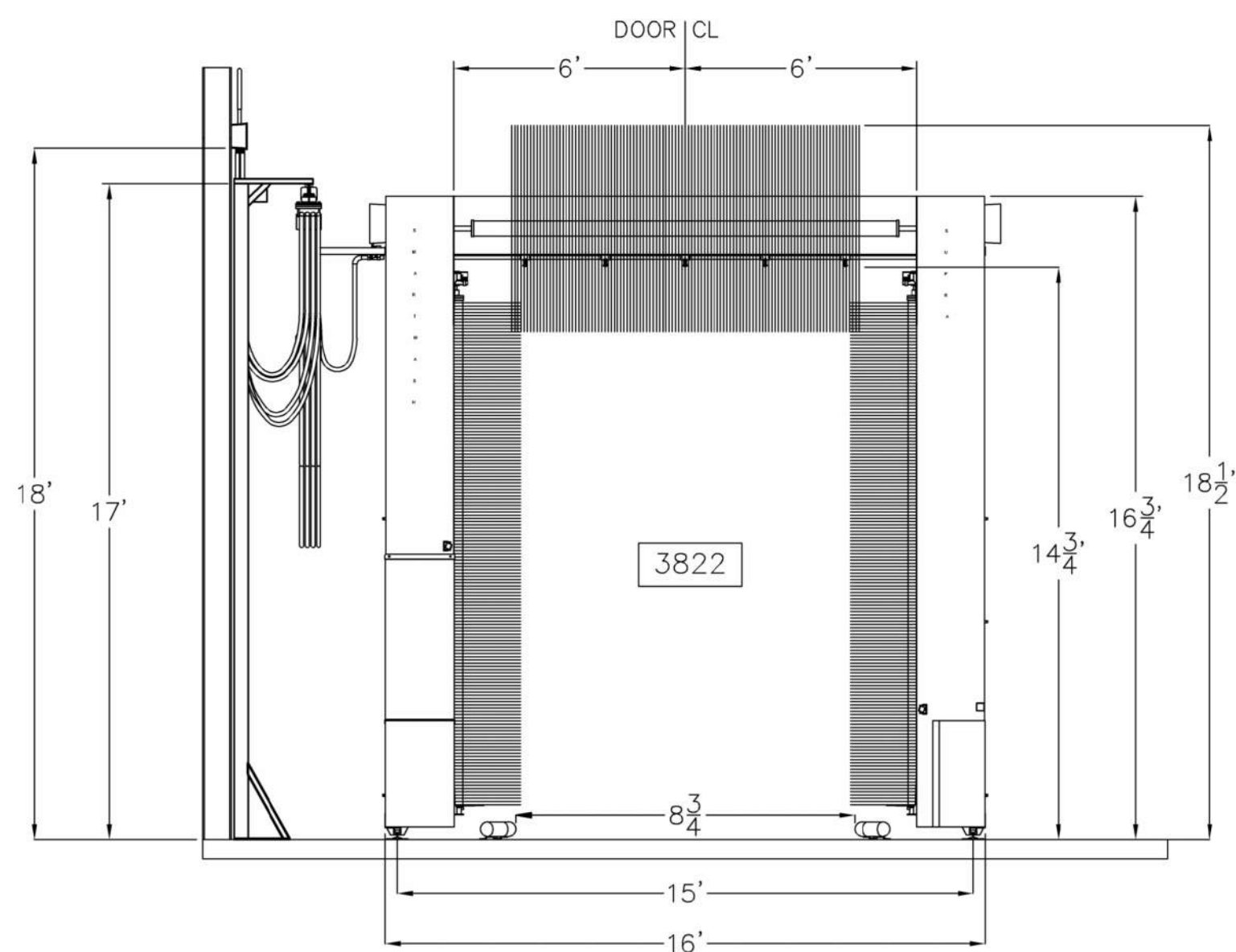


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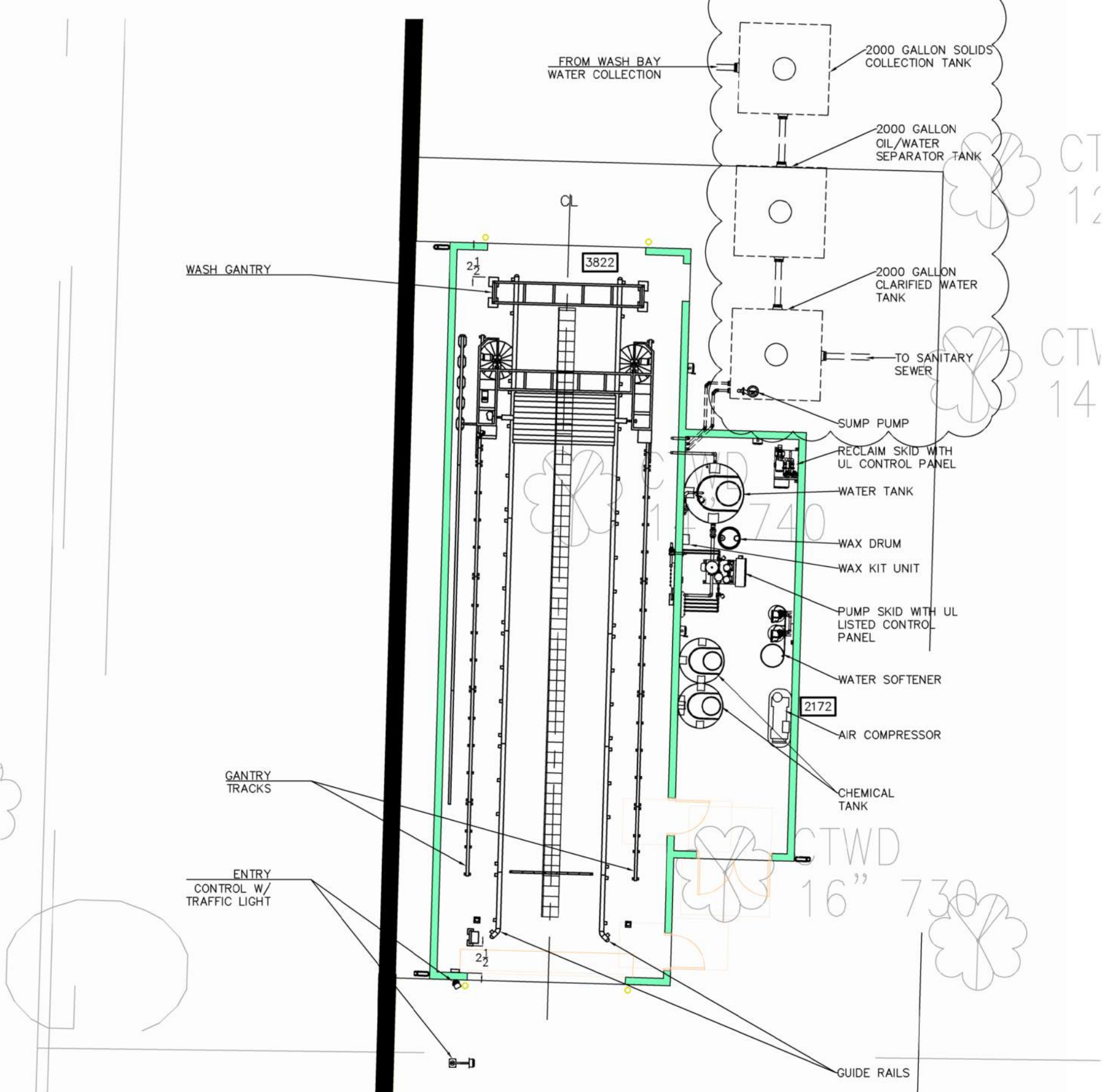
**1 SITE PLAN**

EQUIPMENT SCHEDULE	
EQUIPMENT	DESCRIPTION
PUMP SKID	UL LISTED CONTROL PANEL, CR 32 HIGH PRESSURE PUMP, CR-5 PUMP AND 2 CHEMICAL PUMPS. FUSIBLE DISCONNECT - 400 AMP (FLA 176) - PUMP SKID FROM BUILDING MAIN POWER PULL POWER WIRES AND GROUND WIRE IN CONDUIT TO LINE SIDE OF DISCONNECT, 4' A.F.F. TO BOTTOM OF DISCONNECT. FROM LOAD SIDE OF DISCONNECT TO THE APPROPRIATELY LABELED TERMINALS IN THE UL CONTROL PANEL OF PUMP SKID PULL CAT5e ETHERNET WIRE FROM CUSTOMER NETWORK SERVER LOCATION, TO PUMP SKID PANEL
WATER SOFTENER	CULLIGAN MODEL HET-120; 115 VOLT OUTLET - 20 AMP
RECLAIM SKID	100 GALLON/MIN WITH UL CONTROL PANEL FUSIBLE DISCONNECT - 30 AMP (FLA 24) - RECLAIM SKID FROM BUILDING MAIN POWER PULL POWER WIRES AND GROUND WIRE IN CONDUIT TO LINE SIDE OF DISCONNECT. DISCONNECT TO 4' A.F.F. TO BOTTOM OF BOX. FROM LOAD SIDE OF DISCONNECT TO APPROPRIATELY LABELED TERMINALS IN THE UL CONTROL PANEL OF RECLAIM SKID. SERVICE DISCONNECT - 30 AMP - TRANSFER PUMP FROM UL CONTROL PANEL OF RECLAIM SKID IN CONDUIT PULL POWER WIRES AND GROUND WIRE TO LINE SIDE OF SERVICE DISCONNECT, 4' A.F.F. TO BOTTOM OF SERVICE DISCONNECT. FROM LOAD SIDE OF DISCONNECT IN CONDUIT TO TRANSFER PUMP
ENTRY SYSTEM	ENTRY CONTROL JUNCTION BOX, "J" BOX 12"x12"x4" PVC - 8' A.F.F. PULL IN 1" CONDUIT 3 QTY. #14 AWG. POWER AND GROUND WIRES, 2 QTY. BELDEN (8723) WIRES AND 1 QTY. CAT5e WIRE, FROM UL CONTROL PANEL OF PUMP SKID FROM ENTRY CONTROL JUNCTION BOX, PULL 2 QTY. BELDEN (8723) WIRES IN 3/4" CONDUIT TO ENTRY CONTROL TRAFFIC LIGHT - 8' A.F.F. INSTALL THE ENTRY KEY SYSTEM OUTSIDE ON POLE (2) PULL 3 QTY. #14 AWG. WIRES AND 1 QTY. CAT5e WIRES IN 3/4" CONDUIT UNDERGROUND FROM THE JUNCTION BOX

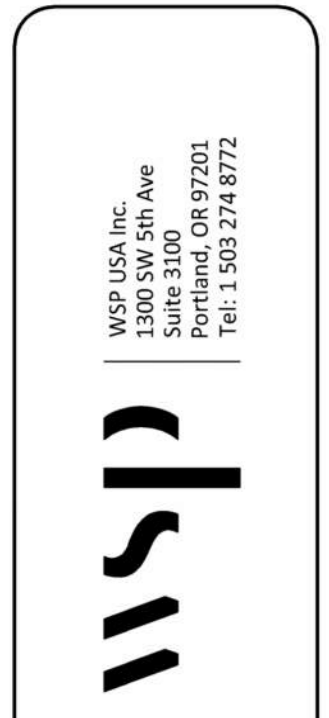
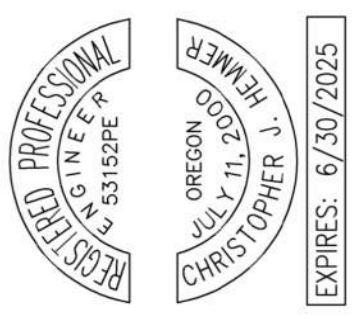


**2 GANTRY WASH ELEVATION**

**NOTES:**  
 4 DIGIT MARK NUMBERS WITH OR WITHOUT ALPHA EXTENSION REPRESENT NEW EQUIPMENT TO BE FURNISHED AND INSTALLED AS GRAPHICALLY INDICATED AND SHOWN IN SECTION 11000 SCHEDULES FOR EQUIPMENT.  
  
 ALL NEW EQUIPMENT SHOWN ON THESE DRAWINGS IS BASED ON SPECIFIED MANUFACTURER. ANY MODIFICATIONS AND / OR SUBSTITUTIONS OF SAID EQUIPMENT MUST BE COORDINATED BY THE CONTRACTOR INCLUDING ALL CONNECTIONS, SERVICES, OPENING SIZES, AND ANY OTHER CONSTRUCTION RELATED REQUIREMENTS.  
  
 RELAY AND COORDINATE ALL STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING REQUIREMENTS OF EQUIPMENT WITH MANUFACTURER PRIOR TO INSTALLATION.  
  
 DEPTH OF TANKS TO BE SPECIFIED BY MANUFACTURER. COORDINATE WITH CIVIL ENGINEER.



**3 ENLARGED BUILDING PLAN**



100% CONSTRUCTION DOCUMENTS  
 S.M.A.R.T FACILITY IMPROVEMENTS  
 CITY OF WILSONVILLE

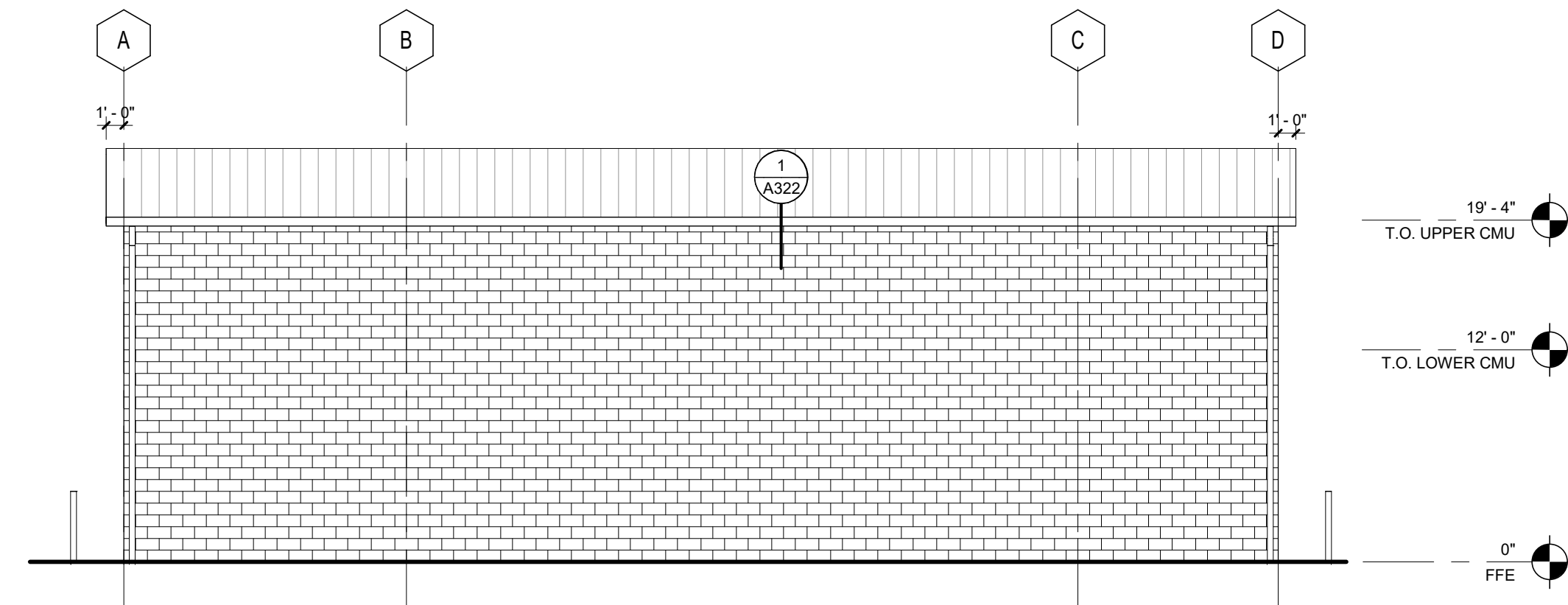
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CHECKED: MK	MK

**C200**

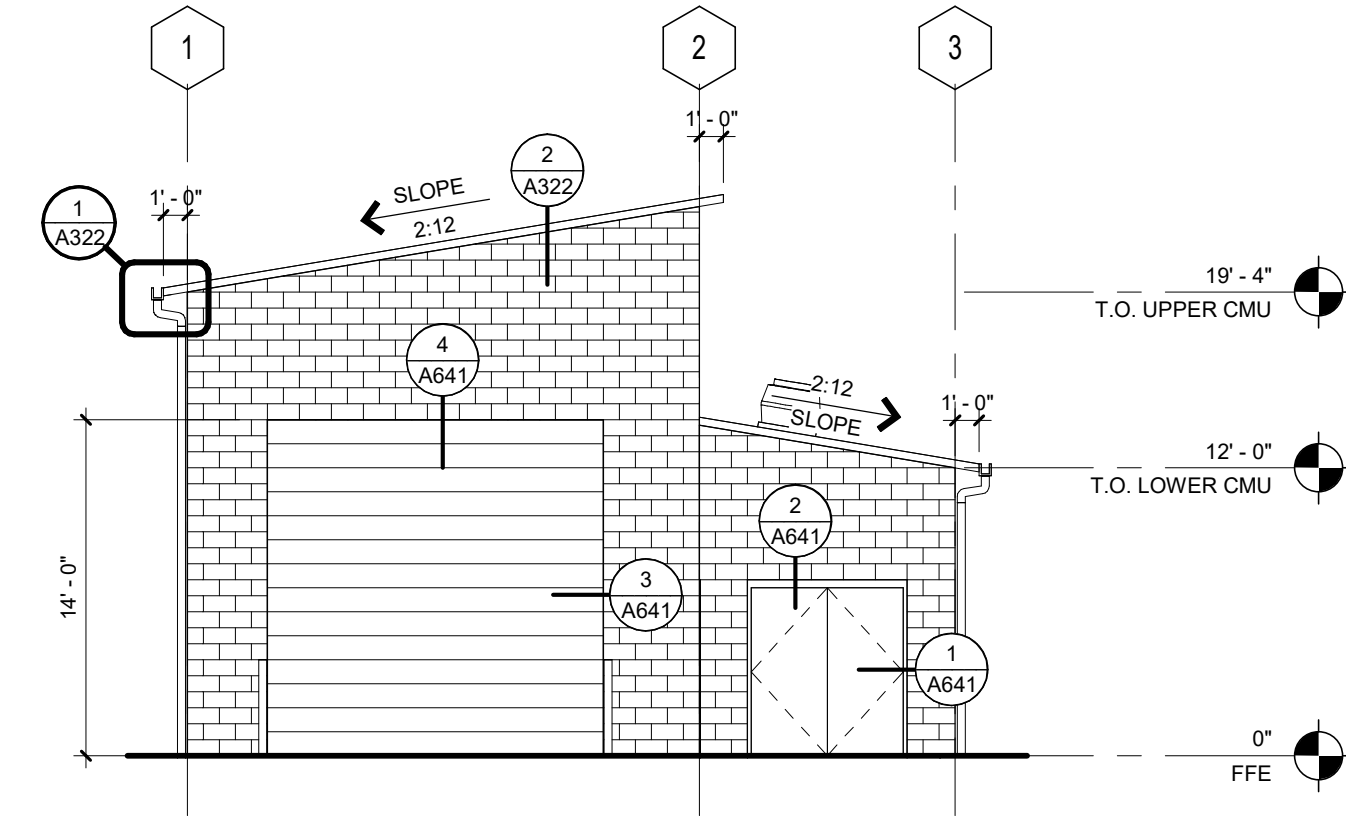


EXTERIOR COLOR INFORMATION		
ELEMENT	FINISH	COLOR
CMU-1	WR & AG	TBD
METAL PANEL	FACTORY FINISH	TBD

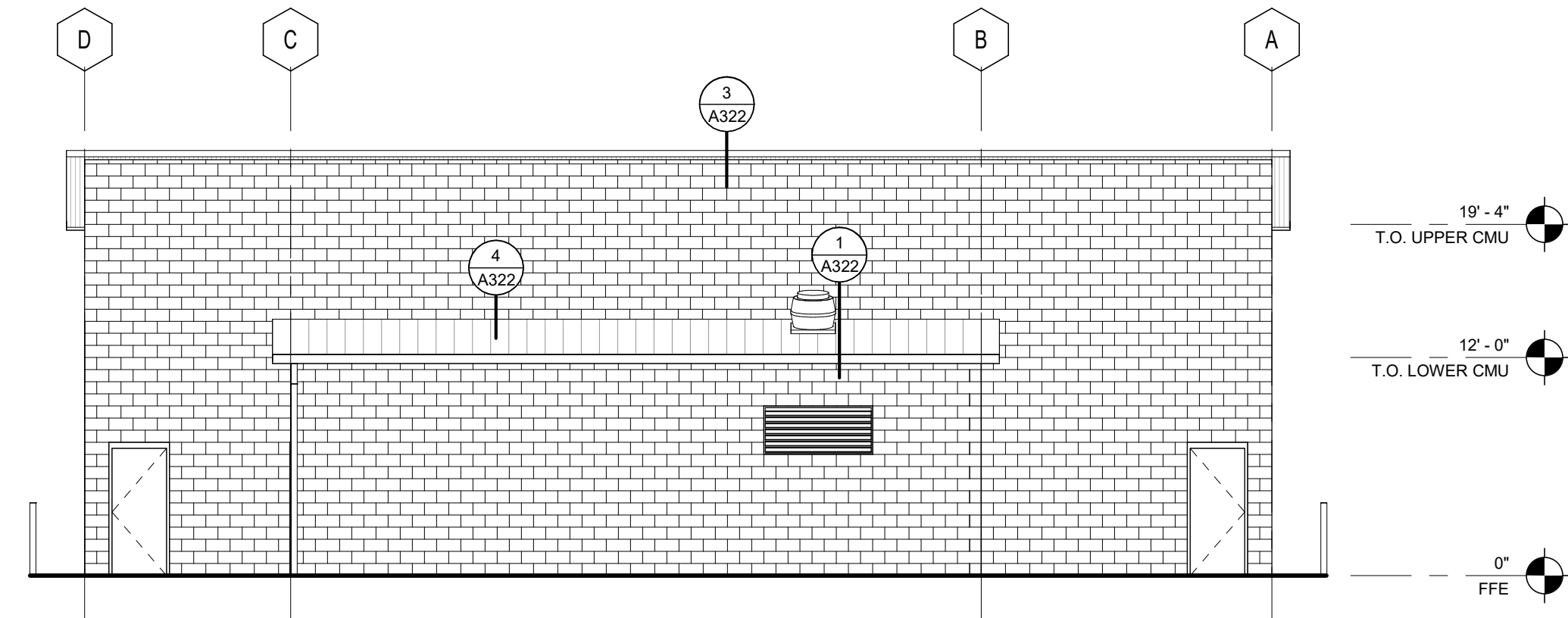
ADD-2



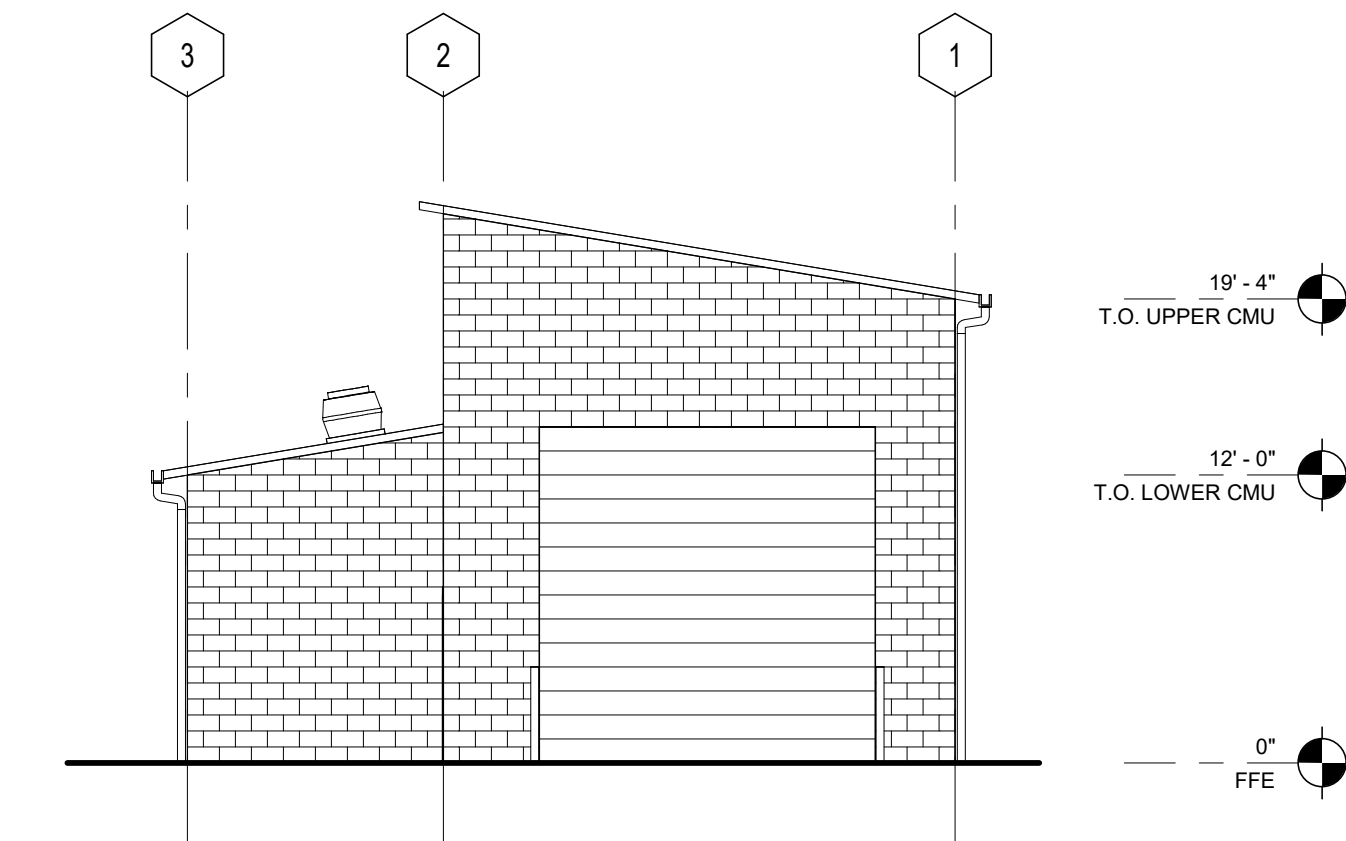
**4 WEST ELEVATION**  
1/8" = 1'-0"



**3 SOUTH ELEVATION**  
1/8" = 1'-0"



**2 EAST ELEVATION**  
1/8" = 1'-0"



**1 NORTH ELEVATION**  
1/8" = 1'-0"

## PLUMBING FIXTURE SCHEDULE

**GENERAL:**  
 A. ALL ROUGH-IN SIZES ARE MINIMUM CONNECTION SIZES. REFER TO DRAWINGS FOR FINAL SIZING.  
 B. ALL VERTICAL WASTE RISERS TO FIXTURES AND ALL BELOW FLOOR WASTE PIPING SHALL BE A MINIMUM OF 2".

**NOTES:**  
 1. LISTED FIXTURE AND TRIM ARE BASIS OF DESIGN. REFER TO SPECIFICATIONS FOR APPROVED ALTERNATE MANUFACTURERS. COORDINATE SUBSTITUTIONS WITH ARCHITECT/OWNER.

REFERENCE				ROUGH-IN				DESCRIPTION	TRIM	NOTES
ID-TAG	MANUFACTURER	MODEL	ADA	CW	HW	W	V			
FCO-1	ZURN	Z1400	N/A	-	-	SEE DWG	-	ADJUSTABLE FLOOR CLEANOUT, CAST IRON BODY, TAPERED THREAD PLUG AND ROUND NICKEL BRONZE SCORIATED CAST IRON HEAVY-DUTY SECURED TOP, ADJUSTABLE TO FINISHED FLOOR. OUTLET SIZE AS NOTED ON DRAWINGS.	N/A	1
FD-1	ZURN	Z415B-P	N	-	-	4"	2"	CAST IRON BODY FLOOR DRAIN, TYPE "B" 6" ROUND POLISHED NICKEL BRONZE STRAINER. OUTLET SIZE AS NOTED ON DRAWINGS.	PROVIDE WITH TRAP PRIMER 1/2" CONNECTIONS. REFER TO TP-1.	1
GCO-1	ZURN	Z1474	N/A	-	-	SEE DWG	-	GRADE CLEANOUT, ROUND, DURA-COATED CAST IRON, SIZE AS INDICATED, DOUBLE FLANGED HOUSING, HEAVY DUTY SECURED SCORIATED DURA-COATED CAST IRON COVER, LIFTING DEVICE, BRONZE CLEANOUT PLUG WITH GAS/WATER-TIGHT SEAL.	N/A	1
RPBP-1	WATTS	LF009	N/A	2 1/2"	-	-	-	BACKFLOW PREVENTER - REDUCED PRESSURE ZONE TYPE, BRONZE OR FDA APPROVED EPOXY COATED CAST IRON CONSTRUCTION, SIZE SAME AS CONNECTED PIPE, NON-CORROSIVE INTERNAL PARTS, STAINLESS STEEL SPRINGS, DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN SPRING-LOADED CHECK	BRONZE OR FDA APPROVED EPOXY COATED CAST IRON STRAINER UPSTREAM OF BACKFLOW PREVENTER, TO BE FURNISHED WITH BACKFLOW PREVENTER. PROVIDE TWO PRESSURE GAUGES, ONE ON EACH SIDE OF ASSEMBLY.	1
TD-1	TRENCHIFY	TPC600	N/A	-	-	4"	-	CLASS D RATED, DUCTILE IRON GRATE WITH LOCKING DEVICE	N/A	1
TP-1	PRECISION PLUMBING PRODUCTS	P1-500	N/A	1/2"	-	1/2"	-	MECHANICAL TRAP PRIMER. BRASS-PLATED CAP AND BODY. UPC/IAPMO LISTED. ACTIVATION WITH 10 PSIG PRESSURE DROP. SYSTEM OPERATING RANGE BETWEEN 20-80 PSI. 1/2" FIP INLET AND 1/2" MIP OUTLET.	N/A	1

## SUMP PUMP SCHEDULE

**NOTES:**  
 1. PROVIDE WITH WATERPROOF POWER CABLE, VERIFY FINAL LENGTH. CONFIRM LENGTH WHEN ORDERING.  
 2. PROVIDE WITH INTEGRAL FLOAT SWITCH OR PIGGY BACK FLOAT.  
 3. PROVIDE ZOELLER MODEL 10-4013 INDOOR ALARM WITH REED SENSOR.

REFERENCE				MECHANICAL DATA			ELECTRICAL				NOTES
ID TAG	MFR	MODEL	SERVES	CONFIGURATION	FLOW (GPM)	OPERATING PRESSURE (FT. HEAD)	MOTOR SIZE (HP)	VOLTAGE (V)	PHASE	FREQUENCY (HZ)	
SP-1	ZOELLER	95	RECLAIM TANKS	SINGLE	80	26	0.5	115	1	60	1,2

## AIR COMPRESSOR AND DRYER SCHEDULE

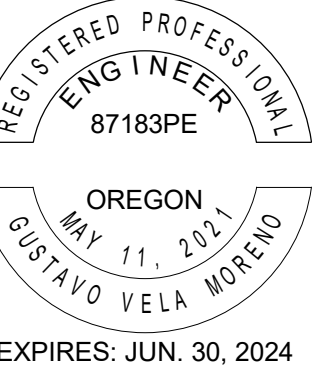
**NOTES:**  
 1. LISTED FIXTURE AND TRIM ARE BASIS OF DESIGN. REFER TO SPECIFICATIONS FOR APPROVED ALTERNATE MANUFACTURERS. COORDINATE SUBSTITUTIONS WITH ARCHITECT/OWNER.  
 2. PROVIDE INTEGRAL DESICCANT AIR DRYER AND OTHER RELEVANT EQUIPMENT IN ORDER TO PROVIDE A FULLY FUNCTIONAL SYSTEM.

ID-TAG	MANUFACTURER	MODEL	DESCRIPTION	CAPACITY (CFM)	ELECTRICAL				NOTES
					MOTOR SIZE (HP)	VOLTAGE (V)	PHASE	FLA / MCA	
AC-1	SULLIVAN PALATEK	30D7	COMPLETE COMPRESSOR PACKAGE WITH MOUNTED DESICCANT AIR DRYER, HIGH EFFICIENCY COALESCING AIR FILTER, AND RECEIVER TANK.	115	30	208	3	77.4 / 96.8	1,2

## PLUMBING PIPING AND INSULATION SCHEDULE

**NOTES:**  
 1. ALL PIPING UTILIZED FOR POTABLE WATER SHALL MEET NSF 14, 61 AND 372. PUSH TO CONNECT / PUSH ON TYPE JOINTS ARE NOT ALLOWED. REFER TO SPECIFICATIONS FOR FURTHER JOINT AND MATERIAL REQUIREMENTS.  
 2. REFER TO SPECIFICATIONS FOR FURTHER INSULATION REQUIREMENTS. INSULATION R-VALUE SHALL MEET ASHRAE 90.1-2019 REQUIREMENTS.  
 3. ALL VALVES UTILIZED IN POTABLE WATER SYSTEMS SHALL MEET NSF 61 AND 372. REFER TO SPECIFICATIONS FOR FURTHER VALVE REQUIREMENTS.

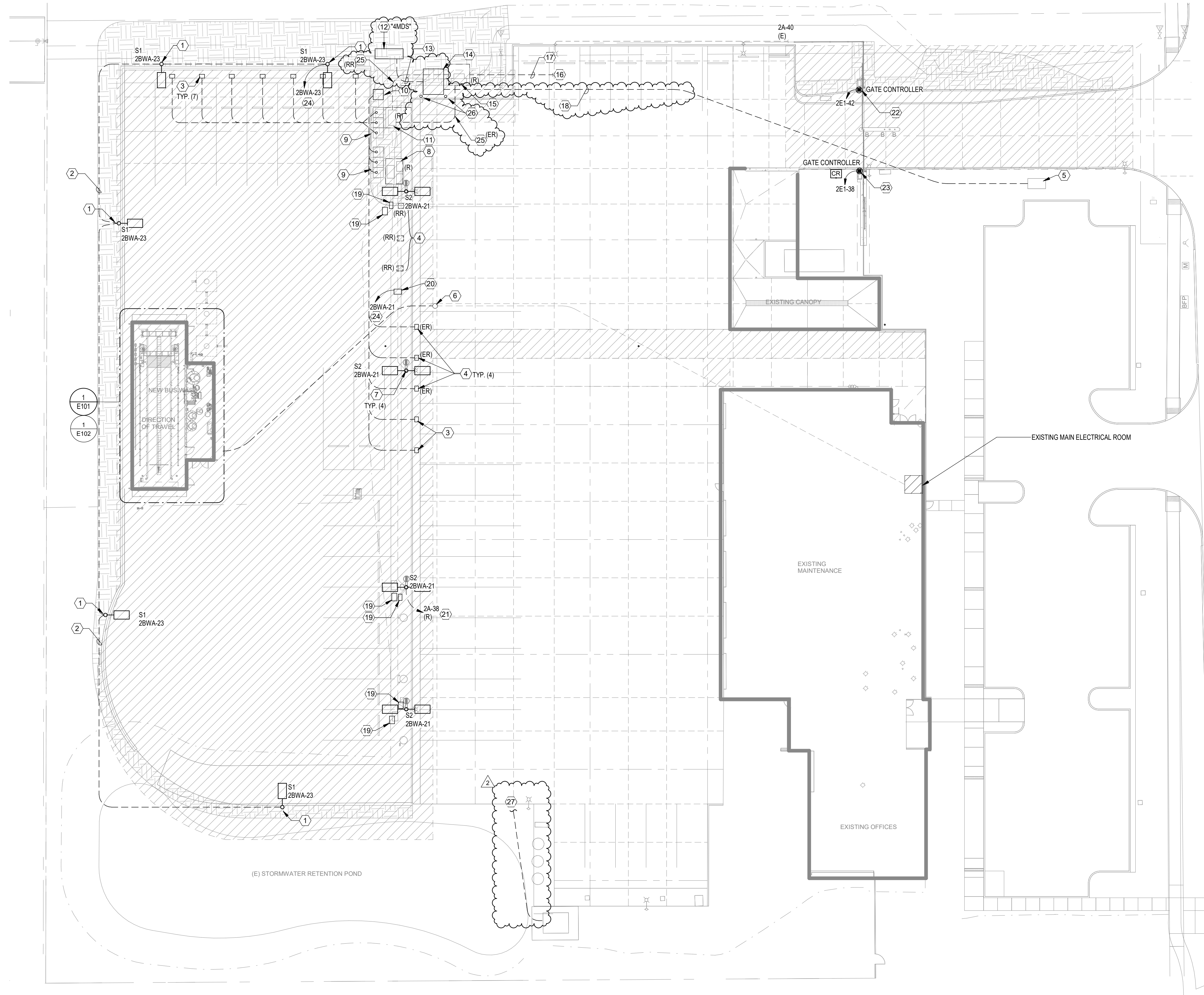
SYSTEM	SIZE RANGE (INCHES)	LOCATION	PIPE MATERIAL	JOINT TYPE	VALVE TYPES	INSULATION TYPE	INSULATION THICKNESS (INCHES)	NOTES
INDUSTRIAL COLD WATER	1/2 - 3	ALL	TYPE L COPPER	SOLDER	BRONZE BALL W/ SS TRIM	MINERAL FIBER/ELASTOMERIC	1	1,2,3
DOMESTIC COLD WATER	1/2 - 3	BELOW GROUND	TYPE L COPPER	BRAZED	BRONZE BALL W/ SS TRIM	MINERAL FIBER/ELASTOMERIC	1	1,2,3
PUMPED SANITARY	3/4 - 4	ALL	SCH 80 CPVC	SOLVENT	PVC BALL	-	-	-
SANITARY & VENT	1 1/4 - 6	ALL	SCH 40 PVC DWV	SOLVENT	N/A	-	-	-



REVISIONS:

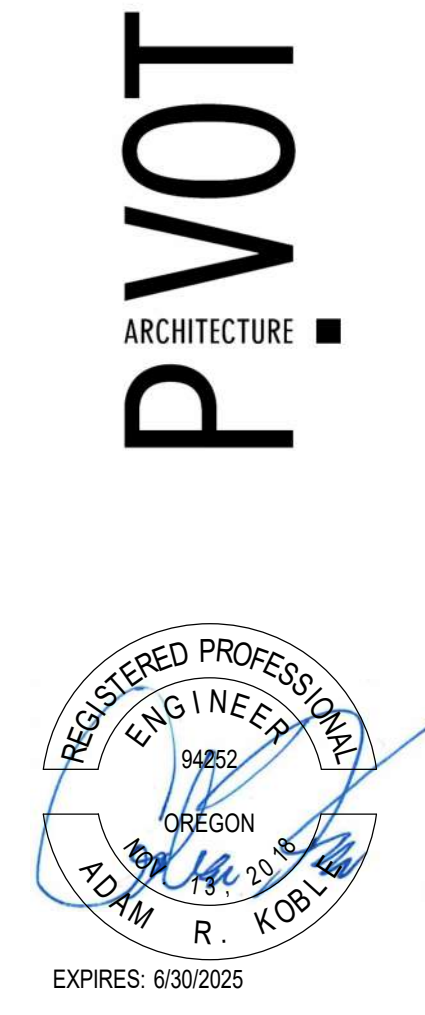
#	DESCRP.	DATE
1	ADD-1	06/28/24
2	ADD-2	07/08/24





**1 SITE PLAN - ELECTRICAL**  
3/64" = 1'-0"

- KEYNOTES** #
- 1 REFER TO STRUCTURAL DETAIL FOR CONCRETE POLE BASE.
  - 2 VERIFY CONDUIT ROUTING WITH CIVIL AND STRUCTURAL ENTITIES. COORDINATE INSTALLATION WITH FOOTING CONSTRUCTION.
  - 3 FUTURE BUS EV CHARGING CHARGE DISPENSER. PROVIDE (1)1-1/2"C FOR POWER CABLES AND (1)1"C FOR CONTROLS. HOMERUN TO DEDICATED 3'X5' CONCRETE PULLBOX LOCATED IN PLANTER NEAR CHARGING EQUIPMENT PAD.
  - 4 RELOCATE EXISTING BUS EV CHARGING DISPENSERS. PROVIDE (1)1-1/2"C FOR POWER CABLES AND (1)1"C FOR CONTROLS TO NEW CHARGING EQUIPMENT.
  - 5 EXISTING PGE PRIMARY VAULT. VERIFY CONNECTION POINT WITH PGE REPRESENTATIVE.
  - 6 NEW POWER FEEDER TO BUS WASH FACILITY AND PANEL. REFER TO ONE-LINE DIAGRAM. FIELD LOCATE, INTERCEPT AND EXTEND EXISTING SPARE CONDUITS TO BUS WASH FACILITY.
  - 7 REMOVE AND REPLACE SITE AREA LIGHT HEADS ALONG CENTER ISLAND WITH NEW DUAL-HEAD FIXTURE. EXISTING POLE AND BASE TO REMAIN.
  - 8 DISCONNECT AND REMOVE EXISTING BUS EV CHARGER EQUIPMENT, SALVAGE TO OWNER.
  - 9 FUTURE BUS EV CHARGING EQUIPMENT CONCRETE PAD LOCATIONS AND CONDUIT PROVISIONS. REFER TO ONE-LINE DIAGRAM.
  - 10 NEW PROPOSED BUS CHARGING EQUIPMENT AND CONCRETE PAD. REFER TO ONE-LINE DIAGRAM.
  - 11 DISCONNECT AND REMOVE EXISTING ELECTRICAL SERVICE AND UTILITY TRANSFORMER.
  - 12 NEW SERVICE SWITCHBOARD. REFER TO ARCHITECTURAL AND CIVIL REQUIREMENTS FOR CONCRETE PAD AND PGE CLEARANCE LANDING. REFER TO ONE-LINE DIAGRAM FOR ADDITIONAL REQUIREMENTS.
  - 13 SECONDARY SERVICE CONDUITS PER PGE REQUIREMENTS.
  - 14 UTILITY TRANSFORMER PAD-VAULT PER PGE REQUIREMENTS. MINIMUM 5FT EXTENSION OF CONDUITS INTO AND OUT OF PAD-VAULT PER PGE. COORDINATE EXACT LOCATION AND ROUTING OF CONDUITS WITH PGE REPRESENTATIVE AND INSPECTOR.
  - 15 DISCONNECT AND REMOVE EXISTING UTILITY TRANSFORMER AND CONCRETE PAD.
  - 16 EXISTING 4" PRIMARY TO EXISTING PGE VAULT.
  - 17 DISCONNECT AND REMOVE EXISTING PRIMARY SERVICE CONDUIT TO REMAIN IN PLACE AS SPARE.
  - 18 NEW PRIMARY SERVICE CONDUIT PER PGE REQUIREMENTS. REFER TO ONE-LINE DIAGRAM.
  - 19 FIELD LOCATE AND INTERCEPT EXISTING CONDUIT SYSTEM. REPLACE BOX AND LID WITH H-20 RATED BOX AND LID.
  - 20 NEW 11X17 CONCRETE PULL BOX. STAMP LID "LIGHTING". FIELD LOCATE EXISTING UNDERGROUND LIGHTING BRANCH CIRCUIT AND CONNECT NEW FIXTURES TO EXISTING SITE LIGHTING BRANCH CIRCUIT.
  - 21 FIELD LOCATE AND REMOVE EXISTING CIRCUIT. MAINTAIN EXISTING RACEWAY BETWEEN LIGHT FIXTURES.
  - 22 DISCONNECT AND REMOVE EXISTING GATE CONTROLLER. CONNECT TO NEW GATE CONTROLLER. RECONNECT TO EXISTING BRANCH CIRCUIT.
  - 23 CONNECT TO NEW GATE CONTROLLER. HOMERUN BRANCH CIRCUIT TO EXISTING PANEL AT ELECTRICAL ROOM AND CONNECT TO EXISTING SPARE CIRCUIT BREAKER POSITION. UPDATE EXISTING PANEL DIRECTORY.
  - 24 HOMERUN VIA EXTERIOR LIGHTING CONTROLS IN BUS WASH BUILDING. REFER TO NOTE 2 SHEET E-102.
  - 25 REMOVE EXISTING SECONDARY FEEDER. TEMPORARILY REROUTE UNDERGROUND TO EXISTING TRANSFORMER TO ALLOW INSTALLATION OF NEW TRANSFORMER PAD-VAULT. COORDINATE WITH PGE.
  - 26 PROVIDE PROTECTIVE BOLLARDS NEAR TRANSFORMER PAD-VAULT. PER PGE REQUIREMENTS.
  - 27 DISCONNECT AND REMOVE EXISTING ELECTRICAL FEED TO CNG COMPRESSOR. MAINTAIN PORTION OF EXISTING UNDERGROUND CONDUIT, INTERCEPT AND EXTEND TO NEW SERVICE "4MDS". COORDINATE WITH OWNER AND UTILITY COMPANY TO MINIMIZE OUTAGE AND DOWN TIME TO THIS EQUIPMENT.



**KCL ENGINEERING**  
312 NW 10th Ave, Suite 100  
Portland, OR 97209  
503-212-4612

100% CONSTRUCTION DOCUMENTS  
**S.M.A.R.T. FACILITY IMPROVEMENTS**  
PROJECT #: 2308.00  
CITY OF WILSONVILLE  
28979 SW BOBERG RD, WILSONVILLE, OR 97070

SHEET TITLE:  
**SITE PLAN**

REVISIONS:

#	DESCRP.	DATE
2	ADD-2	07/08/24

ISSUE DATE: 04/26/2024

**E010**



### COPPER FEEDER SCHEDULE

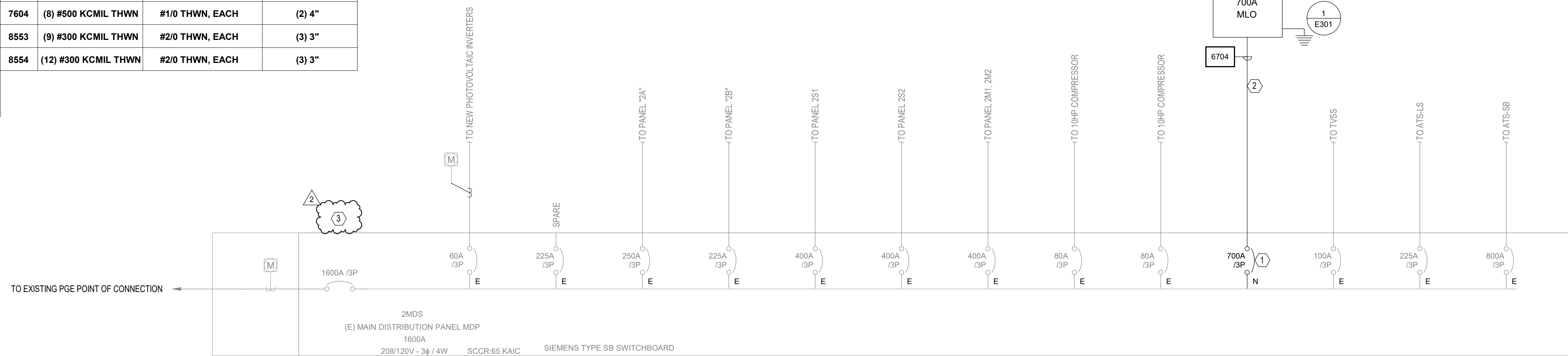
TAG	PHASE/NEUTRAL	GROUND	CONDUIT	TAG	PHASE/NEUTRAL	GROUND	CONDUIT
303	(3) #10 THWN	#10 THWN	3/4"	2553	(3) #250 KCMIL THWN	#4 THWN	3"
304	(4) #10 THWN	#10 THWN	3/4"	2554	(4) #250 KCMIL THWN	#4 THWN	3"
403	(3) #8 THWN	#10 THWN	3/4"	2853	(3) #300 KCMIL THWN	#4 THWN	3"
404	(4) #8 THWN	#10 THWN	1"	2854	(4) #300 KCMIL THWN	#4 THWN	3"
503	(3) #6 THWN	#10 THWN	1"	3103	(3) #350 KCMIL THWN	#4 THWN	3"
504	(4) #6 THWN	#10 THWN	1"	3104	(4) #350 KCMIL THWN	#4 THWN	3"
703	(3) #4 THWN	#8 THWN	1-1/4"	3353	(3) #400 KCMIL THWN	#3 THWN	3"
704	(4) #4 THWN	#8 THWN	1-1/4"	3354	(4) #400 KCMIL THWN	#3 THWN	3"
803	(3) #3 THWN	#8 THWN	1-1/4"	3803	(3) #500 KCMIL THWN	#3 THWN	4"
804	(4) #3 THWN	#8 THWN	1-1/4"	3804	(4) #500 KCMIL THWN	#3 THWN	4"
903	(3) #2 THWN	#8 THWN	1-1/4"	4203	(3) #600 KCMIL THWN	#2 THWN	4"
904	(4) #2 THWN	#8 THWN	1-1/2"	4204	(4) #600 KCMIL THWN	#2 THWN	4"
1003	(3) #1 THWN	#8 THWN	1-1/2"	4603	(3) #600 KCMIL THWN	#2 THWN	4"
1004	(4) #1 THWN	#8 THWN	1-1/2"	4604	(4) #600 KCMIL THWN	#2 THWN	4"
1303	(3) #1 THWN	#6 THWN	1-1/2"	5103	(6) #250 KCMIL THWN	#2 THWN, EACH	(2) 3"
1304	(4) #1 THWN	#6 THWN	1-1/2"	5104	(8) #250 KCMIL THWN	#2 THWN, EACH	(2) 3"
1503	(3) #1/0 THWN	#6 THWN	2"	6203	(6) #350 KCMIL THWN	#1 THWN, EACH	(2) 3"
1504	(4) #1/0 THWN	#6 THWN	2"	6204	(8) #350 KCMIL THWN	#1 THWN, EACH	(2) 4"
1753	(3) #2/0 THWN	#6 THWN	2"	6704	(4) #400 KCMIL THWN	#1/0 THWN, EACH	(2) 3"
1754	(4) #2/0 THWN	#6 THWN	2"	7603	(6) #500 KCMIL THWN	#1/0 THWN, EACH	(2) 4"
2003	(3) #3/0 THWN	#6 THWN	2"	7604	(8) #500 KCMIL THWN	#1/0 THWN, EACH	(2) 4"
2004	(4) #3/0 THWN	#6 THWN	2"	8553	(9) #300 KCMIL THWN	#2/0 THWN, EACH	(3) 3"
2303	(3) #4/0 THWN	#4 THWN	2-1/2"	8554	(12) #300 KCMIL THWN	#2/0 THWN, EACH	(3) 3"
2304	(4) #4/0 THWN	#4 THWN	2-1/2"				
2305	(4) #4/0 THWN	#4 THWN, + #4 ISO GND	2-1/2"				

#### KEYNOTES

- NEW CIRCUIT BREAKER, STYLE AND AIC RATING TO MATCH EXISTING SWITCHBOARD.
- NEW CONDUCTORS IN EXISTING CONDUIT. INTERCEPT END EXTEND EXISTING SPARE CONDUIT AT ELECTRICAL ROOM AND AT THE SITE TO COMPLETE RUN FROM MAIN SWITCHBOARD TO NEW BUS WASH BUILDING. REFER TO SITE PLAN FOR ADDITIONAL REQUIREMENTS.
- REFER TO SERVICE LOAD SUMMARY CALC TABLE BELOW.
- PGE TYPE 810 PAD-VAULT. VERIFY REQUIREMENTS WITH FINALIZED PGE DESIGN DRAWINGS.
- CONCRETE EQUIPMENT PAD SIZED FOR APPROVED EQUIPMENT, INSTALLED PER STRUCTURAL REQUIREMENTS, REFER TO STRUCTURAL DOCUMENTS.
- SPACE PROVISIONS FOR FOUR (4) ADDITIONAL 400A/300A/3P CIRCUIT BREAKERS, FUTURE EXPANSION. STUB, CAP AND MARK (8) 3" FROM DISTRIBUTION TO FUTURE EXPANSION AREA SOUTH OF SWITCHBOARD. VERIFY STUB LOCATIONS IN FIELD.
- PROVIDE ARC FLASH ENERGY REDUCTION DEVICE INTEGRAL WITH MAIN CIRCUIT BREAKER.
- SWITCHBOARD ELEVATION: PROVIDE UTILITY TERMINAL SECTION ON RIGHT SIDE (FACING FRONT ELEVATION) TO COORDINATE WITH UTILITY CONDUIT ENTRIES. REFER TO SITE PLAN FOR SECONDARY ROUTING CONCEPT.
- 175-AMP BRANCH CIRCUIT TO EXISTING CNG COMPRESSOR. MAINTAIN EXISTING CONDUIT IN PLACE FED FROM SWITCHBOARD BEING REMOVED. INTERCEPT AND RE-FED COMPRESSOR FROM NEW SERVICE.

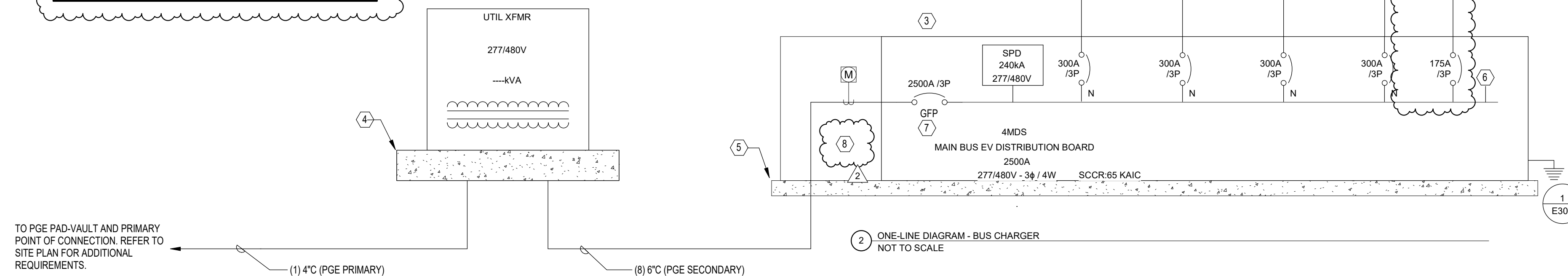
#### RISER DIAGRAM GENERAL NOTES

- DIAGRAM INDICATES OVERALL LAYOUT OF ELECTRICAL DISTRIBUTION SYSTEM. REFER TO FLOOR PLANS FOR EQUIPMENT LOCATIONS.
- USE COPPER CONDUCTORS UNLESS OTHERWISE INDICATED.
- MATCH NEUTRAL CONDUCTOR SIZE TO THE PHASE CONDUCTORS UNLESS OTHERWISE NOTED.
- ALL WIRING SHALL BE IN RACEWAY AS NOTED. REFER TO SPECIFICATIONS FOR CONDUIT APPLICATION REQUIREMENTS.



1 PARTIAL ONE-LINE DIAGRAM - EXISTING BUILDING  
NOT TO SCALE

SERVICE LOAD SUMMARIES	
<b>EXISTING SERVICE "2MDS"</b>	
PEAK 12-MONTH DEMAND LOAD:	80.0 KVA
NEW LOAD, PANEL "2BW":	97.6 KVA
<b>TOTAL LOAD, "2MDS":</b>	177.6 KVA (493.3 AMPS @ 208V/3PH)
<b>NEW SERVICE "4MDS"</b>	
NEW CHARGING STATION 1:	180.0 KVA
FUTURE CHARGING STATIONS:	540.0 KVA
FUTURE EXPANSION PROVISIONS:	997.2 KVA
EXISTING CNG COMPRESSOR:	116.4 KVA
<b>TOTAL LOAD, "4MDS":</b>	1833.6 KVA (2206.5 AMPS @ 480V/3PH)



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PROJECT #: 2300.00  
CITY OF WILSONVILLE  
28979 SW BOBERG RD, WILSONVILLE, OR 97070

SHEET TITLE:  
**ELECTRICAL DIAGRAMS**

REVISIONS:		
#	DESCRP.	DATE
2	ADD-2	07/08/24

ISSUE DATE: 04/26/2024

**E300**