

CONTRACT DOCUMENTS AND SPECIFICATIONS
FOR CONSTRUCTION OF

CITY OF UNALASKA
Pyramid Water Treatment Plant
SODIUM HYPOCHLORITE ON-SITE GENERATION

PROJECT MANUAL

DPW Project No. 20401



FOR BID
June 21, 2022

City of Unalaska
Department of Public Works
P.O. Box 610
Unalaska, Alaska 99685
907-581-1260

City of Unalaska
Pyramid Water Treatment Plant
SODIUM HYPOCHLORITE ON-SITE GENERATION

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Minimum Rates of Pay

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Part 1

BIDDING REQUIREMENTS

**Section 00030
INVITATION TO BID**

Sealed Bids for the City of Unalaska **Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION**, addressed to the City of Unalaska, will be received at the following location:

City of Unalaska
Office of the City Clerk
P.O. Box 610
43 Raven Way
Unalaska, Alaska 99685
Tel. 907-581-1251
Fax 907-581-1417

Sealed Bids will be received until 2:00 p.m., local time on **Thursday, July 21, 2022** and then will be publicly opened and read. Any bids received after the time and date specified may not be considered.

The work will include, but not be limited to, furnishing all labor, tools, select materials and performing all operations in connection with the **Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION**. The project replaces the existing gaseous chlorine dosing system with a new hypochlorite generation equipment. The City is providing the hypochlorite generation equipment, air blowers, water softener systems, brine tanks, hypochlorite tanks, dosing pumps, piping, instrumentation, electrical and other materials. The contractor is to supply select materials and install the hypochlorite generation equipment with all the interconnecting piping, tanks, valves, wires, and miscellaneous fittings necessary for a fully functioning system.

1. Project Location: Pyramid Water Treatment Plant, Unalaska, Alaska 99685
2. Owner: City of Unalaska, Department of Public Utilities

Technical questions shall be directed in writing to the City of Unalaska at the email address shown below. An electronic copy of the Bidding Documents may be obtained from the City of Unalaska Website <http://www.ci.unalaska.ak.us/rfps>, for no charge.

Owner: City of Unalaska
Department of Public Works
P.O. Box 610
Unalaska, Alaska 99685
Bob Cummings, City Engineer, bcummings@ci.unalaska.ak.us
Tel.: 907-581-1260

Each Bid must be submitted on the prescribed form and accompanied by submittal information as prescribed in the Instruction to Bidders. The successful bidder will be required to furnish the

necessary bond(s) for the faithful performance of the Contract, as prescribed in the Bidding Documents.

A prebid conference will be held on **Thursday July 7, 2022** at 2:00 p.m. at the City of Unalaska Department of Public Works. A site visit by all bidders is recommended. The prebid conference may be attended by teleconference at 1-888-204-5984, Access Code 2005439.

The successful Bidder shall hold such Contractors and Business Licenses as required by State Statutes and City of Unalaska Municipal Code Section 9.04. The right is reserved to reject any or all Bids, to waive informalities or irregularities in the bidding, and to accept bids that are considered to be in the best interest of the City of Unalaska.

No bidder may withdraw its bid after the time set for opening thereof, unless the award of the contract is delayed for a period exceeding 60 days.

Dated this _____ day of _____, 2022.

CITY OF UNALASKA, ALASKA

By _____
Tom Cohenour, Director of Public Works

Section 00100
INSTRUCTIONS TO BIDDERS

1. Defined Terms.

Terms used in these Instructions to Bidders which are defined in the General Conditions of the Contract Documents have the meanings assigned to them in the General Conditions.

Certain additional terms used in the Bidding Documents have the meanings indicated below which are applicable to both the singular and plural thereof.

- A. Bidder - one who submits a Bid directly to Owner as distinct from a subbidder, who submits a bid to a Bidder.
- B. Bidding Documents - the Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
- C. Bidding Requirements - the Invitation to Bid, Instructions to Bidders, and Bid Form, plus additional documents that may be submitted with the Bid.
- D. Issuing Office - the City Public Works Department, from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
- E. Low Bidder - Low Bidder will be determined on the basis of the lowest Amount for the total bid including, if applicable, Owner chosen Additive and/or Deductive Bid Items as described in the Bid Form. Award of the Additive or Deductive Bid Items will be made to the extent that construction funds are available, in such order as may suit the best interest of the Owner. The Deductive and Additive Bid items are not in any specific order and are not listed in order of preference. The Owner reserves the right to select the low bidder on the basis of the Base Bid plus any combination of Additive and/or Deductive Bid items. If the order of the bids is affected, the award will be made on the basis of the Base Bid plus any combination of the Deductive and Additive Bid items.
- F. Successful Bidder - the lowest, qualified, responsible and responsive Bidder to whom the City (on the basis of the City's evaluation as hereinafter provided) makes an Award.

2. Copies of Bidding Documents.

- A. Complete sets of the Bidding Documents for the sum stated in the Invitation to Bid may be obtained from the Issuing Offices.

- B. Complete sets of Bidding Documents must be used in preparing Bids; the City does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- C. The Drawings bound in the Contract Documents are at a scale indicated by a note or scale bar on the Drawings.
- D. The City, in making copies of Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids for the work and does not confer a license or grant for any other use.

3. **Qualifications of Bidders.**

To demonstrate qualifications to perform the work, each Bidder must be prepared to submit within 5 days after Bid opening upon City's written request, information such as financial data, previous experience, present commitments, subcontractor names and qualifications, and other such data as may be called for below. Each Bid must contain evidence of Bidder's qualification to do business in Alaska. Bidders shall be eligible to obtain a business license from the City of Unalaska.

Nothing indicated herein should prejudice the right of Owner to seek additional pertinent information as provided in the General Conditions.

4. **License Requirements**

Contractors and subcontractors, in order to perform public work in the State of Alaska, are required to hold State of Alaska Contractor's licenses of the class required to perform the specified work. Contractors and subcontractors are also required to hold current Alaska Business Licenses and obtain a City of Unalaska business license in order to perform public work in the State of Alaska. Contractor's license and Alaska Business License numbers shall be inserted in the appropriate place on the Bid form. Evidence of subcontractor's compliance with the above shall be submitted to the City before starting subcontract work on public work contracts.

5. **Examination of Contract Documents and Site.**

- A. It is the responsibility of each Bidder before submitting a Bid:
 - 1. To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including "technical data" referred to below);
 - 2. To visit the site to become familiar with and satisfy Bidder as to the general, local, and site conditions that may affect cost, progress, performance, or furnishing of the Work;

3. To consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work;
 4. To study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data;
 5. To promptly notify the City of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Contract Documents and such other related documents;
 6. To review applicability of the City of Unalaska sales tax to any purchases of materials or services related to the Work.
- B. Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based upon information and data furnished to the City by Owners of such Underground Facilities or others, and the City does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- C. Provisions concerning responsibility for the adequacy of data furnished to prospective Bidders on subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Contract Documents due to differing or unanticipated conditions appear in Article 4 of the General Conditions.
- D. Before submitting a Bid, each Bidder will be responsible to make or obtain such examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.
- E. On request, the City will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of any such explorations, investigations, test, and studies.
- F. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 5; that, without exception, the Bid is premised upon performing and furnishing the work required by the Contract Documents and applying the specific means, methods, techniques, sequences, or procedures of construction (if any) that may be shown or indicated

INSTRUCTIONS TO BIDDERS

or expressly required by the Contract Documents; that Bidder has given the Contracting Officer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by the City is acceptable to Bidder; and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

- G. The provisions of paragraph 5A through 5F above, inclusive, do not apply to asbestos, polychlorinated biphenyl (PCB), petroleum, hazardous waste, or radioactive material covered by the Supplementary Conditions.
- H. Nothing contained in the Bid Documents, any and all attachments thereto, or any and all addenda thereto, shall be interpreted by any party as requiring or allowing the Contractor to do anything that is not in compliance with all applicable codes and regulations, that is less than general standard industry quality, or that results in an unsafe, unstable or dangerous condition.

6. Availability of Lands for Work, Etc.

The lands upon which the work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the work are to be obtained and paid for by the Successful Bidder. Easements for permanent structures or for permanent changes in existing facilities are to be obtained and paid for by the City unless otherwise provided in the Contract Documents.

7. Interpretations and Addenda.

- A. All questions about the meaning or intent of the Bidding Documents are to be directed to the City of Unalaska. Interpretations or clarifications considered necessary by the City in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the Issuing Office as having received the Bidding Documents. Questions received less than 6 days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- B. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the City.

8. Bid Security.

- A. Each Bid must be accompanied by Bid security made payable to Owner for 5 percent of Bidder's Total Bid price and in the form of a certified bank check or a Bid

INSTRUCTIONS TO BIDDERS

Bond on form attached, issued by a Surety meeting the requirements of the General Conditions.

- B. The Bid security of a successful bidder will be retained until such Bidder has executed the Agreement, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the successful Bidder fails to execute and deliver the Agreement and furnish the required Contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The bid security of the Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the 7th day after the Effective Date of the agreement or the 60th day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security submitted with bids which are not competitive will be returned within 15 days after the Bid opening.

9. **Contract Times.**

The number of days within which, or the dates by which, the work is to be completed and ready for final payment (the Contract Times as defined in Article 1 of the General Conditions) are set forth in the Agreement (or incorporated therein by reference to the attached Bid Form).

10. **Liquidated Damages.**

Provisions for liquidated damages, if any, are set forth in the Agreement.

11. **Bid Form.**

- A. The Bid Form is included with the Bidding Documents.
- B. All blanks on the Bid Form must be completed by printing in black ink or by typewriter.
- C. Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.
- D. Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.
- E. All names must be typed or printed in black ink below the signature.

- F. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).
- G. The address, telephone, email address, and FAX number for communications regarding the Bid must be shown.
- H. See Article 4 above, for required evidence of authority to conduct business as an out-of-state corporation in Alaska. State Contractor license number, if any, must also be shown.

12. **Submission of Bids.**

- A. Bids shall be submitted not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the project title and name and address of Bidder and accompanied by the other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "**BID ENCLOSED**" on the face of it.
- B. Only one Bid from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the City that any Bidder is interested in more than one Bid for work contemplated, all Bids in which such Bidder is interested will be rejected.
- C. Attachments.

Bidder shall complete and submit the following forms with its Bid:

Bid Form
Addenda Acknowledgment
Bid Bond (5% of Bid)
Alaska Business and Contractor's License

13. **Modifications and Withdrawal of Bids.**

- A. Prior to the time and date designated for receipt of Bids, any Bid submitted may be withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by facsimile. If by facsimile, the modification received shall be over the signature of the Bidder and shall be received before the date and time set for receipt of Bids. Facsimile messages shall be worded as to not reveal the amount of the original or modified Bid. Facsimile telephone number is:

City of Unalaska (907) 581-1417

Bid modifications must be sent to the office to which the original proposal is delivered or sent.

- B. If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with the City and promptly thereafter demonstrates to the reasonable satisfaction of the City that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid. Thereafter, that Bidder will be disqualified from further consideration on the Work to be provided under the Contract Documents.

14. **Opening of Bids.**

Bids will be opened and read aloud publicly at the place where Bids are to be submitted.

15. **Bids to Remain Subject to Acceptance.**

All Bids will remain subject to acceptance for 60 days after the day of the Bid opening, but the City may, in its sole discretion, release any Bid and return the Bid security prior to that date.

16. **Award of Contract.**

- A. The City reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, non responsive, unbalanced or conditional Bids, and to reject the Bid of any Bidder if the City believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. The City also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate Contract terms with the successful Bidder. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- B. In evaluating Bids, the City will consider the qualifications of Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- C. The City may consider the qualifications and experience of subcontractors, suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of subcontractors, suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. The City also may consider the operating costs, maintenance requirements,

INSTRUCTIONS TO BIDDERS

performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data are required to be submitted prior to the Notice of Award.

- D. The City may conduct such investigations as the City deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to execute the work in accordance with the Contract Documents to the City's satisfaction within the prescribed time.
- E. If, at the time this Contract is to be awarded, the total of the lowest acceptable Bid exceeds the funds then estimated by the City as available, the City may reject all Bids or take such other action as best serves the City's interests.
- F. If the Contract is to be awarded, it will be awarded to lowest responsive, responsible Bidder as stated in Section 00100 Instructions To Bidders, whose evaluation by the City indicates to the City that the award will be in the best interests of the Project.
- G. In the event of failure of the lowest responsive, responsible Bidder to sign the Contract and provide an acceptable Performance Bond, Payment Bond, and insurance certificate(s), the Owner may award the Contract to the next lowest responsive, responsible Bidder. Such award, if made, will be made within 60 days after the opening of Proposals.
- H. An Additive or Deductive Bid Item is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in the Contract Documents.
- I. Award of the Additive or Deductive Bid Items will be made to the extent that construction funds are available, in such order as may suit the best interest of the Owner. The Deductive and Additive Bid items are not in any specific order and are not listed in order of preference. The Owner reserves the right to select the Base Bid plus any combination of Additive and/or Deductive Bid items. If the order of the bids is affected, the award will be made on the basis of the Base Bid plus any combination of Additive or Deductive Bid items that the Owner selects at their option.

17. Contract Security.

Article 5 of the General Conditions sets forth Owner's requirements as to Performance and Payment Bonds. When the successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required Performance and Payment Bonds.

INSTRUCTIONS TO BIDDERS

18. **Signing of Agreement.**

When the City gives a Notice of Award to the successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement, with all other written Contract Documents attached. Within 10 days thereafter, contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to the City with the required Bonds. Within 10 days thereafter, the City shall deliver one fully signed counterpart to Contractor.

19. **State Required Wage Rates.**

Contractor shall comply with all applicable State labor regulations, including State of Alaska Title 36, Public Contracts, otherwise known as the Little Davis-Bacon Act, and all labor regulations and minimum rates of pay contained therein.

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State Wage Rates can be obtained at <http://labor.alaska.gov/lss/pamp600.htm>. Use the state wage rates that are in effect 10 days before Bid Opening.

NOTE TO BIDDER: Use BLACK ink or typewriter for completing this Bid Form.

**Section 00300
BID FORM**

To: **City of Unalaska, Department of Public Works**

Address: **P.O. Box 610, Unalaska, Alaska 99685**

Project Identification: **City of Unalaska Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE
ON-SITE GENERATION**

DEFINITIONS

The terms used in this Bid which are defined in the General Conditions and Instructions to Bidders included as part of the Contract Documents are used with the same meaning in this Bid.

BIDDERS DECLARATION AND UNDERSTANDING

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over the City.

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that Bidder has examined copies of all the Bidding Documents.

Bidder has familiarized itself with the nature and extent of the Contract Documents, work, site, locality, general nature of work to be performed by Owner or others at the site that relates to work for which this Bid is submitted as indicated in the Contract Documents, and all local conditions and all federal, state, and local Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the work.

Bidder has reviewed and checked all information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, or similar information or data in respect of said Underground Facilities are or will be required by Bidder in order to perform and furnish the work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

Bidder has correlated information known to Bidder and the results of all such observations, examinations, investigations, explorations, tests, and studies with the Contract Documents.

Bidder has given the City written notice of all conflicts, errors, ambiguities or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by the City is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the work for which this Bid is submitted.

BID FORM

00300-1

CONTRACT EXECUTION AND BONDS

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the City in the form included in the Contract Documents to perform and furnish all work as specified or indicated in the Contract Documents for the Contract price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

Bidder accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the day of Bid opening. Bidder will sign and deliver the required number of counterparts of the Agreement with the Bonds and City of Unalaska business license and other documents required by the Bidding Requirements within 10 days after the date of Owner's Notice of Award.

CERTIFICATE OF INSURANCE

Bidder agrees to furnish the City, before commencing any Physical Work related to this Contract and as required elsewhere, the certificates of insurance as specified in these Documents.

Bidder further agrees that the amount stated herein includes specific consideration for the insurance coverages, including contractual liability, specified in the Contract Documents.

CONTRACT COMPLETION TIME

Bidder agrees that the work will be completed and ready for final payment in accordance with the number of calendar days or completion date indicated in the Agreement.

LIQUIDATED DAMAGES

Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the times specified in the Agreement.

ADDENDA

The Bidder hereby acknowledges that it has received Addenda No's _____, _____, _____, _____, _____, _____ (Bidder shall insert No. of each Addendum received) and agrees that all addenda issued are hereby made part of the Contract Documents, and the Bidder further agrees that its Bid(s) includes all impacts resulting from said addenda.

SALES AND USE TAXES

The Bidder agrees that all sales and use taxes are included in the stated bid prices for the work, unless provision is made herein for the Bidder to separately itemize the estimated amount of sales tax.

SUBCONTRACTORS

The Bidder further agrees that if the bid is the apparent low bid, he shall submit, within 5 days after the bid opening, a listing of subcontracting firms or businesses that will be awarded subcontracts for work in

BID FORM

excess of \$5,000 and a copy of the City of Unalaska business license for the Contractor and each Subcontractor.

BID TABULATION AND SUMMARY

The Bidder further proposes to accept, as full payment for work proposed herein, the amount computed under provisions of the Contract Documents and based on the following Bid amounts, it being expressly understood that the unit quantities of work shown on the plans is independent of the exact quantities involved. The Bidder agrees that the bid amount represent(s) a true measure of the labor and materials required to furnish, install, or provide the item of Work, including all allowances for overhead and profit. The amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.

Bidder agrees to perform all of the work described in the Documents including the specifications, special provisions, and as generally shown on the plans for the prices stated in the Bid Schedules. Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding. Bidder understands that the Owner reserves the right to pick and choose what bid items will be constructed as part of this work, recognizing that Mobilization and Demobilization will be common to the remaining items of Work.

City of Unalaska
Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION

BONDING COMPANY

If the Bidder is awarded a construction Contract on this Proposal, the surety who provides the Performance Bond and Payment Bond will be _____

_____ whose address is _____

_____, _____,

Street

City

_____.

State

Zip

BIDDER

An Individual

By

_____ (SEAL)

(Individual's name)

doing business as

Business

address: _____

Phone No.: _____

Fax No.: _____

Email address: _____

A Partnership

By _____ (SEAL)
(Firm name)

(general partner)

Business address: _____

Phone No.: _____

Fax No.: _____

Email address: _____

A Corporation

By _____
(Corporation name)

(state of incorporation)

By _____
(name of person authorized to sign)

(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

Phone No.: _____

Fax No.: _____

Email address: _____

A Joint Venture

By _____
(Name)

(Address)

By _____
(Name)

(Address)

Phone Number and Address for receipt of official communications

Business address: _____

Phone No.: _____

Fax No.: _____

Email address: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

SUBMITTED on _____, 20__.

BID PROPOSAL
 City of Unalaska
Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION

ITEM NO.	DESCRIPTION (Price in Words)	TOTAL PRICE (Numerical)
1	Pyramid Water Treatment Plant – Sodium Hypochlorite On-Site Generation System	
2	Contingent Sum, Materials One-Hundred Twenty Five Thousand Dollars	\$125,000.

TOTAL BID (Items 1 + 2: NUMERICAL) _____

TOTAL BID (Items 1+2: WRITTEN TEXT) _____

BID AUTHORIZATION

The undersigned represents (check appropriate boxes) that he/she operates as an Individual,
 Joint Venture, Partnership, or Corporation, incorporated in the State of _____

BIDDER: _____

Bidding Company: _____

Name (Printed): _____

Signature: Date: _____

Contractor's License No. Business License No. _____

CORPORATE SEAL (If Corporation) No. _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

as Principal, hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

a corporation duly organized under the laws of the State of Alaska as Surety, hereinafter called Surety, are held and firmly bound unto

City of Unalaska _____

(Name of Owner)

PO Box 610, Unalaska, Alaska 99685 _____

(Address of Owner)

as Obligee, hereinafter called Obligee, in the sum of _____ Dollars, (\$ _____) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for the City of Unalaska **Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION**, located in Unalaska, Alaska.

NOW THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and Sealed this _____ day of _____ 2022

(Principal) Seal

(Witness)

(Title) Seal

(Surety) Seal

(Witness)

(Title) Seal

Part 2
CONTRACT FORMS

Section 00500
STANDARD FORM OF AGREEMENT
BETWEEN THE OWNER AND CONTRACTOR

THIS AGREEMENT is dated as of the _____ day of _____ in the year 2022, by and between the City of Unalaska (hereinafter called OWNER) and _____
_____ (hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK

CONTRACTOR shall complete all work as specified or indicated in the Contract Documents. The work is generally described as follows:

The work will include, but not be limited to, furnishing all labor, tools, select materials and performing all operations in connection with the **Pyramid Water Treatment Plant - SODIUM HYPOCHLORITE ON-SITE GENERATION**. The project replaces the existing gaseous chlorine dosing system with a new hypochlorite generation equipment. The City is providing the hypochlorite generation equipment, air blowers, water softener systems, brine tanks, hypochlorite tanks, dosing pumps, piping, instrumentation, electrical and other materials. The contractor is to supply select materials and install the hypochlorite generation equipment with all the interconnecting piping, tanks, valves, wires, and miscellaneous fittings necessary for a fully functioning system.

1. Project Location: Pyramid Water Treatment Plant, Unalaska, Alaska 99685
2. Owner: City of Unalaska, Department of Public Utilities

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK consists of the following:

- Technical Documents, Pyramid Water Treatment Plant Sodium Hypochlorite On-Site Generation, 100% IFC (Issued for Construction) Re-Issue, dated 06/2022, Prepared by Taku Engineering
- Specifications
- Agreement
- State of Alaska Title 36 Wage Rate Requirements
- Instructions to Bidders
- Bid Forms

SODIUM HYPOCHLORITE ON-SITE GENERATION
00500

- Performance Bond
- Payment Bond
- General Conditions
- Supplementary Conditions
- Appendices
- Addenda numbers _____ to _____, inclusive.
- Change Orders which may be delivered or issued after Effective Date of the Agreement and not attached hereto.

Article 2. CONTRACT TIME

- 2.1 All construction must be accomplished between fish processing seasons during periods of low domestic water demand and flow. The allowable window is after October 1, 2022 and before December 1, 2022 (Substantial Completion) to correspond with the low flow period. All Work shall be completed by December 15, 2022 (Final Completion). Besides staging and preparations, actual field Work is limited to the window defined above.
- 2.2 Liquidated Damages. The OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the work is not completed within the times specified above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. These losses include inconvenience to the City, administration and inspection costs, loss of efficiency and general inconvenience to the public. They also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the OWNER if the work is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay the OWNER One Thousand Dollars (\$1,000.00) for each day that expires after the time specified above for *Final Completion* and readiness for final payment.

Article 3. CONTRACT PRICE

- 3.1 The OWNER shall pay CONTRACTOR for completion of the work in accordance with the Contract Documents an amount equal to sum of the established unit prices for each separately identified item of unit price work multiplied by the measured quantity of actual items installed plus the sum of the lump sum prices for each separately identified and selected bid item (herein referred to as the "Contract Sum"). The Contract sum is based upon the Bid Items which are set forth in the Contract Documents and which are hereby accepted by the OWNER.

Article 4. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 13 of the General Conditions. Applications for Payment will be processed by the OWNER as provided in the General Conditions.

- 4.1. Progress Payments. The OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment on or about a day of the month mutually agreeable to the OWNER and CONTRACTOR as agreed to at the preconstruction conference. All progress payments will be on the basis of the progress of the work measured by the actual installed quantity of items, plus allowances for stockpiled materials.

SODIUM HYPOCHLORITE ON-SITE GENERATION

4.1.1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as the OWNER shall determine, or the OWNER may withhold, in accordance with Article 13 (paragraph 13.8) of the General Conditions and the Supplemental Conditions.

- a. Ninety percent of work completed.
- b. Once 50 percent of the work is complete as determined by the OWNER, and if the character and progress of the work have been satisfactory to the OWNER, the OWNER, may determine that, as long as the character and progress of the work remain satisfactory to them, there will be no additional retainage on account of work completed; in which case, the remaining progress payments prior to Substantial Completion will be in an amount equal to 100 percent of the work completed.

4.1.2. Upon Substantial Completion, in an amount sufficient to increase total payments to CONTRACTOR to 95 percent of the Contract Price, less such amounts as the OWNER shall determine, or the OWNER may withhold, in accordance with Article 13 of the General Conditions.

4.2. Final Payment. Upon final completion and acceptance of the work in accordance with the General Conditions; Affidavit of Payment of Debts and Claims; Affidavit of Release of Liens; and Receipt of Consent of Surety Company to Final Payment, the OWNER shall pay the remainder of the Contract Price as provided in said Article 13.

4.2.1 Deductions. The City may deduct from the amount of any payment made to Contractor any sums owed to City by Contractor including, but not limited to, past due sales tax, port and harbor fees, property tax, or rent. Before making any such deduction the City shall have provided Contractor written notice of the amount claimed by City to be due and owing from Contractor.

Article 5. INTEREST ON RETAINAGE

All retainage shall bear interest at the rate required by AS 36.90.250, if applicable.

Article 6. CONTRACTOR'S REPRESENTATIONS

In order to induce the OWNER to enter into this agreement, CONTRACTOR makes the following representations:

- 6.1. CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the work.
- 6.2. CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports, and studies

SODIUM HYPOCHLORITE ON-SITE GENERATION

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which pertain to the subsurface or physical conditions at or contiguous to the site or which otherwise may affect the cost, progress, performance, or furnishing of the work as CONTRACTOR considers necessary for the performance or furnishing of the work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies, or similar information or data are or will be required by CONTRACTOR for such purposes.

- 6.3. CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies, or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.4 of the General Conditions.
- 6.4. CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
- 6.5. CONTRACTOR has given the OWNER written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by the OWNER is acceptable to CONTRACTOR.

Article 7. MISCELLANEOUS

- 7.1. Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 7.2. The CONTRACTOR shall submit the Performance Bond, Labor and Material Payment Bonds, and Certification of Insurance and City of Unalaska business licenses and all Subcontractor City of Unalaska business licenses as required by the Contract Documents, prior to commencement of the Work. The Performance and Material Payment Bonds shall be in the amount of 100% of the contract bid price. **Contractor shall comply with all applicable Federal and State labor regulations, including State of Alaska Title 36, Public Contracts, otherwise known as the Little Davis-Bacon Act, and all labor regulations and minimum rates of pay contained therein.**
- 7.3. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 7.4. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal

SODIUM HYPOCHLORITE ON-SITE GENERATION

representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

7.5 Until Contractor receives notice from the City that project records need not be preserved, Contractor shall preserve, all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in its or its subcontractors' or agents' possession or control, or that come into its or its subcontractors' or agents' possession or control that relate to the Work.

IN WITNESS WHEREOF, The OWNER and CONTRACTOR have signed all counterparts of this Agreement. All portions of the Contract Documents have been signed or identified by the OWNER and CONTRACTOR.

This Agreement will be effective on _____, 2022.

CONTRACTOR

CITY OF UNALASKA, ALASKA

By: _____

By: _____

_____, Its _____

City Manager

State of Alaska)
) ss.
Third Judicial District)

State of Alaska)
) ss.
Third Judicial District)

The foregoing instrument was acknowledged before me on the ____ day of _____, 2022, by _____, the _____ of _____, a _____ Corporation, on behalf of the corporation.

The foregoing instrument was acknowledged before me on the ____ day of _____, 2022, by _____, City Manager for the City of Unalaska, a First Class Alaska Municipal Corporation, on behalf of the City of Unalaska.

Notary Public, State of Alaska
My Commission Expires _____

Notary Public, State of Alaska
My Commission Expires _____

**Section 00610
PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

as Principal, hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

City of Unalaska
(Name of Owner)

PO Box 610, Unalaska, Alaska 99685
(Address of Owner)

as Obligee, hereinafter called Obligee, in the sum of _____

_____ Dollars, (\$ _____) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has a written agreement dated _____ day of _____ 20 ____, entered into a Contract with Owner for the

City of Unalaska
Pyramid Water Treatment Plant
SODIUM HYPOCHLORITE ON-SITE GENERATION

in accordance with the Specifications prepared by the **Taku Engineering** which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as the Work progresses (even though there should be a default or a succession of defaults under the contract or contracts completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price", as used in this paragraph, shall mean the total amount payable by Owner to the Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of six (6) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators, or successors of the Owner.

Signed and Sealed this _____ day of _____ 2022.

(Principal) Seal

(Witness)

(Title) Seal

(Surety) Seal

(Witness)

(Title) Seal

**Section 00620
PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Contractor, and
_____ as Surety, are held and firmly bound unto
City of Unalaska hereinafter called "OWNER", in the sum of _____ dollars, for the
payment of which sum, well and truly made, we bind ourselves, our heirs, executors, administrators,
successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said CONTRACTOR has been awarded and is about to enter into the annexed
Agreement with said OWNER to perform the WORK as specified or indicated in the Contract
Documents entitled

City of Unalaska
**Pyramid Water Treatment Plant
SODIUM HYPOCHLORITE ON-SITE GENERATION**

NOW THEREFORE, if said CONTRACTOR, or subcontractor, fails to pay for any materials,
equipment, or other supplies, or for rental of same, used in connection with the performance of work
contracted to be done, or for amounts due under applicable State law for any work or labor thereon,
said Surety will pay for the same in an amount not exceeding the sum specified above, and, in the
event suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond
shall inure to the benefit of any persons, companies, or corporations entitled to file claims under
applicable State law.

PROVIDED, that any alterations in the WORK to be done or the materials to be furnished, or
changes in the time of completion, which may be made pursuant to the terms of said Contract
Documents, shall not in any way release said CONTRACTOR or said surety thereunder, nor shall
any extensions of time granted under the provisions of said Contract Documents release either said
CONTRACTOR or said Surety thereunder, nor shall any extensions of time granted under the
provisions of said Contract Documents release either said CONTRACTOR or said Surety, and notice
of such alterations or extensions of the Agreement is hereby waived by said Surety.

SIGNED AND SEALED, this _____ day of _____, 2022.

(SEAL)

(CONTRACTOR)

(Surety)

By: _____
(Signature)

By: _____
(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

Part 3

GENERAL CONDITIONS

GENERAL CONDITIONS

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RECEIPT AND WAIVER AND RELEASE OF CLAIM FOR CONTRACTOR UPON FINAL PAYMENT

GENERAL CONDITIONS

ACKNOWLEDGMENT

The City of Unalaska, "General Conditions" are based on the "Standard General Conditions of the Construction Contract" as published by the National Society of Professional Engineers (document number 1910-8, 1983 edition) on behalf of the Engineers Joint Construction Documents Committee. Portions of the NSPE General Conditions are reprinted herein by the express permission of NSPE to the State of Alaska, which supplied these General Conditions to the City of Unalaska. Modifications to the NSPE text are made to provide for State laws, regulations, and established procedures.

The granting of permission by NSPE to allow the State of Alaska to reprint portions of the NSPE document 1910-8, 1983 does not constitute approval of the State of Alaska General Conditions or the subsequently developed City of Unalaska General Conditions.

These General Conditions were modified and updated in May, 2020.

ARTICLE 1 - DEFINITIONS

Wherever used in the Contract Documents the following terms, or pronouns in place of them, are used, the intent and meaning, unless a different intent or meaning is clearly indicated, shall be interpreted as set forth below.

The titles and headings of the Sections, Subsections and Articles herein are intended for convenience of reference and shall not be considered as having bearing on their interpretation.

Whenever used in the Specifications or other Contract Documents the following terms have the meaning indicated which are applicable to both the singular and plural thereof. Working titles which have a masculine gender, are intended to refer to persons of either sex.

Terms not defined below shall have their ordinary accepted meanings within the context in which they are used. "Webster's Third New International Dictionary of the English Language, Unabridged, Copyright 1961", or subsequent revision thereof; shall provide ordinarily accepted meanings. Words which have a well-known technical or trade meaning when used to describe work, materials or equipment shall be interpreted in accordance with such meaning. Words defined in Article 1 are capitalized throughout these General Conditions.

Addenda - All clarifications, corrections, or changes issued graphically or in writing by the CITY after the advertisement but prior to the opening of bids.

Advertisement - The public announcement, as required by law, inviting Bids for work to be performed or materials to be furnished.

Application for Payment - The form provided by the CITY which is used by the CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Approved or Approval - Means written approval by Contracting Officer or his authorized representative as defined in Article 2.1.

A.S. - Initials which stand for Alaska Statute.

Award - The acceptance, by the City, of the successful Bid.

Bid - The offer of a bidder, on the prescribed form to perform the work at the prices quoted.

Bid Bond - A type of bid Guarantee.

Bid Guaranty - The security furnished with a bid to guarantee that the bidder will enter into a contract if his proposal is accepted by the Department.

Bidder - Any individual, firm, corporation or any acceptable combination thereof, or joint venture submitting a bid for the advertised Work.

Calendar Day - Every day shown on the calendar, beginning and ending at midnight.

Change Order - A written order by the CITY directing changes to the contract, within its general scope.

City - The City of Unalaska, Alaska. References to "owner" or "Contracting Agency" mean the city.

Conditions of the Contract - Those portions of the Contract Documents which define the rights and responsibilities of the contracting parties and of others involved in the Work. The Conditions of the Contract include General Conditions, Supplementary Conditions and other Conditions.

Contract - The written agreement between the CITY and the CONTRACTOR setting forth the obligations of the parties and covering the Work to be performed, all as required by the Contract Documents.

Contract Documents - The Contract Form, Addenda, the Bidding Requirements and CONTRACTOR's Bid (including all appropriate bid tender forms), the Bonds, the Conditions of the Contract and all other Contract Requirements, the

Specifications, and the Drawings furnished by the CITY to the CONTRACTOR, together with all change orders and documents approved by the Contracting Officer for inclusion, modifications and supplements issued on or after the Effective Date of the Contract.

Contracting Officer - The person authorized to enter into and administer the contract on behalf of the CITY. He has authority to make findings, determinations and decisions with respect to the contract and, when necessary, to modify or terminate the contract. The Contracting Officer is identified on the Construction Contract.

Contractor - The individual, firm, corporation or any acceptable combination thereof, contracting with the CITY for performance of the Work.

Contract Price - The total moneys payable by the CITY to the CONTRACTOR under the terms of the Contract Documents.

Contract Time - The number of Calendar Days or the date specified in the Construction Contract and authorized time extensions which identify how much time the CONTRACTOR is allowed to achieve Final Completion.

Consultant - A person, firm, agency or corporation retained by the CITY to prepare Contract Documents, perform construction administration services, or other Project related services.

Defective - An adjective which refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the CITY's approval of final payment.

Directive - A written communication to the CONTRACTOR from the Contracting Officer interpreting or enforcing a contract requirement or ordering commencement of an item of work.

Drawings - The drawings which show the character and scope of the Work to be performed and which have been furnished by the CITY or the CITY's Consultant and are by reference made a part of the Contract Documents.

Effective Date of the Contract - The date on which the Contract is fully executed by both CONTRACTOR and the CITY.

Final Completion - The Work (or specified part thereof) has progressed to the point that all Work is complete as determined by the Contracting Officer.

General Requirements - Sections of Division 1 of the Specifications which contain administrative and procedural requirements as well as requirements for temporary facilities which apply to Specification Divisions 2 through 16.

Holidays - The City of Unalaska recognizes the following holidays:

1. New Years Day - January 1
2. President's Day - Third Monday in February
3. Memorial Day - Last Monday in May
4. Independence Day - July 4
5. Labor Day - First Monday in September
6. Veteran's Day - November 11
7. Thanksgiving Day - Fourth Thursday in November
8. Christmas Day - December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both legal holidays.

Install - Means to build into the Work, ready to be used in complete and operable condition and in compliance with Contract Documents.

Invitation for Bids or Invitation to Bid - A portion of the Bidding Documents soliciting bids for the Work to be performed.

Notice of Intent to Award - The written notice by the CITY to all Bidders identifying the apparent successful Bidder and establishing the CITY's intent to execute the Contract when all conditions required for execution of the Contract are met.

Notice to Proceed - A written notice to the CONTRACTOR to begin the Work and establishing the date on which the Contract Time begins.

Payment Bond - The security furnished by the CONTRACTOR and his surety to guarantee payment of the debts covered by the bond.

Performance Bond - The security furnished by the CONTRACTOR and his surety to guarantee performance and completion of the work in accordance with the contract.

Project - The total construction, of which the Work performed under the Contract Documents is the whole or a part, where such total construction may be performed by more than one prime contractor.

Project Manager - The authorized representative of the Contracting Officer who is responsible for administration of the Contract.

Proposal - The offer of a bidder, on the prescribed form to perform the work at the prices quoted.

Proposal Guaranty - The security furnished with a proposal to guarantee that the bidder will enter into a contract if his proposal is accepted by the Department.

Regulatory Requirement - Laws, rules, regulations, ordinances, codes and/or orders of the United States, State of Alaska or City of Unalaska to the extent applicable to the Work.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the CONTRACTOR to illustrate material, equipment, fabrication, or erection for some portion of the Work.

Specification - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative and procedural details applicable thereto.

Subcontractor - An individual, firm, or corporation to whom the CONTRACTOR sublets part of the contract.

Substantial Completion - Although not fully completed, the Work (or a specified part thereof) has progressed to the point where, in the opinion of the CITY as evidenced by the CITY's written notice, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to Substantial Completion thereof.

Supplemental Agreement - A written agreement between the CONTRACTOR and the CITY covering work that is not within the general scope of the contract.

Surety - The corporation, partnership, or individual, other than the CONTRACTOR, executing a bond furnished by the CONTRACTOR.

Unit Price Work - Work to be paid for on the basis of unit prices.

Using Agency - The entity who will occupy or use the completed Work.

Work - Work is the act of, and the result of, performing services, furnishing labor, furnishing and incorporating materials and equipment into the Project and performing other duties and obligations, all as required by the Contract Documents. Such Work, however incremental, will culminate in the entire completed Project, or the various separately identifiable parts thereof.

ARTICLE 2 - AUTHORITIES AND LIMITATIONS

2.1 Authorities and Limitations:

- 2.1.1 The Contracting Officer alone, shall have the power to bind the CITY and to exercise the rights, responsibilities, authorities and functions vested in the Contracting Officer by the Contract Documents, except that the Contracting Officer shall have the right to designate in writing authorized representatives to act for him. Wherever any provision of the Contract Documents specifies an individual or organization, whether Governmental or private, to perform any act on behalf of or in the interests of the CITY that individual or organization shall be deemed to be the Contracting Officer's authorized representative under this Contract but only to the extent so specified. The Contracting Officer may, at any time during the performance of this Contract, vest in any such authorized representatives additional power and authority to act for the Contracting Officer or designate additional representatives, specifying the extent of their authority to act for the Contracting Officer; a copy of each document vesting additional authority in or removing that authority from an authorized representative or designating an additional authorized representative shall be furnished to the CONTRACTOR. The City Council reserves the right to appoint a new Contracting Officer without affecting any of the CONTRACTOR's obligations to the CITY under this Contract.
- 2.1.2 The CONTRACTOR shall perform the Work in accordance with any written order (including but not limited to instruction, direction, interpretation or determination) issued by an authorized representative in accordance with the authorized representative's authority to act for the Contracting Officer. The CONTRACTOR assumes all the risk and consequences of performing the Work in accordance with any order (including but not limited to instruction, direction, interpretation or determination) of anyone not authorized to issue such order, and of any order not in writing.
- 2.1.3 Should the Contracting Officer or his authorized representative designate Consultant(s) to act for the CITY as provided for in Paragraph 2.1.1, the performance or nonperformance of the Consultant under such authority to act, shall not give rise to any contractual obligation or duty of the Consultant to the CONTRACTOR, any Subcontractor, any Supplier, or any other organization performing any of the Work or any Surety representing them.
- 2.1.4 The term "Contracting Officer" when used in the text of these General Conditions or other Contract Documents following this section shall also mean any duly authorized representative of the Contracting Officer when authorized in accordance with Paragraph 2.1.1.

2.2 Evaluations by Contracting Officer:

- 2.2.1 The Contracting Officer will decide all questions which may arise as to;
- a. Quality and acceptability of materials furnished;
 - b. Quality and acceptability of Work performed;
 - c. Compliance with the Schedule of Progress;
 - d. Interpretation of Contract Documents;
 - e. Acceptable fulfillment of the Contract on the part of the CONTRACTOR.
- 2.2.2 In order to avoid cumbersome terms and confusing repetition of expressions in the Contract Documents whenever the terms "as ordered", "as directed", "as required", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used it shall be understood as if the expression were followed by the words "the Contracting Officer". When such terms are used to describe a requirement, direction, review or judgment of the Contracting Officer as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise).

2.2.3 The use of any such term or adjective shall not be effective to assign to the CITY any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provision of paragraphs 2.3 or 2.4.

2.3 Means & Methods:

The means, methods, techniques, sequences or procedures of construction, or safety precautions and the program incident thereto, and the failure to perform or furnish the Work in accordance with the Contract Documents are the sole responsibility of the CONTRACTOR.

2.4 Visits to Site:

The Contracting Officer will make visits to the site and approved remote storage sites at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. Such observations or the lack of such observations shall in no way relieve the CONTRACTOR from his duty to perform the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Incomplete Contract Documents:

The submission of a Bid by the Bidder is considered a representation that the Bidder examined the Contract Documents to make certain that all sheets and pages were provided and that the Bidder is satisfied as to the conditions to be encountered in performing the Work. The CITY expressly denies any responsibility or liability for a Bid submitted on the basis of an incomplete set of Contract Documents.

3.2 Copies of Contract Documents:

The CITY shall furnish to the CONTRACTOR up to six copies of the Contract Documents. Additional copies will be furnished, upon request, at the cost of reproduction.

3.3 Scope of Work:

The Contract Documents comprise the entire Contract between the CITY and the CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the Regulatory Requirements.

It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of the Contract to create in the public or any member thereof a third party benefit, or to authorize anyone not a party to this Contract to maintain a suit pursuant to the terms or provisions of the Contract.

3.4 Intent of Contract Documents:

3.4.1 It is the intent of the Contract Documents to describe a functionally complete Project to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied, without any adjustment in Contract Price or Contract Time, whether or not specifically called for.

3.4.2 Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Regulatory Requirements, whether such reference be specific or by implication, shall mean the edition stated in the Contract Documents or if not stated the latest standard specification, manual, code or Regulatory Requirements in effect at the time of Advertisement for the Project (or, in the Effective Date of the Contract if there was no Advertisement). However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the CITY and the CONTRACTOR, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to the CITY or any of the CITY's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

3.5 Discrepancy in Contract Documents:

3.5.1 Before undertaking the Work, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures, and dimensions shown thereon and all applicable field measurements. Work in the area by the CONTRACTOR shall imply verification of figures, dimensions and field measurements. If, during the above study or during the performance of the Work, the CONTRACTOR finds a conflict, error, discrepancy or omission in the Contract Document, or a discrepancy between the Contract Documents and any standard specification, manual, code, or Regulatory Requirement which affects the Work, The CONTRACTOR shall promptly report such discrepancy in writing to the Contracting Officer. The CONTRACTOR shall obtain a written interpretation or clarification from the Contracting Officer before proceeding with any Work affected thereby. Any adjustment made by the CONTRACTOR without this determination shall be at his own risk and expense. However, the CONTRACTOR shall not be liable to the CITY for failure to report any conflict, error or discrepancy in the Contract Documents unless the CONTRACTOR had actual knowledge thereof or should reasonably have knowledge thereof.

3.5.2 Discrepancy - Order of Precedence:

When conflicts, errors, or discrepancies within the Contract Documents exist, the order of precedence from most governing to least governing will be as follows:

Supplementary Conditions

General Conditions

General Requirements

Technical Specifications

Drawings (recorded dimensions will govern over scaled dimensions, large details over small scale, schedules over plans, architectural drawings over structural drawings over mechanical and electrical drawings)

3.6 Clarifications and Interpretations:

The Contracting Officer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as the Contracting Officer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

3.7 Reuse of Documents:

Neither the CONTRACTOR nor any Subcontractor, or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the CITY shall have or acquire any title to or ownership rights in any of the Contract Documents (or copies thereof) prepared by or for the CITY and they shall not reuse any of the Contract Documents on extensions of the Project or any other project without written consent of the Contracting Officer.

Contract Documents prepared by the CONTRACTOR in connection with the Work shall become the property of the CITY.

ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS

4.1 Availability of Lands:

The CITY shall furnish as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for use of the CONTRACTOR in connection with the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the CITY, unless otherwise provided in the Contract Documents. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 Visit to Site:

The submission of a Bid by the CONTRACTOR is considered a representation that the CONTRACTOR has visited and carefully examined the site and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract Documents.

4.3 Explorations and Reports:

The Supplementary Conditions identify those reports of explorations and tests of subsurface conditions at the site that have been utilized by the CITY in preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the factual data contained in such reports, but not upon interpretations or opinions drawn from such factual data contained therein or for the completeness or sufficiency thereof. Except as indicated in the immediately preceding sentence and in paragraphs 4.4 and 9.9, CONTRACTOR shall have full responsibility with respect to surface and subsurface conditions at the site.

4.4 Utilities:

4.4.1 The horizontal and vertical locations of known underground utilities as shown or indicated by the Contract Documents are approximate and are based on information and data furnished to the CITY by the owners of such underground utilities.

4.4.2 The CONTRACTOR shall have full responsibility for:

- a. Reviewing and checking all information and data concerning utilities.
- b. Locating all underground utilities shown or indicated in the Contract Documents which are affected by the Work.
- c. Coordination of the Work with the owners of all utilities during construction.
- d. Safety and protection of all utilities as provided in paragraph 6.17.
- e. Repair of any damage to utilities resulting from the Work in accordance with 4.4.4 and 4.5.

4.4.3 If Work is to be performed by any utility owner, the CONTRACTOR shall cooperate with such owners to facilitate the Work.

4.4.4 In the event of interruption to any utility service as a result of accidental breakage or as a result of being exposed or unsupported, the CONTRACTOR shall promptly notify the utility owner and the Contracting Officer. If service is interrupted repair work shall be continuous until the service is restored. No Work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

4.5 Damaged Utilities:

When utilities are damaged by the CONTRACTOR, the utility owner shall have the choice of repairing the utility or having the CONTRACTOR repair the utility. In the following circumstances, the CONTRACTOR shall reimburse the utility owner for repair costs or provide at no cost to the utility owner or the CITY, all materials, equipment and labor necessary to complete repair of the damage:

- a. When the utility is shown or indicated in the Contract Documents.
- b. When the utility has been located by the utility owner.
- c. When no locate was requested by the CONTRACTOR for utilities shown or indicated in the Contract Documents.
- d. All visible utilities.
- e. When the CONTRACTOR could have, otherwise, reasonably been expected to be aware of such utility.

4.6 Utilities Not Shown or indicated.

If, while directly performing the Work, an underground utility is uncovered or revealed at the site which was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected

thereby (except in an emergency as permitted by paragraph 6.19) identify the owner of such underground facility and give written notice thereof to that owner and to the Contracting Officer. The Contracting Officer will promptly review the underground utility to determine the extent to which the Contract Documents and the Work should be modified to reflect the impacts of the discovered utility. The Contract Documents will be amended or supplemented to the extent necessary through the issuance of a change document by the Contracting Officer. During such time, the CONTRACTOR shall be responsible for the safety and protection of such underground utility as provided in paragraph 6.17. The CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are directly attributable to the existence of any underground utility that was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of.

4.7 Survey Control:

The CITY will identify sufficient horizontal and vertical control data to enable the CONTRACTOR to survey and layout the Work. All survey work shall be performed under the direct supervision of a registered Land Surveyor when required by paragraph 7.8.

ARTICLE 5 - BONDS, INSURANCE, AND INDEMNIFICATION

5.1 Delivery of Bonds:

When the CONTRACTOR delivers the executed Contract to the Contracting Officer, the CONTRACTOR shall also deliver to the Contracting Officer such bonds as the CONTRACTOR may be required to furnish in accordance with paragraph 5.2.

5.2 Bonds:

The CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount as shown on the Contract as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These bonds shall remain in effect for one year after the date of Final Completion and until all obligations under this Contract, except special guarantees as per 12.7, have been met. All bonds shall be furnished on forms provided by the CITY (or copies thereof) and shall be executed by such Sureties as are authorized to do business in the State of Alaska. The contracting Officer may at his option copy the Surety with notice of any potential default or liability.

5.3 Replacement of Bond and Surety:

If the Surety on any bond furnished in connection with this Contract is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.2, or otherwise becomes unacceptable to the CITY, or if any such Surety fails to furnish reports as to his financial condition as requested by the CITY, the CONTRACTOR shall within five days thereafter substitute another bond and Surety, both of which must be acceptable to CITY.

5.4 Insurance Requirements:

5.4.1 The contractor shall carry and maintain throughout the life of this contract, at its own expense, insurance not less than the amounts and coverage herein specified, and the City of Unalaska, its employees and agents shall be named as additional insured under the insurance coverage so specified and where allowed, with respect to the performance of the work. There shall be no right of subrogation against the City or its agents performing work in connection with the work, and this **waiver of subrogation** shall be endorsed upon the policies. Insurance shall be placed with companies acceptable to the City of Unalaska; and these policies providing coverage thereunder shall contain provisions that no cancellation or material changes in the policy relative to this project shall become effective except upon **30 days** prior written notice thereof to the City of Unalaska.

5.4.2 Prior to commencement of the work, the contractor shall furnish certificates to the City of Unalaska, in duplicate, evidencing that the Insurance policy provisions required hereunder are in force. Acceptance by the City of Unalaska of deficient evidence does not constitute a waiver of contract requirements.

5.4.3 The contractor shall furnish the City of Unalaska with certified copies of policies upon request. The minimum coverages and limits required are as follows:

1. **Workers' Compensation** insurance in accordance with the statutory coverages required by the State of Alaska and **Employers Liability** insurance with limits not less than **\$1,000,000** and, where applicable, insurance in compliance with any other statutory obligations, whether State or Federal, pertaining to the compensation of injured employees assigned to the work, including but not limited to Voluntary Compensation, Federal Longshoremen and Harbor Workers Act, Maritime and the Outer Continental Shelf's Land Act.
2. **Commercial General Liability** with limits not less than **\$1,000,000** per Occurrence and **\$2,000,000** Aggregate for Bodily Injury and Property Damage, including coverage for Premises and Operations Liability, Products and Completed Operations Liability, Contractual Liability, Broad Form Property Damage Liability and Personal Injury Liability. Coverage shall not contain any exclusion of Explosion, Collapse, or Underground. Coverage is to be endorsed to include a per project aggregate. Additionally, such insurance shall be considered primary to any other insurance carried by the City of Unalaska and the insurer will endorse the policy accordingly.
3. **Commercial Automobile Liability** on all owned, non-owned, hired and rented vehicles with limits of liability of not less than **\$1,000,000** Combined Single Limit for Bodily Injury and Property Damage per each accident or loss.
4. If applicable, Contractor's Equipment insurance covering all of the contractor's equipment and machinery to be used in connection with the performance of the work specified in this contract. This coverage requirement may be waived at the discretion of the City of Unalaska if the Contractor self-insures the equipment and will waive all right of recovery against the City of Unalaska in writing.
5. **Umbrella/Excess Liability** insurance coverage of not less than **\$1,000,000** per occurrence and annual aggregate providing coverage in excess of General Liability, Auto Liability, and Employers Liability.
6. If work involves use of aircraft, Aircraft Liability insurance covering all owned and non-owned aircraft with a per occurrence limit of not less than \$1,000,000.
7. If work involves use of watercraft, Protection and Indemnity insurance with limits not less than \$1,000,000 per occurrence. Hull and Machinery coverage is to be carried on the vessel for the full current market value. This coverage requirement may be waived at the discretion of the City of Unalaska if the contractor self-insures the equipment and will waive all rights of recovery against the City of Unalaska in writing.
8. Where applicable, **Professional Liability** insurance with limits of not less than \$1,000,000 per claim and \$1,000,000 aggregate, subject to a maximum deductible of \$10,000 per claim. The City of Unalaska has the right to negotiate increase of deductibles subject to acceptable financial information of the policyholder.
9. Where applicable, Pollution Liability insurance with a project limit of not less than \$1,000,000 subject to a maximum deductible of \$10,000 to include coverage for Asbestos, Hazardous Materials, Lead or other related environmental hazards. The City of Unalaska has the right to negotiate increase of deductibles subject to acceptable financial information of the policyholder.

In the event Asbestos, Hazardous Materials, Lead or other related environmental hazards are transported by vehicle and/or marine vessel, the operator of such vehicles and vessels shall provide a Certificate of Insurance for the transportation of such materials (including loading and unloading) with limits of not less than \$1,000,000.

10. **Builder's Risk Insurance:** Coverage shall be provided on an "All Risk" completed value basis and protect the interests of the City, the contractor and his subcontractors. Coverage shall include all materials, equipment and supplies that are intended for specific installation in the project while such materials, supplies and equipment are located at the project site and in transit from port of arrival to job site and while temporarily located away from the project site.

- 5.4.4 Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its officers, officials, employees and volunteers; or the contractor shall provide a financial guarantee

satisfactory to the City guaranteeing payment of losses and related investigations, claim administration and defense expense.

- 5.4.5 All insurance policies as described above are required to be written on an “occurrence” basis. In the event occurrence coverage is not available, the contractor agrees to maintain “claims made” coverage for a minimum of two years after project completion.
 - 5.4.6 If the contractor employs subcontractors to perform any work hereunder, the contractor agrees to require such subcontractors to obtain, carry, maintain, and keep in force during the time in which they are engaged in performing any work hereunder, policies of insurance which comply with the requirements as set forth in this section. This requirement is applicable to subcontractors of any tier.
 - 5.4.7 The contractor is required to maintain all certificates of insurance during the course of the project and for a minimum of three (3) years following the completion of such project. It is further agreed, that upon request by the City of Unalaska, the Contractor will provide copies of any and all subcontractor certificates of insurance for review of compliance.
 - 5.4.8 Failure by the Contractor to maintain the required insurance coverage or to comply with the above, may, at the option of the City of Unalaska, be deemed Defective Work and remedied in accordance with the contract.
- 5.5 Indemnification:
- 5.5.1 The CONTRACTOR and his Subcontractors will name the owner as “Additional Insured” and will provide a "Waiver of Subrogation” on all required policies of insurance.
 - 5.5.2 The CONTRACTOR shall indemnify, save harmless, and defend the CITY and its agents and its employees from any and all claims or actions for injuries or damages sustained by any person or property arising directly or indirectly from the CONTRACTOR's performance of this contract; however, this provision has no effect if, but only if, the sole proximate cause of the injury or damage is the negligence of the City or its agents.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision of Work:

The CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. All Work under this Contract shall be performed in a skillful and workmanlike manner. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

6.2 Superintendence by CONTRACTOR:

The CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent. The Contracting Officer shall be advised in writing of the superintendent's name, local address, and telephone number. This written advice is to be kept current until Final Acceptance by the CITY. The superintendent will be the CONTRACTOR's representative at the site and shall have full authority to act and sign documents on behalf of the CONTRACTOR.

All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall cooperate with the Contracting Officer in every way possible.

6.3 Character of Workers:

The CONTRACTOR shall provide a sufficient number of competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The CONTRACTOR shall at all times maintain good discipline and order at the site. The Contracting Officer may, in writing, require the CONTRACTOR to remove from the Work any employee the Contracting Officer deems incompetent, careless, or otherwise detrimental to the progress of the Work, but the Contracting Officer shall have no duty to exercise this right.

6.4 CONTRACTOR to Furnish:

Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5 Materials and Equipment:

All materials and equipment shall be of specified quality and new, except as otherwise provided in the Contract Documents. If required by the Contracting Officer, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to the CITY or any of the CITY's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

6.6 Anticipated Schedules:

6.6.1 Within reasonable time prior to the preconstruction conference the CONTRACTOR shall submit to the Contracting Officer for review an anticipated progress schedule indicating the starting and completion dates of the various stages of the Work.

6.6.2 Within fifteen days after the date of the Notice to Proceed, the CONTRACTOR shall submit to the Contracting Officer for review:

Anticipated schedule of Shop Drawing submissions; and Anticipated Schedule of Values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by the CONTRACTOR at the time of submission.

6.7 Finalizing Schedules:

Prior to processing the first Application for Payment the Contracting Officer and the CONTRACTOR will finalize schedules required by paragraph 6.6.

Acceptance by the CITY of the progress schedule, will neither impose on the CITY nor relieve the CONTRACTOR from full responsibility for the progress or scheduling of the Work. If accepted, the finalized schedule of Shop Drawing and other required submissions will be acceptable to the CITY as providing a workable arrangement for processing the submissions. If accepted the finalized Schedule of Values will be acceptable to the CITY as an approximation of anticipated value of Work accomplished over the anticipated Contract Time. Receipt and acceptance of a schedule submitted by the CONTRACTOR shall not be construed to assign responsibility for performance or contingencies to the CITY or relieve the CONTRACTOR of his responsibility to adjust his forces, equipment, and work schedules as may be necessary to insure completion of the Work within prescribed Contract Time. Should the progress of the Work be discontinued for any reason, the CONTRACTOR shall notify the Contracting Officer at least 24 hours in advance of resuming operations.

6.8 Adjusting Schedules:

Upon substantial changes to the schedule or upon request, the CONTRACTOR shall submit to the Contracting Officer for acceptance (to the extent indicated in paragraph 6.7 and the General Requirements) adjustments in the schedules to reflect the actual present and anticipated progress of the Work.

6.9 Substitutes or "Or-Equal" Items:

6.9.1 Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is

permitted, materials or equipment of other Suppliers may be accepted by the Contracting Officer only if sufficient information is submitted by the CONTRACTOR which clearly demonstrates to the Contracting Officer that the material or equipment proposed is equivalent or equal in all aspects to that named. The procedure for review by the Contracting Officer will include the following as supplemented in the General Requirements.

6.9.2 Requests for review of substitute items of material and equipment will not be accepted by the Contracting Officer from anyone other than the CONTRACTOR.

6.9.3 If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the Contracting Officer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not delay the CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the CITY for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.

6.9.4 All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Contracting Officer in evaluating the proposed substitute. The Contracting Officer may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed substitute. The Contracting Officer may reject any substitution request which the Contracting Officer determines is not in the best interest of the CITY.

6.10 Substitute Means and Methods:

If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Contracting Officer, if the CONTRACTOR submits sufficient information to allow the Contracting Officer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the Contracting Officer will be similar to that provided in paragraph 6.9 as applied by the Contracting Officer and as may be supplemented in the General Requirements.

6.11 Evaluation of Substitution:

The Contracting Officer will be allowed a reasonable time within which to evaluate each proposed substitute. The Contracting Officer will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Contracting Officer's prior written acceptance which will be evidenced by either a Change Order or a Shop Drawing approved in accordance with Sections 6.20 and 6.21. The Contracting Officer may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

6.12 Dividing the Work:

The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.13 Subcontractors:

The CONTRACTOR may utilize the services of licensed specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by licensed specialty Subcontractors, in accordance with the following conditions:

6.13.1 The CONTRACTOR shall not award any Work to any Subcontractor without prior written approval of the Contracting Officer. This approval will not be given until the CONTRACTOR submits to the Contracting

Officer a written statement concerning the proposed award to the Subcontractor which shall contain required E.E.O. documents, evidence of insurance, and a copy of the proposed subcontract executed by the subcontractor. No acceptance by the Contracting Officer of any such Subcontractor shall constitute a waiver of any right of the CITY to reject Defective Work.

- 6.13.2 The CONTRACTOR shall be fully responsible to the CITY for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions.
- 6.13.3 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate written agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the CITY and contains waiver provisions as required by paragraph 13.17 and termination provisions as required by Article 14.
- 6.13.4 Nothing in the Contract Documents shall create any contractual relationship between the CITY and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the CITY to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Regulatory Requirements. The CITY will not undertake to settle any differences between or among the CONTRACTOR, Subcontractors, or Suppliers.
- 6.13.5 The CONTRACTOR and Subcontractors shall coordinate their work and facilitate general progress of Work. Each trade shall afford other trades every reasonable opportunity for installation of their work and storage of materials. If cooperative work of one trade must be altered due to lack of proper supervision, or failure to make proper provisions in time by another trade, such conditions shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time.
- 6.13.6 The CONTRACTOR shall include on his own payrolls any person or persons working on the contract who are not covered by written subcontract, and shall ensure that all Subcontractors include on their payrolls all persons performing work under the direction of the Subcontractor.

6.14 Use of Premises:

The CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project limits and approved remote storage sites and lands and areas identified in and permitted by Regulatory Requirements, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against the CITY by any such owner or occupant because of the performance of the Work, the CONTRACTOR shall hold the CITY and its agencies harmless.

6.15 Structural Loading:

The CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.16 Record Documents:

The CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Field Memos, Work Orders, Change Orders, Supplemental Agreements, and written interpretations and clarifications (issued pursuant to paragraph 3.6) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to the Contracting Officer for reference and copying. Upon completion of the Work, the annotated record documents, samples and Shop Drawings will be delivered to the Contracting Officer. Record documents shall accurately record variations in the Work which vary from requirements shown or indicated in the Contract Documents.

6.17 Safety and Protection:

The CONTRACTOR alone shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- 6.17.1 All employees on the Work and other persons and organizations who may be affected thereby;
- 6.17.2 All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
- 6.17.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of construction.
- 6.17.4 The CONTRACTOR shall comply with all applicable Regulatory Requirements enacted for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time except as stated in 4.6, except damage or loss attributable to unforeseeable causes beyond the control of and without the fault or negligence of the CONTRACTOR, including but not restricted to acts of God or the public enemy. The CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until Final Acceptance (except as otherwise expressly provided in connection with Substantial Completion).

The Contractor shall do whatever work is necessary for overall project safety and be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during the Contract period. This requirement shall apply continuously and not limited to normal working hours.

Safety provisions shall conform to Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and other applicable federal, state, county, and local laws, ordinances, codes, requirements set forth herein, and regulations that may be specified in other parts of these Contract Documents. Where these are in conflict, the more stringent requirements shall apply. Contractor shall become thoroughly familiar with governing safety provisions and shall comply with the obligations set forth therein.

The Contractor shall develop and maintain for the duration of the Contract, a safety program that will effectively incorporate and implement required safety provisions. Contractor shall appoint a qualified employee who is authorized to supervise and enforce compliance with the safety program.

The Engineer's duty to conduct construction review of the Contractor's performance does not include a review or approval of the adequacy of Contractor's safety supervisor, safety program, or safety measures taken in, on, or near the construction site.

As part of safety program, Contractor shall maintain at its office or other well-known location at the job site, safety equipment applicable to the Work as prescribed by governing safety authorities, and articles necessary for giving first aid to the injured. Establish procedures for the immediate removal to a hospital or a doctor's care of persons who may be injured on the job site.

Contractor shall do all work necessary to protect the general public from hazards, including but not limited to, surface irregularities, trenches, excavations, and blasting. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. Construct and maintain satisfactory and substantial fencing, railings, barricades, or steel plates, as applicable, at all openings, obstructions, or other hazards. Such barricades shall have adequate warning lights as necessary or required for safety.

6.18 Safety Representative:

The CONTRACTOR shall designate a responsible safety representative at the site. This person shall be the CONTRACTOR's superintendent unless otherwise designated in writing by the CONTRACTOR to the Contracting Officer.

6.19 Emergencies:

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the CITY, is obligated to act to prevent threatened damage, injury or loss. The CONTRACTOR shall give the Contracting Officer prompt written notice if the CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents is required because of the action taken in response to an emergency, a change will be authorized by one of the methods indicated in Paragraph 9.2, as determined appropriate by the Contracting Officer.

6.20 Shop Drawings and Samples:

6.20.1 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the Contracting Officer for review and approval in accordance with the accepted schedule of Shop Drawing submissions the required number of all Shop Drawings, which will bear a stamp or specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as the Contracting Officer may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Contracting Officer to review the information as required.

6.20.2 The CONTRACTOR shall also submit to the Contracting Officer for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.20.3 Before submission of each Shop Drawing or sample the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.20.4 At the time of each submission the CONTRACTOR shall give the Contracting Officer specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to the Contracting Officer for review and approval of each such variation. All variations of the proposed shop drawing from that specified will be identified in the submission and available maintenance, repair and replacement service will be indicated. The submittal will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such variation, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the CITY in evaluating the proposed variation. If the variation may result in a change of Contract Time or Price, or contract responsibility, and is not minor in nature; the CONTRACTOR must submit a written request for Change Order with the variation to notify the CITY of his intent. The CITY may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed variation. The Contracting Officer may reject any variation request which the Contracting Officer determines is not in the best interest of the CITY.

6.21 Shop Drawing and Sample Review:

6.21.1 The Contracting Officer will review with reasonable promptness Shop Drawings and samples, but the Contracting Officer's review will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate acceptance of

the assembly in which the item functions. The CONTRACTOR shall make corrections required by the Contracting Officer and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review. The CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by the Contracting Officer on previous submittals.

6.21.2 The Contracting Officer's review of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless the CONTRACTOR has in writing advised the Contracting Officer of each such variation at the time of submission as required by paragraph 6.20.4. The Contracting Officer if he so determines, may give written approval of each such variation by Change Order, except that, if the variation is minor and no Change Order has been requested a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample review comments shall suffice as a modification. No approval by the Contracting Officer will relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.20.3.

6.21.3 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to the Contracting Officer's review of the pertinent submission will be the sole expense and responsibility of the CONTRACTOR.

6.22 Maintenance During Construction:

The CONTRACTOR shall maintain the Work during construction and until Substantial Completion, at which time the responsibility for maintenance shall be established in accordance with paragraph 13.10.

6.23 Continuing the Work:

The CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the CITY. No work shall be delayed or postponed pending resolution of any disputes, disagreements, or claims except as the CONTRACTOR and the Contracting Officer may otherwise agree in writing.

6.24 Consent to Assignment:

The CONTRACTOR shall obtain the prior written consent of the Contracting Officer to any proposed assignment of any interest in, or part of this Contract. The consent to any assignment or transfer shall not operate to relieve the CONTRACTOR or his Sureties of any of his or its obligations under this Contract or the Performance Bonds. Nothing herein contained shall be construed to hinder, prevent, or affect an assignment of monies due, or to become due hereunder, made for the benefit of the CONTRACTOR's creditors pursuant to law.

6.25 Use of Explosives:

6.25.1 When the use of explosives is necessary for the prosecution of the Work, the CONTRACTOR shall exercise the utmost care not to endanger life or property, including new Work and shall follow all Regulatory Requirements applicable to the use of explosives. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

6.25.2 All explosives shall be stored in a secure manner in compliance with all Regulatory Requirements, and all such storage places shall be clearly marked. Where no Regulatory Requirements apply, safe storage shall be provided not closer than 1,000 feet from any building, camping area, or place of human occupancy.

6.25.3 The CONTRACTOR shall notify each public utility owner having structures in proximity to the site of his intention to use explosives. Such notice shall be given sufficiently in advance to enable utility owners to take such steps as they may deem necessary to protect their property from injury. However, the CONTRACTOR shall be responsible for all damage resulting from the use of the explosives, whether or not, utility owners act to protect their property.

6.26 CONTRACTOR's Records:

6.26.1 Records of CONTRACTOR and Subcontractors relating to personnel, payrolls, invoices of materials, and any and all other data relevant to the performance of the Contract, must be kept on a generally recognized accounting system. Such records must be available during normal work hours to the Contracting Officer for

purposes of investigation to ascertain compliance with Regulatory Requirements and provision of the Contract Documents.

6.26.2 Payroll records must contain the name and address of each employee, his correct classification, rate of pay, daily and weekly number of hours of work, deductions made, and actual wages paid. The CONTRACTOR and Subcontractors shall make employment records available for inspection by the Contracting Officer and representatives of the State of Alaska Department of Labor and Workforce Development and will permit such representatives to interview employees during working hours on the Project.

6.26.3 Records of all communications between the CITY and the CONTRACTOR and other parties, where such communications affected performance of this Contract, must be kept by the CONTRACTOR and maintained for a period of three years from Final Acceptance. The CITY or its assigned representative may perform an audit of these records during normal work hours after written notice to the CONTRACTOR.

ARTICLE 7 - LAWS AND REGULATIONS

7.1 Laws to be Observed:

The CONTRACTOR shall keep fully informed of all Regulatory Requirements and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the Work, or which in any way affect the conduct of the Work. The CONTRACTOR shall at all times observe and comply with all such Regulatory Requirements, orders and decrees; and shall protect and indemnify the CITY and its representatives against claim or liability arising from or based on the violation of any such Regulatory Requirement, order, or decree whether by the CONTRACTOR, Subcontractor, or any employee of either. Except where otherwise expressly required by applicable Regulatory Requirements, the CITY shall not be responsible for monitoring CONTRACTOR's compliance with any Regulatory Requirements.

7.2 Permits, Licenses, and Taxes:

7.2.1 The CONTRACTOR shall procure all permits and licenses, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work. As a condition of performance of this Contract, the CONTRACTOR shall pay all Federal, State and local taxes incurred by the CONTRACTOR, in the performance of the Contract. Proof of payment of these taxes is a condition precedent to final payment by the CITY under this Contract.

7.2.2 The CONTRACTOR's certification that taxes have been paid (as contained in the Release of Contract) may be verified with the Department of Revenue and Department of Labor and Workforce Development and Unalaska City Clerk, prior to final payment.

7.2.3 If any Federal, State or local tax is imposed, charged, or repealed after the date of Bid opening and is made applicable to and paid by the CONTRACTOR on the articles or supplies herein contracted for, then the Contract shall be increased or decreased accordingly by a Change Order.

7.2.4 The Contractor shall require all Subcontractors to obtain a City of Unalaska Business License.

7.3 Patented Devices, Materials and Processes:

If the CONTRACTOR employs any design, device, material, or process covered by letters of patent, trademark or copyright, the CONTRACTOR shall provide for such use by suitable legal agreement with the patentee or owner. The CONTRACTOR and the Surety shall indemnify and save harmless the CITY and its agents, any affected third party, from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the CITY for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the prosecution or after the completion of the Work.

7.4 Compliance of Specifications and Drawings:

If the CONTRACTOR observes that the Specifications and Drawings supplied by the CITY are at variance with any Regulatory Requirements, CONTRACTOR shall give the Contracting Officer prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 9.2. as determined appropriate by the Contracting Officer. If the CONTRACTOR performs any Work knowing or having reason to know that it is contrary to

such Regulatory Requirements, and without such notice to the Contracting Officer, the CONTRACTOR shall bear all costs arising therefrom; however, it shall not be the CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings supplied by the CITY are in accordance with such Regulatory Requirements.

7.5 Accident Prevention:

The CONTRACTOR shall comply with AS 18.60.075 and all pertinent provisions of the Construction Code Occupational Safety and Health Standards issued by the Alaska Department of Labor.

7.6 Sanitary Provisions:

The CONTRACTOR shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees and CITY representatives as may be necessary to comply with the Regulatory requirements.

7.7 Business Registration:

The Contractor shall comply with AS 08.18.011 which states, as follows: "it is unlawful for a person to submit a bid or work as a contractor until he has been issued a certificate of registration by the Department of Commerce. A partnership or joint venture shall be considered registered if one of the general partners or ventures whose name appears in the name under which the partnership or venture does business is registered." The Contractor shall obtain a City of Unalaska Business License prior to commencement of the Work to the extent required by the City of Unalaska Code of Ordinances section 9.30.101.

7.8 Professional Registration and Certification:

All craft trades, architects, engineers and land surveyors, electrical administrators, explosive handlers, and welders employed under the Contract shall specifically comply with applicable provisions of AS 08.18, 08.48, 08.40, 08.52, and 08.99. Provide copies of individual licenses within seven days following a request from the Contracting Officer.

7.9 Local Building Codes:

The CONTRACTOR shall comply with AS 35.10.025 which requires construction in accordance with applicable local building codes including the obtaining of required permits. City of Unalaska permits required for the work are identified in the Supplemental Conditions.

7.10 Air Quality Control:

The CONTRACTOR shall comply with all applicable provision of AS 46.03.04 as pertains to Air Pollution Control.

7.11 Archaeological or Paleontological Discoveries:

When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, or paleontological remains, such as shell heaps, land or sea mammal bones or tusks, the CONTRACTOR shall cease operations immediately and notify the Contracting Officer. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the Contracting Officer order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra work, such shall be covered by an appropriate Contract change document.

7.12 Not used.

7.13 Preferential Employment:

To the fullest extent allowed by law, the CONTRACTOR shall comply with AS 36.10, as amended, which provides for preferential employment of Alaska residents.

7.14 Wages and Hours of Labor:

7.14.1 One certified copy of all payrolls shall be submitted weekly to the State Department of Labor to assure compliance with AS 36.05.040, Filing Schedule of Employees Wages Paid and Other Information. The prime

CONTRACTOR shall be responsible for the submission of certified copies of payrolls of all Subcontractors. The certification shall affirm that the payrolls are current and complete, that the wage rates contained therein are not less than the applicable rates referenced in these Contract Documents, and that the classification set forth for each laborer or mechanic conforms with the work he performed. The CONTRACTOR and his Subcontractors shall attend all hearings and conferences and produce such books, papers, and documents all as requested by the Department of Labor. Should Federal funds be involved, the Contracting Agency shall also receive a copy of the CONTRACTOR's certified payrolls.

7.14.2 The following Labor provisions shall also apply to this Contract:

- a. The CONTRACTOR and his Subcontractors shall pay all employees unconditionally and not less than once a week;
- b. Wages may not be less than those stated in the advertised specifications, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors;
- c. The scale of wages to be paid shall be posted by the CONTRACTOR in a prominent and easily accessible place at the site of the work;
- d. The CITY shall withhold so much of the accrued payments as is necessary to pay laborers, mechanics, or field surveyors employed by the CONTRACTOR or Subcontractors the difference between
 1. the rates of wages required by the contract to be paid laborers, mechanics, or field surveyors on the work, and
 2. the rates of wages in fact received by laborers, mechanics or field surveyors.

7.15 Overtime Work Hours and Compensation:

Pursuant to 40 U.S.C. 327-330 and AS 23.10.060, the CONTRACTOR shall not require nor permit any laborer or mechanic in any workweek in which he is employed on any work under this Contract to work in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all such hours worked in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek whichever is the greater number of overtime hours. In the event of any violation of this provision, the CONTRACTOR shall be liable to any affected employee for any amounts due and penalties and to the CITY for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of this provision in the sum of \$10.00 for each Calendar Day on which such employee was required or permitted to be employed on such work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by this paragraph.

7.16 Covenant Against Contingent Fees:

The CONTRACTOR warrants that no person or selling agent has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee. For breach or violation of this warranty, the CITY shall have the right to annul this Contract without liability or, in its discretion, to deduct price of consideration from the Contract or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

7.17 Officials Not to Benefit:

No member of or delegate to the U.S. Congress, the State Legislature, Unalaska City Council or other State or City Officials shall be admitted to any share or part of this Contract, nor to any benefit that may arise there from. However, this provision shall not be construed to extend to this Contract if made with a corporation for its general benefits.

7.18 Personal Liability of Public Officials:

In carrying out any of the provisions thereof, or in exercising any power or authority granted to the Contracting Officer by the Contract, there will be no liability upon the City nor upon its agents or authorized as its representatives, either

personally or as officials of the City of Unalaska, it being always understood that in such matters they act as agents and representatives of the CITY.

ARTICLE 8 - OTHER WORK

8.1 Related Work at Site:

- 8.1.1 The CITY reserves the right at any time to contract for and perform other or additional work on or near the Work covered by the Contract.
- 8.1.2 When separate contracts are let within the limits of the Project, the CONTRACTOR shall conduct his Work so as not to interfere with or hinder the work being performed by other contractors. The CONTRACTOR shall join his work with that of the others in an acceptable manner and shall perform it in proper sequence to that of others.
- 8.1.3 If the fact that other such work to be performed is identified or shown in the Contract Documents, the CONTRACTOR shall assume all liability, financial or otherwise, in connection with this Contract and indemnify and save harmless the City of Unalaska and its agents from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by the CONTRACTOR because of the presence and operations of other contractors.
- 8.1.4 If the fact that such other work to be performed was not identified or shown in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work. If the CONTRACTOR believes that such performance will require an increase in Contract Price or Contract Time, the CONTRACTOR shall notify the Contracting Officer of such required increase within fifteen (15) calendar days following receipt of the Contracting Officer's notice. Should the Contracting Officer find such increase(s) to be justified, a Change Order will be executed.

8.2 Access, Cutting, and Patching:

The CONTRACTOR shall afford each utility owner and any other contractor who is a party to such a direct contract with the CITY (or the CITY, if the CITY is performing the additional work with the CITY's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work and shall properly connect and coordinate the Work with the work of others. The CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work, the CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter such other work with the written consent of the Contracting Officer. The duties and responsibilities of the CONTRACTOR under this paragraph are for the benefit of other contractors to the extent that there are comparable provisions for the benefit of the CONTRACTOR in said direct contracts between the CITY and other contractors.

8.3 Defective Work by Others:

If any part of the CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor, utility owner, or the CITY, the CONTRACTOR shall inspect and promptly report to the Contracting Officer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to so report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non apparent defects and deficiencies in the other work.

8.4 Coordination:

If the CITY contracts with others for the performance of other work at the site, Contracting Officer will have authority and responsibility for coordination of the activities among the various prime contractors.

ARTICLE 9 - CHANGES

9.1 CITY's Right to Change:

Without invalidating the Contract and without notice to any Surety, the CITY may, at any time or from time to time, order additions, deletions or revisions in the Work within the general scope of the Contract, including but not limited to changes:

- 9.1.1 In the Contract Documents;
- 9.1.2 In the method or manner of performance of the Work;
- 9.1.3 In City-furnished facilities, equipment, materials, services, or site;
- 9.1.4 Directing acceleration in the performance of the Work.

9.2 Authorization of Changes within the General Scope:

Additions, deletions, or revisions in the Work within the general scope of the Contract as specified in 9.1 shall be authorized by one or more of the following ways:

- 9.2.1 Directive (pursuant to paragraph 9.3)
- 9.2.2 A Change Order (pursuant to paragraph 9.5)
- 9.2.3 CITY's acceptance of Shop Drawing variations from the Contract Documents as specifically identified by the CONTRACTOR as required by paragraph 6.20.4.

9.3 Directives:

- 9.3.1 The Contracting Officer shall provide written clarification or interpretation of the contract documents (pursuant to paragraph 3.6).
- 9.3.2 The Contracting Officer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents.
- 9.3.3 The Contracting Officer may order the Contractor to correct Defective Work or methods which are not in conformance with the Contract Documents.
- 9.3.4 The Contracting Officer may direct the commencement or suspension of Work or emergency related work (as provided in paragraph 6.19).
- 9.3.5 Upon the issuance of a Directive to the CONTRACTOR by the Contracting Officer, the CONTRACTOR shall immediately proceed with the performance of the work as prescribed by such Directive.
- 9.3.6 If the CONTRACTOR believes that the changes noted in a Directive may cause an increase in the Contract Price or an extension of Contract Time, the CONTRACTOR shall immediately provide written notice to the Contracting Officer depicting such increases before proceeding with the Directive, except in the case of an emergency. If the Contracting Officer finds the increase in Contract Price or the extension of Contract Time justified, a Change Order will be issued. If however, the Contracting Officer does not find that a Change Order is justified, the Contracting Officer may direct the CONTRACTOR to proceed with the work. The CONTRACTOR shall cooperate with the Contracting Officer in keeping complete daily records of the cost of such work. If a Change Order is ultimately determined to be justified, in the absence of agreed prices and unit prices, payment for such work will be made on a cost of the work basis as provided in 10.4.

9.4 Change Order:

A change in Contract Time, Contract Price, or responsibility may be made for changes within the scope of the Work only by Change Order. Upon receipt of an executed Change Order, the CONTRACTOR shall promptly proceed with the work

involved which will be performed under the applicable conditions of the Contract Documents except as otherwise specifically provided. Changes in Contract Price and Contract Time shall be made in accordance with Article 10 and 11.

9.5 Shop Drawing Variations:

Variations by shop drawings shall only be eligible for consideration under 9.4 when the conditions affecting the price, time, or responsibility are identified by the CONTRACTOR in writing and a request for a Change Order is submitted as per 6.20.4.

9.6 Changes Outside the General Scope; Supplemental Agreement:

Any change which is outside the general scope of the Contract, as determined by the Contracting Officer, must be authorized by the appropriate representatives of the CITY and the CONTRACTOR.

9.7 Unauthorized Work:

The CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in this Article 9, except in the case of an emergency as provided in paragraph 6.19 and except in the case of uncovering Work as provided in paragraph 12.4.2.

9.8 Notification of Surety:

If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents including, but not limited to, Contract Price or Contract Time is required by the provisions of any Bond to be given to a Surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

9.9 Differing Site Conditions:

9.9.1 The CONTRACTOR shall promptly, and before such conditions are disturbed (except in an emergency as permitted by paragraph 6.19), notify the Contracting Officer in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in the Contract, and which could not have been discovered by a careful examination of the site, or (2) unknown physical conditions at the site, or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Contracting Officer shall promptly investigate the conditions, and if the Contracting Officer finds that such conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or time required for, performance of this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly.

9.9.2 Any claim for additional compensation by the CONTRACTOR under this clause shall be made in accordance with Article 15 and shall not be allowed unless the CONTRACTOR has first given the notice required by this Contract. In the event that the Contracting Officer and the CONTRACTOR are unable to reach an agreement concerning an alleged differing site condition, the CONTRACTOR will be required to keep an accurate and detailed record which will indicate the actual cost of the work done under the alleged differing site condition. Failure to keep such a record shall be a bar to any recovery by reason of such alleged differing site conditions. The Contracting Officer shall be given the opportunity to supervise and check the keeping of such records.

ARTICLE 10 - CONTRACT PRICE; COMPUTATION AND CHANGE

10.1 Contract Price:

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to the CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the CONTRACTOR shall be at his expense without change in the Contract Price. The Contract Price may only be changed by a Change Order or Supplemental Agreement.

10.2 Claim for Price Change:

Any claim for an increase or decrease in the Contract Price shall be submitted in accordance with the terms of Article 15, and shall not be allowed unless notice requirements of this Contract have been met.

10.3 Change Order Price Determination:

The value of any work covered by a Change Order for an increase or decrease in the Contract Price shall be determined in one of the following ways:

- 10.3.1 Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 10.9.1
- 10.3.2 By mutual acceptance of a lump sum price which includes overhead and profit.
- 10.3.3 When 10.3.1 and 10.3.2 are inapplicable, on the basis of the Cost of the Work (determined as provided in paragraphs 10.4 and 10.5) plus a CONTRACTORS's fee for overhead and profit (determined as provided in paragraph 10.6).

10.4 Cost of the Work:

The term Cost of the Work means the sum of all costs necessarily incurred and paid by the CONTRACTOR in the proper performance of the work. Except as otherwise may be agreed to in writing by the CITY, such costs shall be in amount no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 10.5:

- 10.4.1 Payroll costs for employees in the direct employ of the CONTRACTOR in the performance of the work under schedules of job classifications agreed upon by the CITY and the CONTRACTOR. Payroll costs for employees not employed full time on the work shall be apportioned on the basis of their time spent on the work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by the CITY.
- 10.4.2 Cost of all materials and equipment furnished and incorporated in the work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to the CONTRACTOR unless the CITY deposits funds with the CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to the CITY. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the CITY, and the CONTRACTOR shall make provisions so that they may be obtained.
- 10.4.3 Payments made by the CONTRACTOR to Subcontractors for work performed by Subcontractors. If required by the CITY, CONTRACTOR shall obtain competitive quotes from Subcontractors or Suppliers acceptable to the CONTRACTOR and shall deliver such quotes to the CITY who will then determine which quotes will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as the CONTRACTOR's Cost of Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.
- 10.4.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, and surveyors) employed for services necessary for the completion of the work.
- 10.4.5 Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel and subsistence expenses of the CONTRACTOR's employees incurred in discharge of duties connected with the work.

- b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the work, and cost less market value of such items used but not consumed which remain the property of the CONTRACTOR.
- c. Rentals of all construction equipment and machinery and the parts thereof whether rented from the CONTRACTOR or others in accordance with rental agreements approved by the CITY and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the work.
- d. Sales, consumer, use or similar taxes related to the work, and for which the CONTRACTOR is liable, imposed by Regulatory Requirements.
- e. Deposits lost for causes other than negligence of the CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by the CONTRACTOR in connection with the performance and furnishing of the Work provided they have resulted from causes other than the negligence of the CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of the CITY. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining the CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and the CONTRACTOR is placed in charge thereof, the CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraphs 10.6.2.a and 10.6.2.b.
- g. The cost of utilities, fuel and sanitary facilities at the site.
- h. Minor expenses such as long-distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the work.
- i. Cost of premiums for additional bonds and insurance required because of changes in the work and premiums for property insurance coverage within the limits of the deductible amounts established by the CITY in accordance with Article 5.

10.5 Excluded Costs:

The term Cost of the Work shall not include any of the following:

- 10.5.1 Payroll costs and other compensation of CONTRACTOR's officer, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agency, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 10.4.1 or specifically covered by paragraph 10.4.4 - all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.
- 10.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.
- 10.5.3 Any part of CONTRACTOR's capital expenses including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.
- 10.5.4 Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 10.4.5.i above).
- 10.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of

Defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

10.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 10.4.

10.6 CONTRACTOR's Fee:

The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

10.6.1 A mutually acceptable fixed fee; or if none can be agreed upon.

10.6.2 A fee based on the following percentages of the various portions of the Cost of the Work:

- a. For costs incurred under paragraphs 10.4.1 and 10.4.2, the CONTRACTOR's Fee shall be twenty percent;
- b. For costs incurred under paragraph 10.4.3, the CONTRACTOR's Fee shall be fifteen percent; and if a sub-contract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all subcontractors shall be fifteen percent;
- c. No fee shall be payable on the basis of costs itemized under paragraphs 10.4.4, 10.4.5 and 10.5;
- d. The amount of credit to be allowed by the CONTRACTOR to the CITY for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's Fee by an amount equal to ten percent of the net decrease; and
- e. When both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 10.6.2.a through 10.6.2.d, inclusive.

10.7 Cost Breakdown:

Whenever the cost of any work is to be determined pursuant to paragraphs 10.4 and 10.5, the CONTRACTOR will submit in form acceptable to the CITY an itemized cost breakdown together with supporting data.

10.8 Cash Allowances:

It is understood the CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to the Contracting Officer. CONTRACTOR agrees that:

10.8.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

10.8.2 CONTRACTOR's cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued to reflect actual amounts due the CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

10.9 Unit Price Work:

10.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the

actual quantities and classifications of Unit Price Work performed by the CONTRACTOR will be made by the CITY in accordance with paragraph 10.9.3.

- 10.9.2 Each unit price will be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR's overhead and profit for each separately identified item. If the "Basis of Payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Contract Documents.
- 10.9.3 Payment to the CONTRACTOR shall be made only for the actual quantities of work performed and accepted or materials furnished, in conformance with the Contract Documents. When the accepted quantities of work or materials vary from the quantities stated in the bid schedule, or change documents, the CONTRACTOR shall accept as payment in full, payment at the stated unit prices for the accepted quantities or work and materials furnished, completed and accepted; except as provided below:
- a. When the quantity of work to be done or material to be furnished under any item, for which the total cost of the item exceeds 10% of the total Contract Price, is increased by more the 25 per cent of the quantity stated in the bid schedule, or change documents, either party to the Contract, upon demand, shall be entitled to an equitable unit price adjustment on the portion of the work above 125 per cent of the quantity stated in the bid schedule.
 - b. When the quantity of work to be done or material to be furnished under any major item, for which the total cost of the item exceeds 10% of the total Contract Price, is decreased by more than 25 per cent of the quantity stated in the bid schedule, or change documents either party to the contract, upon demand, shall be entitled to an equitable price adjustment for the quantity of work performed or material furnished, limited to a total payment of not more the 75 per cent of the amount originally bid for the item.

10.10 Determinations for Unit Prices:

The Contracting Officer will determine the actual quantities and classifications of Unit Price Work performed by the CONTRACTOR. The Contracting Officer will review with the CONTRACTOR preliminary determinations on such matters before certifying the prices on the Bid Schedule. The Contracting Officer's certification thereon will be final and binding on the CONTRACTOR, unless, within ten days after the date of any such decisions, the CONTRACTOR delivers to the Contracting Officer written notice of intention to appeal from such a decision.

ARTICLE 11 - CONTRACT TIME; COMPUTATION AND CHANGE

11.1 Commencement of Contract Time; Notice to Proceed:

The Contract Time will commence to run on the day indicated in the Notice to Proceed. The CONTRACTOR shall notify the CONTRACTING OFFICER at least fourteen (14) days in advance of the time actual construction operations will begin

11.2 Starting the Work:

No work on contract items shall be performed before the effective date of the Notice to Proceed. The CONTRACTOR shall notify the Contracting Officer at least 24 hours in advance of the time actual construction operations will begin. The CONTRACTOR may request a limited Notice to Proceed after award has been made, to permit him to order long lead materials which could cause delays in project completion. However, granting is within the sole discretion of the Contracting Officer, and refusal or failure to grant a limited Notice to Proceed shall not be a basis for claiming for delay, extension of time, or alteration of price.

11.3 Computation of Contract Time:

- 11.3.1 When the contract time is specified on a calendar days basis, all work under the contract shall be completed within the number of calendar days specified. The count of contract time begins on the day following receipt of the Notice to Proceed by the CONTRACTOR, if no starting day is stipulated therein. Calendar days shall continue to be counted against contract time until and including the date of Final Completion of the Work.

11.3.2 When the Contract completion time is specified as a fixed calendar date, it shall be the date of Final Completion.

11.4 Time Change:

The Contract Time may only be changed by a Change Order or Supplemental Agreement.

11.5 Extension Due to Delays:

The right of the CONTRACTOR to proceed shall not be terminated nor the CONTRACTOR charged with liquidated or actual damages because of any delays to the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to the following: acts of God or of the public enemy, acts of the CITY in contractual capacity, acts of another contractor in the performance of a contract with the CITY, floods, fires, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather and delays of Subcontractors or Suppliers due to such causes. Any delay in receipt of materials on the site, caused by other than one of the specifically mentioned occurrences above, does not of itself justify a time extension. Provided, that the CONTRACTOR shall within twenty-four (24) hours from the beginning of any such delay (unless the Contracting Officer shall grant a further period of the time prior to the date of final settlement of the Contract) notify the Contracting Officer in writing of the cause of delay. The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when the findings of fact justify such an extension.

11.6 Essence of Contract:

All time limits stated in the Contract Documents are of the essence of the Contract.

11.7 Reasonable Completion Time:

It is expressly understood and agreed by and between the CONTRACTOR and the CITY that the date of beginning and the time for Final Completion of the Work described herein are reasonable times for the completion of the Work.

11.8 Delay Damages:

Whether or not the CONTRACTOR's right to proceed with the Work is terminated, he and his sureties shall be liable for damages resulting from his refusal or failure to complete the Work within the specified time. Liquidated damages for delay shall be paid by the CONTRACTOR or his Surety to the City in the amount as specified in the Agreement or the Supplementary Conditions for each Calendar Day the completion of the Work or any part thereof is delayed beyond the Contract Time required by the Contract, or any extension thereof. If such amount of liquidated damages is not established by the Contract Documents, then the CONTRACTOR and his Surety shall be liable to the City for any actual damages occasioned by such delay. The CONTRACTOR acknowledges that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that the City will sustain by reason of delayed completion. These liquidated damages are intended as compensation for losses difficult to estimate, and include those items enumerated in the Supplementary Conditions or elsewhere in the Contract Documents. These damages will continue to run both before and after termination in the event of default termination. These liquidated damages do not cover excess costs of completion or the CITY's costs, fees, and charges related to procurement. If a default termination occurs, the Contractor or his Surety shall pay in addition to these damages, all excess costs and expenses related to completion as provided by Article 14.2.5.

ARTICLE 12 - QUALITY ASSURANCE

12.1 Warranty and Guaranty:

The CONTRACTOR warrants and guarantees to the CITY that all Work will be in accordance with the Contract Documents and will not be Defective. Prompt notice of all defects shall be given to the CONTRACTOR. All Defective Work, whether or not in place, may be rejected, corrected or accepted as provided for in this Article.

12.2 Access to Work:

The CITY and the CITY's representatives, testing agencies and governmental agencies with jurisdiction interests will have access to the Work at reasonable times for their observation, inspecting and testing. The CONTRACTOR shall provide proper and safe conditions for such access.

12.3 Tests and Inspections:

- 12.3.1 The CONTRACTOR shall give the Contracting Officer timely notice of readiness of the Work for all required inspections, tests or approvals.
- 12.3.2 If Regulatory Requirements require any Work (or part thereof) to specifically be inspected, tested or approved, the CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish the Contracting Officer the required certificates of inspection, testing or approval. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with CITY's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by the CONTRACTOR. The CITY may perform additional tests and inspections which it deems necessary to insure quality control. All such failed tests or inspections shall be at the CONTRACTOR's expense.
- 12.3.3 If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of the Contracting Officer, it must, if requested by the Contracting Officer, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the Contracting Officer timely notice of CONTRACTOR's intention to cover the same and the Contracting Officer has not acted with reasonable promptness in response to such notice.
- 12.3.4 Neither observations nor inspections, test or approvals by the CITY of others shall relieve the CONTRACTOR from the CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

12.4 Uncovering Work:

- 12.4.1 If any Work is covered contrary to the written request of the Contracting Officer, it must, if requested by the Contracting Officer, be uncovered for the contracting Officer's observation and replaced at the CONTRACTOR's expense.
- 12.4.2 If the Contracting Officer considers it necessary or advisable that covered Work be observed, inspected or tested, the CONTRACTOR, at the Contracting Officer's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Contracting Officer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, the CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) and the CITY shall be entitled to an appropriate decrease in the Contract Price. If, however, such Work is not found to be Defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

12.5 CITY May Stop the Work:

If the Work is Defective, or the CONTRACTOR fails to supply suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Contracting Officer may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Contracting Officer to stop the Work shall not give rise to any duty on the part of the Contracting Officer to exercise this right for the benefit of the CONTRACTOR.

12.6 Correction or Removal of Defective Work:

If required by the Contracting Officer, the CONTRACTOR shall promptly, as directed, either correct all Defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by the Contracting Officer, remove it from the site and replace it with Work which conforms to the requirements of the Contract Documents. The CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

12.7 One Year Correction Period:

If within one year after the date of Final Completion or such longer period of time as may be prescribed by Regulatory Requirements or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be Defective, the CONTRACTOR shall promptly, without cost to the CITY and in accordance with the Contracting Officer's written instructions, either correct such Defective Work, or, if it has been rejected by the Contracting Officer, remove it from the site and replace it with conforming Work. If the CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the CITY may have the Defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by the CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service for the benefit of the CITY before Substantial Completion of all the Work, the correction period for the item may begin on an earlier date if so provided in the Specifications or by Change Order. Provisions of this paragraph are not intended to shorten the Statute of Limitations for bringing an action.

12.8 Acceptance of Defective Work:

Instead of requiring correction or removal and replacement of Defective Work, the Contracting Officer may accept Defective Work, the CONTRACTOR shall bear all direct, indirect and consequential costs attributable to the Contracting Officer's evaluation of and determination to accept such Defective Work (costs to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the CITY shall be entitled to an appropriate decrease in the Contract Price. If the CITY has already made final payment to the CONTRACTOR, an appropriate amount shall be paid by the CONTRACTOR or his Surety to the CITY.

12.9 CITY May Correct Defective Work:

If the CONTRACTOR fails within a reasonable time after written notice from the Contracting Officer to proceed to correct Defective Work or to remove and replace rejected Work as required by the Contracting Officer in accordance with paragraph 12.6, or if the CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the CITY may, after seven days' written notice to the CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph the CITY shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the Contracting Officer may exclude the CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend the CONTRACTOR's services related thereto, take possession of the CONTRACTOR's tool, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or approved remote storage sites or for which the CITY has paid the CONTRACTOR but which are stored elsewhere, the CONTRACTOR shall allow the Contracting Officer and his authorized representatives such access to the site as may be necessary to enable the Contracting Officer to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of the CITY or its agents in exercising such rights and remedies will be charged against the CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the CITY shall be entitled to an appropriate decrease in the Contract Price. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all cost of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the CONTRACTOR's Defective Work. The CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the Contracting Officer of the CITY's rights and remedies hereunder.

ARTICLE 13 - PAYMENTS TO CONTRACTOR AND COMPLETION

13.1 Schedule of Values:

The Schedule of Values established as provided in paragraph 6.6 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Contracting Officer. Progress payments on account of Unit Price Work will be based on the number of units completed.

13.2 Preliminary Payments:

Upon approval of the Schedule of Values the CONTRACTOR may be paid for direct costs substantiated by paid invoices and other prerequisite documents required by the General Requirements. Direct costs shall include the cost of Bonds, insurance, approved materials stored on the site or at approved remote storage sites, deposits required by a Supplier prior to fabricating materials, and other approved direct mobilization costs substantiated as indicated above. These payments shall be included as a part of the total Contract Price as stated in the Contract.

13.3 Application for Progress Payment:

The CONTRACTOR shall submit to the Contracting Officer for review an Application for Payment filled out and signed by the CONTRACTOR covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents. Progress payments will be made as the Work progresses on a monthly basis or twice a month when requested by the CONTRACTOR, but only when the approved invoice exceeds \$10,000.00.

13.4 Review of Applications for Progress Payments:

Contracting Officer will, either indicate in writing a recommendation of payment, or return the Application for Payment to the CONTRACTOR indicating in writing the Contracting Officer's reasons for refusing to recommend payment. If the latter case, the CONTRACTOR may make the necessary corrections and resubmit the Application for Payment.

13.5 Stored Materials and Equipment:

If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that the CITY has received the materials and equipment free and clear of all charges, security interests and encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the CITY's interest therein, all of which will be satisfactory to the Contracting Officer. No payment will be made for perishable materials that could be rendered useless because of long storage periods. No progress payment will be made for living plant materials until planted. The payment may be reduced by an amount equal to transportation and handling cost if the materials are stored offsite, in a remote location, or will require special handling.

13.6 CONTRACTOR's Warranty of Title:

The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to the CITY no later than the time of payment free and clear of any claims, liens, security interests and further obligations.

13.7 Withholding of Payments:

The CITY may withhold or refuse payment for any of the reasons listed below provided it gives written notice of its intent to withhold and of the basis for withholding:

- 13.7.1 The Work is Defective, or completed Work has been damaged requiring correction or replacement, or has been installed without approval of Shop Drawing, or by an unapproved Subcontractor.
- 13.7.2 The Contract Price has been reduced by Change Order.
- 13.7.3 The CITY has been required to correct Defective Work or complete Work in accordance with paragraph 12.9.
- 13.7.4 The CITY's actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.1.a through 14.2.1.k inclusive.
- 13.7.5 Claims have been made against the CITY or against the funds held by the CITY on account of the CONTRACTOR's actions or inactions in performing this Contract, or there are other items entitling the CITY to a set off.

13.7.6 Subsequently discovered evidence or the results of subsequent inspections or test, nullify any previous payments for reasons stated in subparagraphs 13.7.1 through 13.7.5.

13.7.7 The CONTRACTOR has failed to fulfill or is in violation of any of his obligations under any provision of this Contract.

13.8 Retainage:

At any time the CITY finds that satisfactory progress is not being made it may in addition to the amounts withheld under 13.7 retain a maximum amount equal to 10% of the total amount earned on all subsequent progress payments. This retainage may be released at such time as the Contracting Officer finds that satisfactory progress is being made.

13.9 Request for Release of Funds:

If the CONTRACTOR believes the basis for withholding is invalid or no longer exists, immediate written notice of the facts and Contract provisions on which the CONTRACTOR relies, shall be given to the CITY, together with a request for release of funds and adequate documentary evidence proving that the problem has been cured. In the case of withholding which has occurred at the request of the Department of Labor and Workforce Development, the CONTRACTOR shall provide a letter from the Department of Labor stating that withholding is no longer requested. Following such a submittal by the CONTRACTOR, the CITY shall have a reasonable time to investigate and verify the facts and seek additional assurances before determining whether release of withheld payments is justified.

13.10 Substantial Completion:

When the CONTRACTOR considers the Work ready for its intended use the CONTRACTOR shall notify the Contracting Officer in writing that the Work or a designated portion thereof is substantially complete (except for items specifically listed by the CONTRACTOR as incomplete) and request that the CITY issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Contracting Officer, the CONTRACTOR and appropriate Consultant(s) shall make an inspection of the Work to determine the status of completion. If the Contracting Officer does not consider the Work substantially complete, the Contracting Officer will notify the CONTRACTOR in writing giving the reasons therefor. If the Contracting Officer considers the Work substantially complete, the Contracting Officer will within fourteen days execute and deliver to the CONTRACTOR a certificate of Substantial Completion with tentative list of items to be completed or corrected. At the time of delivery of the certificate of Substantial Completion the Contracting Officer will deliver to the CONTRACTOR a written division of responsibilities pending Final Completion with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties which shall be consistent with the terms of the Contract Documents. The CITY shall be responsible for all CITY costs resulting from the initial inspection and the first re-inspection, the CONTRACTOR shall pay all costs incurred by the CITY resulting from re-inspections, thereafter.

13.11 Access Following Substantial Completion:

The CITY shall have the right to exclude the CONTRACTOR from the Work after the date of Substantial Completion, but the CITY shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

13.12 Final Inspection:

Upon written notice from the CONTRACTOR that the entire Work or an agreed portion thereof is complete, the Contracting Officer will make a final inspection with the CONTRACTOR and appropriate Consultants and will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or Defective. The CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies. The CONTRACTOR shall pay for all costs incurred by the CITY resulting from re-inspections.

13.13 Final Application for Payment:

After the CONTRACTOR has completed all such corrections to the satisfaction of the Contracting Officer and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates of payment to all laborers, Subcontractors and Suppliers, certificates of inspection, marked-up record documents and other documents - all as required by the Contract Documents, and after the Contracting Officer has indicated that the Work is acceptable (subject to the provisions of paragraph 13.17), the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all certificates, warranties, guaranties, releases, affidavits, and other documentation required by the Contract Documents.

13.14 Final Payment and Final Completion:

- 13.14.1 If on the basis of the Contracting Officer's observation of the Work during construction and final inspection, and the Contracting Officer's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, the Contracting Officer is satisfied that the Work has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the CITY will process final Application for Payment. Otherwise, the Contracting Officer will return the Application for Payment to the CONTRACTOR, indicating in writing the reasons for refusing to process final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the final Application for Payment.
- 13.14.2 If, through no fault of the CONTRACTOR, Final Completion of the Work is significantly delayed, the Contracting Officer shall, upon receipt of the CONTRACTOR's final Application for Payment, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by the CITY for Work not fully completed or corrected is less than the retainage provided for in paragraph 13.8, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the CONTRACTOR to the CITY with the application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
- 13.14.3 In addition to other requirements, final payment shall not be due until CITY's receipt of verification from the State of Alaska Department of Labor and Workforce Development ("the Department") that (i) Contractor has complied with AS 36.05.045(a) and (ii) the Department is not conducting an investigation and (iii) the Department has not issued a notice of violation of AS 36.05 to Contractor or to any subcontractor.
- 13.14.4 The Contractor shall furnish the attached forms fully executed prior to the City making final payment. These forms include the Affidavit of Release of Liens by the Contractor; Lien Release Form; and the Lien Release General to City. The forms will be made available to the contractor in electronic format upon request.

13.15 Final Acceptance:

Following receipt of the CONTRACTOR's Release with no exceptions, and certification that laborers, Subcontractors and materialmen have been paid, certification of payment of payroll and sales taxes and revenue taxes, and final payment to the CONTRACTOR, the CITY will issue a letter of Final Acceptance, releasing the CONTRACTOR from further obligations under the Contract, except as provided in paragraph 13.16.

13.16 CONTRACTOR's Continuing Obligation:

The CONTRACTOR's obligation to perform and complete the Work and pay all laborers, Subcontractors, and materialmen in accordance with the Contract Documents shall be absolute. Neither any progress or final payment by the CITY, nor the issuance of a certificate of Substantial Completion, nor any use or occupancy of the Work or any part thereof by the CITY, nor any act of acceptance by the CITY nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor any correction of Defective Work by the CITY will constitute an acceptance of Work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents.

13.17 Waiver of Claims by CONTRACTOR:

The making and acceptance of final payment will constitute a waiver of all claims by the CONTRACTOR against the CITY other than those previously made in writing and still unsettled.

13.18 No Waiver of Legal Rights:

The CITY shall not be precluded or be stopped by any payment, measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefor, from showing the true amount and character of the Work performed and materials furnished by the CONTRACTOR, nor from showing that any payment, measurement, estimate or certificate is untrue or is incorrectly made, or that the Work or materials are Defective. The CITY shall not be

precluded or stopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the CONTRACTOR or his Sureties, or both, such damages as it may sustain by reason of his failure to comply with requirements of the Contract Documents. Neither the acceptance by the CITY, or any representative of the CITY, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of the Contract Time, nor any possession taken by the CITY, shall operate as a waiver of any portion of the Contract, or of the power herein reserved, or of any right to damages. A waiver by the CITY of any breach of the Contract shall not be held to be a waiver of any other subsequent breach.

ARTICLE 14 - SUSPENSION OF WORK, DEFAULT AND TERMINATION

14.1 CITY May Suspend Work:

14.1.1 The CITY may, at any time suspend the Work or any portion thereof by notice in writing to the CONTRACTOR. If the Work is suspended without cause the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Article 15. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that suspension is due to the fault or negligence of the CONTRACTOR, or that suspension is necessary for Contract compliance, or that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the CONTRACTOR.

14.1.2 In case of suspension of Work, the CONTRACTOR shall be responsible for preventing damage to or loss of any of the Work already performed and of all materials whether stored on or off the site or approved remote storage sites.

14.2 Default of Contract:

14.2.1 If the CONTRACTOR:

- a. Fails to begin the Work under the Contract within the time specified in the "Proposal", or
- b. Fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workmen or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 6.6 as revised from time to time), or
- c. Performs the Work unsuitably or neglects or refuses to remove materials or to correct Defective Work.
- d. Discontinues the prosecution of the Work, or
- e. Fails to resume Work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency except as prohibited by 11 U.S.C. 363e, or
- g. Allows any final judgment to stand against him unsatisfied for period of 60 days, or
- h. Makes an assignment for the benefit of creditors without the consent of the Contracting Officer, or
- i. Disregards Regulatory Requirements, or
- j. Otherwise violates in any substantial way any provisions of the Contract Documents, or
- k. For any cause whatsoever, fails to carry on the Work in an acceptable manner, the Contracting Officer may give notice in writing to the CONTRACTOR and his Surety of such delay, neglect, or default.

If the CONTRACTOR or Surety, within the time specified in the above Notice of Default, shall not proceed in accordance therewith, then the CITY may, upon written notification from the Contracting Officer of the fact of such delay, neglect or default and the CONTRACTOR's failure to comply with such notice, have full power and authority without violating the Contract, to take the prosecution of the Work out of the hands of the CONTRACTOR. The CITY may terminate the services of the CONTRACTOR, exclude the CONTRACTOR

from the site and take possession of the Work and of all the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by the CONTRACTOR (without liability to the CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which the CITY has paid the CONTRACTOR but which are stored elsewhere, and finish the Work as the CITY may deem expedient. The CITY may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, or use such other methods that in the opinion of the Contracting Officer are required for the completion of said Contract in an acceptable manner.

- 14.2.3 The Contracting Officer may, by written notice to the CONTRACTOR and his Surety or his representative, transfer the employment of the Work from the CONTRACTOR to the Surety, or if the CONTRACTOR abandons the Work undertaken under the Contract, the Contracting Officer may, at his option with written notice to the Surety and without any written notice to the CONTRACTOR, transfer the employment for said Work directly to the Surety. The Surety shall submit its plan for completion of the Work, including any contracts or agreements with third parties for such completion, to the CITY for approval prior to beginning completion of the Work. Approval of such contracts shall be in accordance with all applicable requirements and procedures for approval of subcontracts as stated in the Contract Documents.
- 14.2.4 Upon receipt of the notice terminating the services of the CONTRACTOR, the Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the Work included under the Contract and employ by contract or otherwise any person or persons to finish the Work and provide the materials therefor, without termination of the continuing full force and effect of this Contract. In case of such transfer of employment to the Surety, the Surety shall be paid in its own name on estimates covering Work subsequently performed under the terms of the Contract and according to the terms thereof without any right of the CONTRACTOR to make any claim for the same or any part thereof.
- 14.2.5 If the Contract is terminated for default, the CONTRACTOR and the Surety shall be jointly and severally liable for damages for delay as provided by Article 11.8, and for the excess cost of completion, and all costs and expenses incurred by the CITY in completing the Work or arranging for completion of the Work, including but not limited to costs of assessing the Work to be done, costs associated with advertising, soliciting or negotiating for bids or proposals for completion, and other procurement costs. Following termination the CONTRACTOR shall not be entitled to receive any further balance of the amount to be paid under the contract until the work is fully finished and accepted, at which time if the unpaid balance exceeds the amount due the CITY and any amounts due to persons for whose benefit the CITY has withheld funds, such excess shall be paid by the CITY to the CONTRACTOR. If the damages, costs, and expenses due the CITY exceed the unpaid balance, the CONTRACTOR and his Surety shall pay the difference.
- 14.2.6 If, after notice of termination of the CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, or that termination was wrongful, the rights and obligations of the parties shall be determined in accordance with the clause providing for convenience termination.

14.3 Rights or Remedies:

Where the CONTRACTOR's services have been so terminated by the CITY, the termination will not affect any rights or remedies of the CITY against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the CITY will not release the CONTRACTOR from liability.

14.4 Convenience Termination:

- 14.4.1 The performance of the Work may be terminated by the CITY in accordance with this section in whole or in part, whenever, for any reason the Contracting Officer shall determine that such termination is in the best interest of the CITY. Any such termination shall be effected by delivery to the CONTRACTOR of a Notice of Termination, specifying termination is for the convenience of the CITY the extent to which performance of Work is terminated, and the date upon which such termination becomes effective. Immediately upon receipt of a Notice of Termination and except as otherwise directed by the Contracting Officer the CONTRACTOR shall:
- a. Stop Work on the date and to the extent specified in the Notice of Termination;

- b. Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the Work as is not terminated;
- c. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;
- d. With the written approval of the Contracting Officer, to the extent he may require, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, the cost of which would be reimbursable, in whole, or in part, in accordance with the provisions of the Contract;
- e. Submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory exclusive of items the disposition of which had been directed or authorized by the Contracting Officer;
- f. Transfer to the Contracting Officer the completed or partially completed record drawings, Shop Drawings, information, and other property which, if the Contract had been completed, would be required to be furnished to the CITY;
- g. Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to the Contract which is in the possession of the CONTRACTOR and in which the CITY has or may acquire any interest. The CONTRACTOR shall proceed immediately with the performance of the above obligations.

14.4.2 When the CITY orders termination of the Work effective on a certain date, all Work in place as of that date will be paid for in accordance with the Basis of Payment clause of the Contract. Materials required for completion and on hand but not incorporated in the Work will be paid for at cost plus 15% with materials becoming the property of the CITY - or the CONTRACTOR may retain title to the materials and be paid an agreed upon lump sum. Materials on order shall be canceled, and the CITY shall pay reasonable factory cancellation charges with the option of taking delivery of the materials in lieu of payment of cancellation charges. The CONTRACTOR shall be paid 10% of the cost, freight not included, of materials canceled, and direct expenses only for CONTRACTOR chartered freight transport which cannot be canceled without charges, to the extent that the CONTRACTOR can establish them. The extra costs due to cancellation of Bonds and insurance and that part of job start-up and phase-out costs not amortized by the amount of Work accomplished shall be paid by the CITY. Charges for loss of profit or consequential damages shall not be recoverable except as provided above.

14.4.3 The termination claim shall be submitted promptly, but in no event later than 90 days from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer upon request of the CONTRACTOR made in writing within the 90-day period. Upon failure of the CONTRACTOR to submit his termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall thereupon pay to the CONTRACTOR so determined.

14.4.4 The CONTRACTOR and the Contracting Officer may agree upon whole or any part of the amount or amounts to be paid to the CONTRACTOR by reason of the total or partial termination of the Work pursuant to this section. The Contract shall be amended accordingly, and the CONTRACTOR shall be paid the agreed amount. In the event of the failure of the CONTRACTOR and the Contracting Officer to agree in whole or in part, as provided heretofore, as to the amounts with respect to costs to be paid to the CONTRACTOR in connection with the termination of the Work the Contracting Officer shall determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall pay to the CONTRACTOR the amount determined as follows:

- a. All costs and expenses reimbursable in accordance with the Contract not previously paid to the CONTRACTOR for the performance of the Work prior to the effective date of the Notice of Termination;
- b. So far as not included under "a" above, the cost of settling and paying claims arising out of the termination of the Work under subcontracts or orders which are properly chargeable to the terminated portions of the Contract;

- c. The reasonable costs of settlement with respect to the terminated portion of the Contract heretofore, to the extent that these costs have not been covered under the payment provisions of the Contract.

14.4.5 The CONTRACTOR shall have the right of appeal under the CITY's claim procedures, as defined in Article 15, for any determination made by the Contracting Officer, except if the CONTRACTOR has failed to submit his claim within the time provided and has failed to request extension of such time, CONTRACTOR shall have no such right of appeal. In arriving at the amount due the CONTRACTOR under this section, there shall be deducted:

- a. All previous payments made to the CONTRACTOR for the performance of Work under the Contract prior to termination;
- b. Any claim which the CITY may have against the CONTRACTOR;
- c. The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the CONTRACTOR or sold pursuant to the provisions of this section and not otherwise recovered by or credited to the CITY; and,
- d. All progress payments made to the CONTRACTOR under the provisions of this section.

14.4.6 Where the Work has been terminated by the CITY said termination shall not affect or terminate any of the rights of the CITY against the CONTRACTOR or his Surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the CITY due to the CONTRACTOR under the terms of the Contract shall not release the CONTRACTOR or his Surety from liability. Unless otherwise provided for in the Contract Documents, or by applicable statute, the CONTRACTOR, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the CITY at all reasonable times at the office of the CONTRACTOR, all its books, records, documents, and other evidence bearing on the cost and expenses of the CONTRACTOR under his Contract and relating to the Work terminated hereunder.

ARTICLE 15 - CLAIMS AND DISPUTES

15.1 Notification:

- 15.1.1 In addition to the notice requirements set out elsewhere in this Contract, if the CONTRACTOR becomes aware of any act or occurrence which may form the basis of a claim by the CONTRACTOR for additional compensation or an extension of time for performance, or if any dispute arises regarding a question of fact or interpretation of the contract, the CONTRACTOR shall immediately inform the Project Manager.
- 15.1.2 If the matter cannot be resolved by agreement within 7 days, the CONTRACTOR shall, within the next 14 days, submit an Intent to Claim in writing to the Project Manager.
- 15.1.3 If the claim or dispute is not resolved by the City, then the CONTRACTOR shall submit a written claim to the Project Manager, in writing, within 90 days after the CONTRACTOR becomes aware of the basis of the claim or should have known the basis of the claim, whichever is earlier.
- 15.1.4 CONTRACTOR waives any right to claim if the PROJECT MANAGER was not notified properly or afforded the opportunity to inspect conditions or monitor actual costs or if the Claim is not submitted within the time required.

15.2 Presenting Claim:

The Claim shall specifically include the following:

- 15.2.1 The act, event or condition giving rise to the claim.
- 15.2.2 The Contract provisions which apply to the claim and under which relief is provided.
- 15.2.3 The item or items of Contract Work affected and how they are affected.
- 15.2.4 The specific relief requested, including contract time if applicable, and the basis upon which it was calculated.

15.3 Claim Validity, Additional Information, and Project Manager's Actions:

The Claim, in order to be valid, must not only show that the CONTRACTOR suffered damages or delay but that those conditions were actually a result of the act, event or condition complained of and that the Contract provides entitlement to relief to the CONTRACTOR for such act, event, or condition. The Project Manager reserves the right to make written request to the CONTRACTOR at any time for additional information which the CONTRACTOR may possess relative to the Claim. The CONTRACTOR agrees to provide the Project Manager such additional information within 30 days of receipt of such a request. Failure to furnish such additional information may be regarded as a waiver of the Claim. The Claim, if not resolved by agreement within 60 days of its receipt, will automatically be forwarded to the Contracting Officer for formal written decision.

15.4 Contracting Officer's Decision:

The CONTRACTOR will be furnished the Contracting Officer's Decision within the next 90 days, unless additional information is requested by the Contracting Officer. The Contracting Officer's Decision is final and conclusive unless fraudulent as to the Claim.

15.5 Notice of Appeal:

Within 30 days of receipt of the Decision, the CONTRACTOR may deliver a Notice of Appeal to the City Manager of Unalaska, Alaska. The Notice of Appeal shall include specific exceptions to the Contracting Officer's Decision, including specific provisions of the contract, which the CONTRACTOR intends to rely upon in the appeal. General assertions that the Contracting Officer's decision is contrary to law or fact are not sufficient.

15.6 City Manager's Decision:

The decision of the City Manager will be rendered within 120 days of Notice of Appeal. This decision constitutes the exhaustion of contractual and administrative remedies. The time limits given above may only be extended by mutual consent. The decision of the City Manager shall be final and conclusive unless the CONTRACTOR commences action through the court within 120 days from receipt thereof.

AFFIDAVIT OF RELEASE OF LIENS BY THE CONTRACTOR

TO ALL WHOM IT MAY CONCERN:

WHEREAS, the undersigned has been employed by City of Unalaska to furnish labor and materials under a contract dated _____ for the _____, in the Unalaska, Alaska of which the City of Unalaska is the Owner.

NOW, THEREFORE, this ____ day of _____, 201__, the undersigned, as the Contractor for the above-named Contract pursuant to the Conditions of the Contract, hereby certifies that to the best of his knowledge, information and behalf, except as listed below, the Releases or Waivers of Lien* attached hereto include the Contractor, all subcontractors, all suppliers of materials and equipment, and all performers of work, labor or services, who have or may have liens against any property of the Owner and on the monies or other considerations due or to become due from the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS: (If none, write "None." If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each Exception.) _____.

ATTACHMENTS:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Release or Waiver of Liens from Subcontractors and material and equipment suppliers.

Contractor (Name of sole ownership corporation or partnership)

(Signature of Authorized Representative)

Title

* The word lien as used herein shall include Stop Orders, Stop Notices, or Freeze Orders on the monies other consideration of the Owner that are due or to become due on the Contract referenced above.

[INSERT GENERAL CONTRACTOR NAME].
(“Contractor”)

*Unconditional Waiver and Release of
Lien/Claim for Subcontractor Upon
Final Payment*

Project Name and Location:

Company Name:

[INSERT SUB NAME]

Project # _____

(“Payee”)

Unalaska, Alaska

AMOUNT OF PAYMENT: _____

WHEREAS,

_____, being first duly sworn, states that he is [INSERT TITLE] of Payee which has a contract with **Contractor** on the above-referenced project.

NOW, THEREFORE, in **FINAL PAYMENT**, the undersigned, for and in consideration of the amount of payment identified above received or to be received and other good and valuable consideration, the receipt of which is hereby acknowledged, does hereby waive and release any and all liens or right of liens or claims on the aforementioned property and all improvements thereon, and on monies or other consideration due or to become due on account of labor or services, materials, fixtures, or apparatus heretofore furnished, or which may be furnished at anytime hereafter, and do hereby further release and forever discharge the City of Unalaska and Contractor, and any payment and performance bond surety, of and from all manner of debts, claims, demands or other sums due or claimed to be due or owed on account of the above-referenced project and/or the above-referenced contract.

THIS WAIVER AND RELEASE IS UNCONDITIONAL, save and except only the receipt of payment and final bank clearance of said remittance in the above-stated amount.

THE UNDERSIGNED further warrant that; 1) no other sums are claimed, 2) that all laborers, subcontractors, and suppliers employed by Payee. have been paid all sums previously due, and will be paid all current sums due out of this payment, 3) that none of such laborers, subcontractors or suppliers is or will be entitled to claim or assert any claim against the above-described real estate or the improvements thereon for labor or materials furnished to or for the account of Contractor; 4) there are no federal, state or municipal taxes or other charges unpaid or delinquent.

EXCEPT as set forth below:

EXCEPTIONS:

Person	Amount
_____	_____
_____	_____
_____	_____

Upon request, Payee shall list the names of each of its subcontractors and suppliers, with contract and payment status, and furnish waivers from said parties.

THE PERSONS SIGNING below, by signing, do hereby certify that he/she is fully authorized and empowered to execute this instrument and to bind the Company hereto.

DATED: _____

By: _____

DATED: _____

By: _____

STATE OF ALASKA)
) ss.
 THIRD JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this ____ day of _____, 20____,
 before me appeared _____, who acknowledged being the
 _____, an Alaska corporation, and voluntarily signing and
 sealing the foregoing instrument on behalf of said Corporation, and being authorized so to do.

 Notary Public in and for Alaska
 My Commission Expires: _____

STATE OF ALASKA)
) ss.
 THIRD JUDICIAL DISTRICT)

SUBSCRIBED AND SWORN to before me this __ day of _____, 201__.

 Notary Public For Alaska
 My Commission Expires: _____

CITY OF UNALASKA

*Receipt and Waiver and Release of
Claim for Contractor Upon Final Payment*

Project Name and Location:

Company Name:

**[INSERT CONTRACTOR
NAME]**
"CONTRACTOR"

Unalaska, Alaska

PAYMENT AMOUNT: _____

WHEREAS, _____, being first duly sworn, states that he is [INSERT TITLE] of CONTRACTOR, general contractor to the City of Unalaska for the above-referenced project.

NOW, THEREFORE, in **FINAL PAYMENT**, the undersigned, for and in consideration of the PAYMENT AMOUNT identified above and other good and valuable consideration paid or to be paid to CONTRACTOR, the receipt of which is hereby acknowledged, CONTRACTOR does hereby waive and release any and all liens or right of liens or claims on the aforementioned property and all improvements thereon, and on monies or other consideration due or to become due on account of labor or services, materials, fixtures, or apparatus heretofore furnished, or which may be furnished at any time hereafter, and does hereby further release and forever discharge the City of Unalaska of and from all manner of debts, claims, demands or other sums due or claimed to be due or owed on account of the above-referenced project and/or the above-referenced contract.

THIS WAIVER AND RELEASE IS UNCONDITIONAL, save and except only; 1) the receipt of payment and final bank clearance of said remittance in the above-stated amount; and 2) the Exceptions identified below or in the Contractor's affidavit attached hereto.

EXCEPTIONS:

Person	Amount
_____	_____
_____	_____

THE UNDERSIGNED further warrants that; 1) no other sums are claimed, 2) that all laborers, subcontractors, and suppliers employed by Contractor have been paid all sums previously due, and will be paid all current sums due out of this payment, 3) that none of such laborers, subcontractors or suppliers is or will be entitled to claim or assert any claim against the above-described real estate or the improvements thereon or any surety bond related to the

Project for labor or materials furnished to or for the account of Contractor; and 4) there are no federal, state or municipal taxes or other charges unpaid or delinquent.

THIS WAIVER AND RELEASE IS UNCONDITIONAL, save and except only the receipt of payment and final bank clearance of said remittance in the above-stated amount

THE PERSONS SIGNING below, by signing, do hereby certify that he/she is fully authorized and empowered to execute this instrument and to bind Contractor hereto.

CONTRACTOR.

DATED: _____ BY: _____

_____,
[insert title]

STATE OF ALASKA)

) ss.

THIRD JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this ____ day of _____, 20__, before me appeared _____, who acknowledged to me that he was the _____ of _____, and he acknowledged to me that he had, in his official capacity aforesaid, executed the foregoing documents as the free act and deed of said Corporation, for the uses stated therein.

Notary Public in and for Alaska
My Commission Expires: _____

Part 4

TECHNICAL DOCUMENTS

General Specifications

Section 01025 – Measurement and Payment

Mechanical Specifications

Section 220816 – Disinfection of Potable Water Piping

Additional Mechanical Specifications included in Technical Documents included below.

Electrical Specifications

Section 260526 - Grounding and Bonding for Electrical Systems

Section 260529 – Hangers and Supports for Electrical Systems

Section 260533 – Raceways and Boxes for Electrical Systems

Section 260553 – Identification for Electrical Systems

Section 260805 – General Requirements for Electrical Work

Section 260810 – Testing Electrical Systems

Additional Electrical Specifications included in Technical Documents included below.

Pyramid Water Treatment Plant Sodium Hypochlorite On-Site Generation Technical Documents dated June 20, 2022 (75-Pages)

4.0 Executive Summary

5.0 Scope of Work

6.0 Specifications

221113 – Facility Water Distribution Piping

220523.12 – Ball Valves for Process Piping

220523.11 – Check Valves for Process Piping

221223.11 – Potable Water Storage Tanks

262416 – Panelboards

26221 – Low Voltage Distribution Transformers

Appendix A: Project Drawings

Appendix B: Project Specifications

Appendix C: Line List

PART 1 - GENERAL

1.1 SCOPE

- A. Payment for the single LUMP SUM bid item described as **Pyramid Water Treatment Plant – Sodium Hypochlorite On-Site Generation System**, as further specified herein, shall include full compensation to be received by the CONTRACTOR for furnishing all tools, labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the WORK in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA) and the Alaska Department of Labor (ADOL). No separate payment will be made for any item described in the Contract Documents, and all costs therefore shall be included in the price named in the Bid Schedule for the various appurtenant items of WORK.

1.2 OWNER FURNISHED EQUIPMENT AND MATERIALS

- A. **Appendix 1** includes a detailed list of all Owner Furnished Process equipment. This equipment was directly procured by the Owner and will be made available to the Contractor in Unalaska. It will be the Contractor's responsibility to unpack, inventory, transport, stage and install the equipment.
- B. **Appendix 2** includes detailed lists of miscellaneous materials that will be Owner furnished. These materials will be made available to the Contractor in Unalaska. It will be the Contractor's responsibility to unpack, inventory, transport, stage and install the equipment.
- C. The Contractor shall identify and provide a list of items that differs from the lists provided in the Appendices. Missing or other identified items required to perform the Work will be paid for separately under Bid Item No. 2.

1.3 CONTRACTOR FURNISHED MATERIALS

- A. The Contractor is responsible to provide all tools, equipment, and expendables required to conduct the Work.
- B. The Contractor is also responsible for locally batched cast-in-place concrete and its components. There is no separate pay item for concrete and the cost should be included in the Lump Sum Pay Item for the **Sodium Hypochlorite On-Site Generation System**.

1.4.1 PAY ITEMS

- A. **Bid Item No. 1:** Payment for the single LUMP SUM bid item described as **Pyramid Water Treatment Plant – Sodium Hypochlorite On-Site Generation System** includes all work described, shown and specified in the *Technical Documents* prepared by Taku Engineering and included in the Project Manual. This item includes all Work necessary to install a fully functioning system. Work required but not specified shall be conducted in accordance with applicable code requirements and general industry standards for the type and kind of Work being performed. Besides what is described in Item 1.3 above, any required non-expendable materials will be paid for under Bid Item No. 2.
- B. **Bid Item No. 2:** The Contractor shall identify all materials and equipment not furnished by the Owner that are either missing from what is included on the Owner's furnished equipment and

materials lists or are demonstratively required to complete the Work required in Bid Item No. 1. With Owner pre-approval, the Contractor shall procure materials identified during the inventory process described in Item 1.2 or as otherwise required to complete the Work. A Bid Item described as **Contingent Sum, Materials** is available to pay for materials and freight for non-expendable materials as described above. The Contractor will be paid direct costs for materials and freight with a 15% (Fifteen Percent) markup to compensate for overhead and profit.

Materials known to be missing from City inventory but required to do the Work include all piping, valves, and fittings, including PVC-Kynar adapters. These materials will be paid for from **Contingent Sum, Materials** as described herein.

The Contingent Sum amount listed on the Bid Form is far in excess of the anticipated cost of required materials and freight. In addition to required materials, freight and mark-up, the Owner will use these funds for discretionary work, change orders, upgrades and/or other items identified during the construction process. Any and all expenditures from Bid Item No. 2 require written approval by the Owner prior to purchase. Payment may not be made for materials without prior written approval.

1.5 PAYMENT

- A. Payment includes full compensation for furnishing all required labor, tools, plant, transportation, services, incidentals, erection, application, or installation of all items of the WORK described or required, and all other costs for the items to necessary to provide a complete functional system, in place. Payment includes installation of all materials, products, and equipment listed as Owner furnished or supplied as part of the Contingent Sum bid item.
- B. Payment will be in accordance with the General Conditions, Owner/Contractor Agreement, and Section 00800 - Supplementary General Conditions.

1.6 NON-PAYMENT FOR REJECTED ITEMS materials, products equipment,

- A. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products placed beyond the lines and grades of the required WORK.
 - 4. Products remaining on hand at the completion of the WORK.
 - 5. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS (Not Used)

PART 3- MEASUREMENT AND PAYMENT

3.1 INCIDENTAL WORK

- A. Several items of work not specifically covered in the Contract Documents will be considered incidental to the cost of the contract. These items include, but are not limited to the following:

1. Unpacking and Inventory of Owner supplied materials and equipment described in Item 1.2 above;
2. Cleaning;
3. Site Safety;
4. Surveying and layout;
5. Waste disposal transport and fees;
6. Demolition required to construct described improvements;
7. Move personnel, equipment, supplies, and incidentals to the project site;
8. Establish offices, buildings, and other facilities;
9. Perform other work and operations and pay costs incurred, before beginning construction;
10. Bonds and insurance;
11. Alaska Department of Labor (ADOL) registration and fees;
12. Demobilization activities;
13. Furnish required submittals such as product data, as-builts, certificates, payrolls, reports, and equipment warranties.
14. Attend progress meetings;
15. Other items not specifically called out but otherwise necessary for proper construction.

These items are not described in the bid documents but are considered incidental to work performed under this contract. No separate payment will be made for any items required to construct the facility as shown and designed. The listed items are not in any order of precedence.

End of Section 01025

SECTION 220816 – DISINFECTION OF POTABLE WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. AWWA C651, Disinfecting Water Mains
- C. 40 CFR 414, National Primary Drinking Water Regulations
- D. 18 AAC 80, Drinking Water

1.2 SECTION INCLUDES

- A. Disinfection requirements for new, repaired or modified potable water distribution piping systems.
- B. Dechlorination procedures for chlorinated water discharge

1.3 CONTRACTOR PERFORMED WORK

- A. Water quality testing: Contractor shall perform water quality testing of water samples taken in the presence of an owner's representative from the piping systems for chlorine concentrations and bacteriological quality. Unalaska DPW will approve use of disinfected piping when test results demonstrate compliance with water quality requirements of the Safe Drinking Water Act as described in Section 1.4 C, furnishing disinfection report to Contractor.

1.4 DESCRIPTION

- A. Disinfection Requirements
 - 1. Protect interior of pipes, fittings, and valves against contamination during construction
 - a. Material delivered for construction shall be protected so as to minimize entrance of foreign material.
 - b. Close opening of pipeline when pipe-laying is stopped at the end of the workday or for other reasons, such as breaks.
 - 2. Do not disinfect any pipe until source of potable water supply used for flushing or disinfection is approved by Unalaska DPW.
 - 3. Contractor shall perform water quality testing of water samples taken from piping systems for chlorine concentrations and bacteriological quality as described in Section 1.4 C. Samples shall be taken only when an owner's representative is present. Lab reports shall be submitted to the owner with witnesses listed on report along with date, time, and location of sample.

4. Do not place piping in service until approved by Unalaska DPW that water quality test results are acceptable as described in Section 1.4 C.
 5. Re-flush and retest disinfected potable water piping that has been allowed to stand stagnant for more than 30 days before being placed in service.
- B. Water Discharge Requirements
1. Neutralized chlorinated water used for disinfection prior to discharge as described in Section 3.4
 2. Discharge to neutralized water to land only.
 3. Implement appropriate erosion controls and sediment controls at the discharge point to prevent erosion and sediment beyond the disposal area.
 4. A written visual inspection record for erosion, daily flow estimate, and sheen must be kept per ADEC requirements.
 5. If a sheen is noted all discharge activities must cease until ADEC approval is granted to continue.
- C. Water Quality Testing Requirements
1. Notify Unalaska DPW at least 48 hours (2 working days) in advance to arrange for a bacterial quality, free chlorine concentration, or a total chlorine concentration test.
 2. Requirements for demonstration of compliance with the maximum contaminant level of the Safe Drinking Water Act:
 - a. Total chlorine concentration of less than 1 mg/L (1 ppm)
 - b. The absence of any coliform bacteria.
 - c. Less than 200 non-coliform bacteria per 100 mL sample.

PART 2 - PRODUCTS

2.1 MATERIAL SAFETY DATA SHEETS

- A. Maintain on site Material Safety Data Sheets (MSDS) for chemical products, including disinfection and dichlorination products.

2.2 ACCEPTABLE DISINFECTANTS

- A. Sodium hypochlorite solution.
- B. Disinfection with pure chlorine gas or liquid is not permitted.

2.3 ACCEPTABLE DECHLORINATION (NEUTRALIZING) AGENTS

- A. Sodium ascorbate, Vita-D-Chlor or equal.
- B. Sodium thiosulfate, technical grade prismatic rice.

2.4 PRECAUTIONS

- A. Calcium hypochlorite is a corrosive and is a strong oxidizer. Reducing agents (e.g. sodium ascorbate or thiosulfate), concentrated acids, and organic compounds (e.g. antifreeze, gasoline), can oxidize, burn or explode if they come into contact with solid-phase calcium hypochlorite.
- B. Disinfecting solutions containing chlorine shall not exceed 12% active chlorine; greater concentrations can chemically attack and degrade polyethylene.

PART 3 - EXECUTION

3.1 DISINFECTION OF NEW WATER MAINS

A. Preliminary Flushing

1. Prior to disinfection, fill main with water to eliminate air pockets.
2. Flush new mains, including fire service mains and lead-in connections to fire system risers, thoroughly before connection is made to system piping in order to remove foreign materials that might have entered the main during the course of the installation or that might have been present in existing piping.
3. The minimum rate of flow shall be greater than the water demand rate of the system, which is determined by the system design.
4. Follow AWWA C651 "Disinfecting Water Mains" using continuous feed method where practical.
5. For all systems, the flushing operation shall be continued for a sufficient time to ensure thorough cleaning.
6. Obtain verification from Unalaska DPW that system has been thoroughly cleaned (flushed) and is ready for chlorination before proceeding.

B. Chlorination of the Main

1. Inject chlorinated water, with a free chlorine concentration of not less than 25 mg/L, into main at a point no more than 10 feet downstream from beginning of new main. Verify free chlorine concentration of not less than 25 mg/L by an initial free chlorine concentration test as described in Section 1.4 C.
2. Leave chlorinated water in the main for at least 24 hours during which time valves and hydrants in system shall be operated to ensure disinfection of the appurtenances.
3. At the end of the 24-hour period, treated water in all portions of the main shall have a free chlorine concentration of not less than 10 mg/L. Verify this by a residual free chlorine concentration test as described in section 1.4 C.
4. After residual free chlorine concentration test has been completed, flush system with potable water until total chlorine concentration in the main is less than 1 mg/L (1 ppm).
5. After final flushing, contact Unalaska DPW to arrange for final total chlorine concentration and bacteriological quality tests as described in section 1.4 C.
6. After final total chlorine concentration and bacteriological quality test have been completed contractor will furnish disinfection report to Unalaska DPW. If water quality tests do not show compliance with water quality requirements of the Safe Drinking Water Act

as described in section 1.4 C, repeat the disinfection steps until test results demonstrate compliance.

7. At the completion of all testing, the contractor shall take another sample of water in the main and have it analyzed at an approved testing laboratory to demonstrate that bacteria contamination is within acceptable limits. The contractor shall furnish to the owner an affidavit outlining the dates and times of the flushing, pressure tests, and continuity tests with laboratory furnished testing results. The names of witnesses as well as the owners representative shall be included with signatures on the certificate.

3.2 DISINFECTION DURING AND FOLLOWING REPAIR OR MINOR MODIFICATION OF EXISTING MAINS OR INTERIOR PIPING.

- A. Before Repair
 1. Where practical, isolate a section of affected line and shut off all service connections.
 2. Swab or spray the inside of new pipe and fittings with a minimum of 1% hypochlorite solution before they are installed. Disinfect tools to be used in the same manner.
- B. Flushing After Repair
 1. Prior to disinfection, flush affected line to clean out contamination introduced during repairs. If possible, flush from both directions. Flush until discolored water is eliminated and water flows clear. If line segment cannot be isolated, thoroughly flush the segment to a tank or through a fire hydrant. Follow the requirements in the water discharge requirements section
- C. Apply chlorine to water to expose interior surfaces of affected segment at the chlorine concentration and contact times as follows; verify total chlorine concentration by an initial total chlorine concentration test.

<u>Chlorine Concentration (mg/L, ppm)</u>	<u>Contact Time</u>
300	15 minutes
250	1 hour
200	1.5 hours
150	2 hours
100	3 hours

- D. Retain chlorinated water in piping for the above prescribed time. At the end of the contact period, flush affected line with potable water until total chlorine concentration in the main is less than 1mg/L (1 ppm).
- E. After flushing, arrange for final total chlorine concentration and bacteriological quality test.
- F. After final total chlorine concentration and bacteriological quality tests have been completed, the contractor will furnish disinfection report to Unalaska DPW.. If water quality tests to not show compliance with the water quality requirements of the Safe Drinking Water Act as described in section 1.4 C, repeat the steps above until tests demonstrate compliance.

3.3 DECHLORINATION OF DISCHARGES (NEUTRALIZATION)

- A. It is the Contractor’s responsibility to determine the appropriate amount of dechlorinator needed to neutralize the chlorine present in discharge water.
- B. Provide a mixing tank to allow dichlorination of water prior to discharge.
- C. Approximate dosage rate of neutralizer may be calculated from the following table:

<u>Free Chlorine Residual Concen- tration</u>	<u>Sodium Ascorbate (Vita-D-Chlor)</u>	<u>Sodium Thiosul- fate</u>
10 mg/L	2.2 lb/10,000 gal	1.2 lb/10,000 gal
50 mg/L	11 lb/10,000 gal	6 lb/10,000 gal
500 mg/L	110 lb/10,000 gal	60 lb/10,000 gal

- D. Do not dose neutralizing chemical beyond the minimum required to neutralize the chlorine actually present in the discharge.

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. All products shall be installed per the manufacturers' instructions.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency (NRTL), and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Burndy, or approved equal.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire with green insulation or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick, or equal.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex-head bolt or socket set screw.
- J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- K. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.

- L. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
- M. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- N. Straps: Solid copper, with copper lugs, rated for 600 A.
- O. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal two-piece clamp.
- P. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- Q. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.
- B. Ground Plates: 1/4-inch thick, hot-dip galvanized.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install stranded conductor for No. 8 AWG and larger, and solid conductors for No. 10 AWG and smaller unless otherwise indicated.
- B. Grounding Bus: Install where shown in the drawings.
 - 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 GROUNDING AT THE "SERVICE"

3.3 Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Check tightness of main bonding jumper between the neutral and ground buses in the lower section of the switchgear.

3.4 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.5 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

C. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

D. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Prepare dimensioned as-built drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Prepare test and inspection reports.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section Includes:

1. Steel slotted support systems.
2. Aluminum slotted support systems.
3. Conduit and cable support devices.
4. Support for conductors in vertical conduit.
5. Structural steel for fabricated supports and restraints.
6. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
7. Fabricated metal equipment support.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product to be used for support.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
2. Include rated capacities and furnished specialties and accessories via product cut sheet(s).

1.4 INFORMATIONAL SUBMITTALS

- A. Structural: hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.
 - 1. Basis: Indicate structural calculation, for critical supports.
 - 2. Detailed description of equipment anchorage devices on which the support is based and on the installation requirements.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Engage a professional structural engineer, where required by State statute.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Due to the corrosive atmosphere, carbon steel and galvanized steel products are not allowed. Only stainless steel or non-metallic products are allowed.
- B. Stainless Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch- diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 1. Manufacturer: Unistrut; Part of Atkore International, or equal.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Stainless Steel.
 - 4. Channel Width: 1-5/8 inches, or 1-1/4 inches, or 13/16 inches.
- C. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with minimum 13/32-inch- diameter holes at a maximum of 8 inches o.c., in at least one surface.
 - 1. Manufacturers: Select as appropriate.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Channel Width: Select for load criteria.
 - 4. Fittings and Accessories: Products provided by channel and angle manufacturer and designed for use with those items.

5. Fitting and Accessory Materials: Same as those for channels and angles, except metal items may be stainless steel.
 6. Rated Strength: Selected to suit applicable load criteria.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; Stainless Steel.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Mechanical-Expansion Anchors: Insert-wedge-type, Stainless steel, for use in hardened cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Hilti, Inc.
 2. Concrete Inserts: Stainless steel, slotted support system units similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 5. Hanger Rods: Threaded stainless steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural, stainless steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 102.
 - 4. NECA 105.
 - 5. NECA 111.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single or two bolt conduit clamps, as required.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 25 percent.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Existing Concrete: Expansion anchor fasteners or epoxied stainless steel or all-thread rod.

2. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, or Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69 Spring-tension clamps.
 3. To Light Steel: Sheet metal screws.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Conduits and fittings.
- 2. Wireways and auxiliary gutters.
- 3. Boxes, enclosures, and cabinets.

- B. Related Requirements:

- 1. Section 260529 – Hangers and Supports For Electrical Systems

1.3 DEFINITIONS

- A. RNC: Rigid Nonmetallic Conduit
- B. ENT: Non-Metallic Tubing
- C. LFNC: Liquidtight Flexible Nonmetallic Conduit

1.4 ACTION SUBMITTALS

- A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets – refer to the Drawings.

PART 2 - PRODUCTS

2.1 CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Wall Thickness: Schedule 80.
3. ENT: Comply with NEMA TC 13 and UL 1653.
4. RNC: Comply with NEMA TC 2 and UL 651 unless otherwise indicated.
5. LFNC: Comply with UL 1660.

B. Nonmetallic Fittings:

1. Fittings, General: Listed and labeled for type of conduit, location, and use.
2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
3. Solvents and Adhesives: As recommended by conduit manufacturer.

2.2 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets shall be listed for use in wet locations.

B. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

C. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.

D. Gangable boxes are allowed.

E. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, with continuous-hinge cover with flush latch unless otherwise indicated.

1. Type 12 Metal Enclosures: Stainless Steel
2. Nonmetallic Enclosures: Plastic or Fiberglass
3. Interior Panels: Stainless Steel

F. Cabinets:

1. NEMA 250, Type 4X, stainless-steel, plastic or fiberglass box with removable interior panel and removable front.
2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.
4. Stainless steel barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors:
 1. Exposed: RNC
 2. Connection to Vibrating Equipment: LFNC.
 3. Boxes and Enclosures, Aboveground: Type 4X.
- B. Indoors:
 1. Exposed: RNC
 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC
 3. Boxes and Enclosures: Type 4X stainless steel
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Flexible Conduit: Fittings listed for use with flexible conduit.
- A. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.

- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Threaded Conduit Joints: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts.
- K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- M. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- O. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- P. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.

6. Where otherwise required by NFPA 70.

Q. Expansion-Joint Fittings:

1. Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

R. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFNC

T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

U. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

V. Locate boxes so that cover or plate will not span different building finishes.

W. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

Y. Set floor boxes level and flush with finished floor surface.

3.3 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to finishes as recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Identification Labels
3. Arc-Flash Warning Labels.
4. Tags.
5. Signs.
6. Cable ties.
7. Paint for identification.
8. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145 for safety color codes.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 5. Color for Neutral: White.

6. Color for Equipment Grounds: Green.
7. Colors for Isolated Grounds: Green with white stripe.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES," or distance required by the NEC.

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Brady, or approved equal.
2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

C. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil- thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Brady, or approved equal.
2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.

D. Heat-shrinkable Wire Labels: Tubular, Machine-printed, heat-shrink polyolefin. UL244 Recognized.

1. Brady, Dymo or approval equal.

2.4 TAGS

- A. Metal Tags: Stainless steel, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

2.5 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.
 - 2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets, or self-adhesive, in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 CABLE TIES

- A. Manufacturer: 3M, or approved equal.
- B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black, except where used for color-coding.
- C. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Identification requirements applies to all new, relocated, and modified equipment. Existing equipment that is not being relocated or modified by new work is excluded.
- B. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Verify identity of each item before installing identification products.
- E. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- F. Apply identification devices to surfaces that require finish after completing finish work.
- G. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- H. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- J. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "POWER."
 - 2. "UPS."
 - 3. "CONTROL."
 - 4. "INSTRUMENTATION."
 - 5. "NETWORK."

- K. Vinyl Wraparound Labels:
1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- L. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- M. Self-Adhesive Labels:
1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
- N. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- O. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- P. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- Q. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- R. Metal Tags:
1. Place in a location with high visibility and accessibility.
 2. Secure using general-purpose cable ties.
- S. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high sign; where two lines of text are required, use labels 2 inches high.
- T. Cable Ties: General purpose, for attaching tags, except as listed below:
1. Outdoors: UV-stabilized nylon.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30V to Ground: Identify with self-adhesive raceway labels.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "POWER."
 - 2. "UPS."
 - 3. "CONTROL."
 - 4. "INSTRUMENTATION."
 - 5. "NETWORK."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes, use vinyl wraparound labels, or self-adhesive wraparound labels to identify the phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide machine-printed, heat-shrinkable labels with the conductor designation.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 - 1. Apply to exterior of door, cover, or other access.
- I. Emergency Operating Instruction Signs: Self-adhesive labels or Baked-enamel warning signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer, load shedding or standby generator connection.
- J. Equipment Identification Labels:

1. Indoor Equipment: Self-adhesive label.
2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Emergency system boxes and enclosures.
 - d. Enclosed switches.
 - e. Enclosed circuit breakers.
 - f. Enclosed controllers.
 - g. Push-button stations.
 - h. Battery racks.
 - i. Power-generating units.
 - j. Monitoring and control equipment.
 - k. UPS equipment.
 - l. Fiber Optic Cabling and Systems

END OF SECTION 260553

SECTION 260805 – GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 GENERAL

1.1 SUMMARY

A. This Section Includes:

1. General requirements specifically applicable to Division 26, Division 27, Division 28, in addition to Division 1 provisions.
2. The electrical system equipment and installation shall comply with all provisions and requirements of this specification, as well as any and all applicable national, state and local codes and standards.

1.2 WORK SEQUENCE

- A. Construct Work in sequence under provisions of Division 01.

1.3 COORDINATION

- A. Coordinate the Work specified in this Division under provisions of Division 01.

1.4 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code (NEC), the latest adopted edition by the State of Alaska
- B. NECA – Standard of Installation.
- C. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. ANSI/IEEE C2 – National Electrical Safety Code, the latest adopted edition.

1.5 SUBMITTALS

- A. Provide equipment submittals for material not provided by the Owner. Submittals shall be approved by the Owner's Engineer before purchase. Submittals shall include wiring diagrams, component parts, dimensions, etc.

1.6 ASBUILT DRAWINGS

- A. Mark up a clean set of drawings as the work progresses to show changes. Use red for additions, and green for deletions.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Provide one (1) operation and maintenance manuals for approval by the Owner. After approval, provide two (2) copies for use by the Owner's O & M personnel.
- B. Manuals shall be hard cover, loose-leaf binders with pages reinforced to prevent pullout and shall be separate from other divisions.

1.8 DEMONSTRATION OF ELECTRICAL SYSTEMS

- A. During the substantial completion inspection:
 - 1. Conduct operating test for approval under provisions of Division 01.
 - 2. Demonstrate installation to operate satisfactorily in accordance with the requirements of the contract documents.
 - 3. Have instruments available for measuring voltage and current values, and for demonstration of continuity, grounds or open circuit conditions.
 - 4. Provide personnel to assist in taking measurements, making tests, and demonstrating that all systems operate correctly.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All Materials and Equipment shall be new and shall be listed and labeled by Underwriter's Laboratories (UL), or another third-party listing agency with NRTL authority.
- B. In general, materials shall be stainless steel or nonmetallic.

PART 3 EXECUTION

3.1 WORKMANSHIP

- A. Install Work using procedures defined in the NECA Standard of Installation and/or the manufacturer's installation instructions. Install Work meeting the requirements of the adopted codes (NFPA 70, etc.), industry standards (IEEE, etc.), and industry best practices for the region.

3.2 TESTS

- A. As specified in Section 260810 – Testing Electrical Systems

END OF SECTION 260805

SECTION 260810 – TESTING ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 REFERENCES

- A. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. ANSI/TIA/EIA – 568-B.1 and Addendums, General Cabling System requirements

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit Test Reports

1.4 COORDINATION

- A. Provide written ten (10) days advance notice of all tests to be performed to allow Owner's Representative to witness testing.

1.5 REQUIRED TEST INSTRUMENTS

- A. Megohmmeter
- B. Multimeter

1.6 QUALITY ASSURANCE

- A. Testing Equipment and Instrumentation Quality and Calibration: For test equipment and instrumentation required to perform electrical QA work, perform the following:
 - 1. Submit test equipment and instrumentation list. For each equipment or instrument, identify the following:
 - a. Equipment/instrument identification number.
 - b. Planned application or use.
 - c. Manufacturer, make, model, and serial number.

- d. Calibration history, including certificates from agencies that calibrate the equipment and instrumentation.
- 2. Test equipment and instrumentation shall meet the following criteria:
 - a. Capable of testing and measuring performance within the specified acceptance criteria.
 - b. Be calibrated at manufacturer's recommended intervals with current calibration tags permanently affixed to the instrument being used.
 - c. Be maintained in good repair and operating condition throughout duration of use on Project.
 - d. Be recalibrated/repared if dropped or damaged in any way since last calibrated.

1.7 MINIMUM REPORT INFORMATION

- A. Report Contents: Clearly labeled test, date, identification of product, type of test and results of tests.
- B. Submit copy of all tests performed in the O&M manual.

1.8 GENERAL REQUIREMENTS

- A. Submit test results and report within seven (7) working days of tests to the Field Engineer Representative.
- B. Promptly notify Owner's representative of irregularities and non-compliance of Work or products.
- C. Perform additional tests when test if performed incorrectly, deemed inaccurate, or incorrectly documented.
- D. Perform and submit all testing prior to substantial completion and system acceptance.
- E. Replace and retest all material installed which does not meet or exceed the minimum acceptable limits set forth in this specification.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 GENERAL TESTING REQUIREMENTS

- A. Certify that electrical systems, subsystems, and equipment have been installed, calibrated, and started and that they are operating according to the Contract Documents and approved Shop Drawings and submittals.
- B. Certify that electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents and approved Shop Drawings and submittals, and that pretest set points have been recorded.
- C. Set systems, subsystems, and equipment into operating mode to be tested according to approved test procedures (for example, normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- D. Measure capacities and effectiveness of systems, assemblies, subsystems, equipment, and components, including operational and control functions to verify compliance with acceptance criteria.
- E. Test systems, assemblies, subsystems, equipment, and components operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and response according to acceptance criteria.
- F. If tests cannot be completed because of a deficiency outside the scope of the electrical system, document the deficiency and report it to Owner. After deficiencies are resolved, reschedule tests.
- G. Comply with Construction Checklist requirements, including material verification, installation checks, startup, and performance tests requirements specified in Sections specifying electrical systems and equipment.

3.2 FEEDER CONDUCTOR TEST

- A. Tests Criteria:
 - 1. Use Megohm meter to test all feeder cables
 - 2. Perform insulation-resistance test on all conductors – phase to ground, phase to neutral and phase to phase and record results. Test 600 volt rated cable at 1000 volts DC.
 - 4. Test duration shall be one (1) minute.
 - 5. Perform continuity test to insure correct cable connection.
 - 6. Submit test results after completion.
- B. Test Values:

1. Minimum insulation resistance value: 50 megohms.
2. Investigate deviations between phases.

END OF SECTION 260800

Pyramid Water Treatment Plant Sodium Hypochlorite On-Site Generation Technical Documents

100% IFC (Issued for Construction)
June 20, 2022

PREPARED FOR:



City of Unalaska

PREPARED BY:

The logo for Taku Engineering consists of a blue musical note symbol on the left, followed by the word 'taku' in a blue serif font and 'ENGINEERING' in a blue sans-serif font below it. The entire logo is enclosed in a blue circular border.

907.433.1125



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1.0 Executive Summary

The City of Unalaska is replacing the existing gaseous chlorine dosing system with a new hypochlorite generation system for potable water disinfection at the Pyramid Water Treatment Plant. The City is providing the hypochlorite generation equipment and materials listed in the Appendices. The contractor is to furnish select materials and install the hypochlorite generation equipment, all the interconnecting piping, valves, wires, and miscellaneous fittings necessary to the function of the system. Also included in the contractor's scope is a water pressure booster system to bring the sodium hypochlorite system inlet pressure above 50 psig.

2.0 Scope of Work

2.1 General

The work is to be phased in two steps to maintain constant chlorine dosing capabilities within the plant. Coordination with the operators is required during construction and for all demolition and startup work. All work shall be completed in accordance with the drawings in *Appendix A* and the applicable project specifications in the Project Manual and *Appendix B*. Contractor to provide startup support, equipment, and additional work as necessary to provide a complete and fully functioning system.

- Owner provided equipment and materials to include:
 - Two on-site sodium hypochlorite generation units, with integrated PLCs, transforming rectifiers, and pumps
 - Two dilution air blowers with airflow switches
 - Two water softener systems
 - Two 360-gallon HDPE brine tanks
 - Two 1,100-gallon sodium hypochlorite tanks
 - Two dosing pump systems
 - One manual hypochlorite dilution panel
 - One hydrogen detector
 - Instrumentation for generation system
 - Filters
 - Two water pressure boosting pumps
 - One pressure switch
 - One hydro-pneumatic tank
 - All electrical equipment and interconnections
- Contractor to provide materials to include, but not limited to:
 - Anchor bolts and seismic restraints
 - All piping, valves, and fittings
 - Concrete for containment wall

The Contractor is also responsible to provide startup support and other work.



2.2 Mechanical

- The contractor is to demolish all the existing gaseous chlorine equipment and associated piping, pumps, and instrumentation.
- The demolition is to be staged. The two smaller gaseous chlorine units (25 pounds per day and 50 pounds per day) are to be demolished first, leaving the two larger units online. The final two units and remaining equipment is to be demolished following the startup of one of the two sodium hypochlorite generator trains.
- The contractor is to demolish the existing exhaust ventilation ducting on the south wall of the room to make space for the new equipment. If necessary, the contractor is to patch the hole in the painted plywood wall that previously was used for the ventilation ducting.
- The contractor is to install two booster pumps, pressure switch, hydropneumatic tank, valves, and piping to provide the required inlet pressure to the two sodium hypochlorite generation trains. All piping to be field routed. A line list is included for reference in Appendix C.
- The contractor is to install the two sodium hypochlorite generation trains per the design drawings. The two trains will be put in one at a time as a phased construction sequence as required to maintain constant chlorine dosing of the Pyramid Water Treatment Plant. All piping to be field routed. A line list is included for reference in Appendix C.
- The contractor is to install the two hydrogen dilution blowers and vent piping and exhaust outside the building as shown on the drawings to prevent hydrogen build up in the system and in the chlorine room. All piping to be field routed. A line list is included for reference in Appendix C.
- The contractor is to install the dilution panel on the provided stand per the design drawings. The dilution panel is for manual feeding of sodium hypochlorite into the dilution tanks at a required concentration.
- The contractor is to install two dosing pumps and pulsation dampener as shown on the drawings. The pumps are to be mounted on a fabricated pedestal style stand per the drawings.

2.3 Civil

- The contractor is to build an 18" concrete containment wall around the dilution tanks and brine tanks as shown on the drawings.
- The contractor is to anchor the dilution tanks to the existing slab with fabricated anchors and cable per the manufacturer's instructions and design drawings.
- Stands and other supports are to be anchored to the existing concrete floor with grouted concrete anchors.

2.4 Electrical

- The contractor is to demolish the existing gaseous chlorine system equipment including: instruments, pumps, switches, and other associated equipment. The demolition is to be phased to maintain chlorine dosing capabilities within the Pyramid Water Treatment Plant.



Technical Manual

- The contractor is to install power and instrumentation wiring to all the new equipment installed during this project, including interconnection wiring between the sodium hypochlorite generator units and remotely located instruments.
- The contractor is to install one new 120/240V electrical panel to provide UPS-backed power to critical system components. The contractor is to remove the existing 120/208V UPS backed panel and integrated transformer and relocate existing 120V UPS-backed circuits to the new panel.
- A new 50KVA, 1-phase, 480-120/240V, pad mount Square D EE50S3H transformer will be installed on the mezzanine level of the building. This transformer is required to provide 120V UPS backed power to critical components.
- Non-critical components are to be landed on the existing panel 'H'.
- The contractor is to run CAT5e cable between the existing plant PLC and the two onboard PLCs each located on the respective sodium hypochlorite generator.

3.0 Specifications

The project shall be completed in accordance with the applicable codes including the latest editions of the National Electric Code (NEC), Uniform Mechanical Code (UMC), and industry standards for commercial and industrial work. In addition, the following additional specifications are included as part of this design package.

Mechanical

221113 – Facility Water Distribution Piping
220523.12 – Ball Valves for Process Piping
220523.14 – Check Valves for Process Piping
221223.11 – Potable Water Storage Tanks

Electrical

262416 – Panelboards
26221 – Low-Voltage Distribution Transformers



Appendix A: Project Drawings

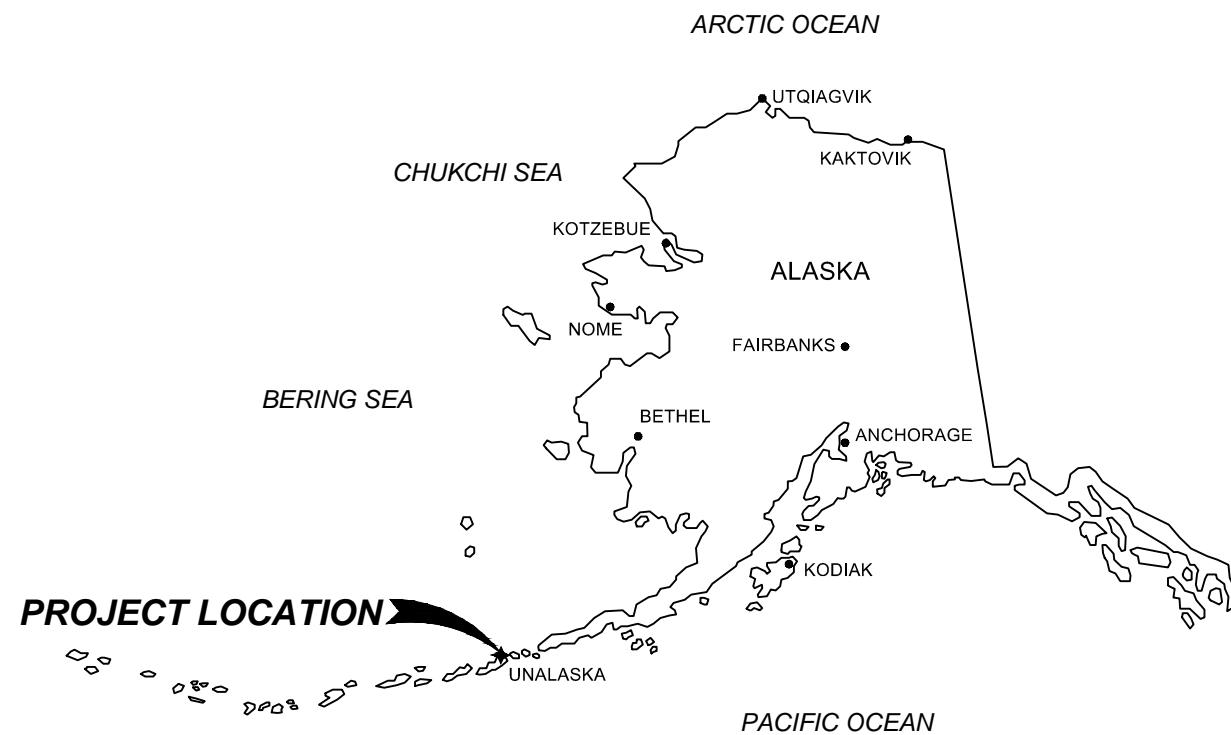


CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT



SODIUM HYPOCHLORITE ON-SITE GENERATION

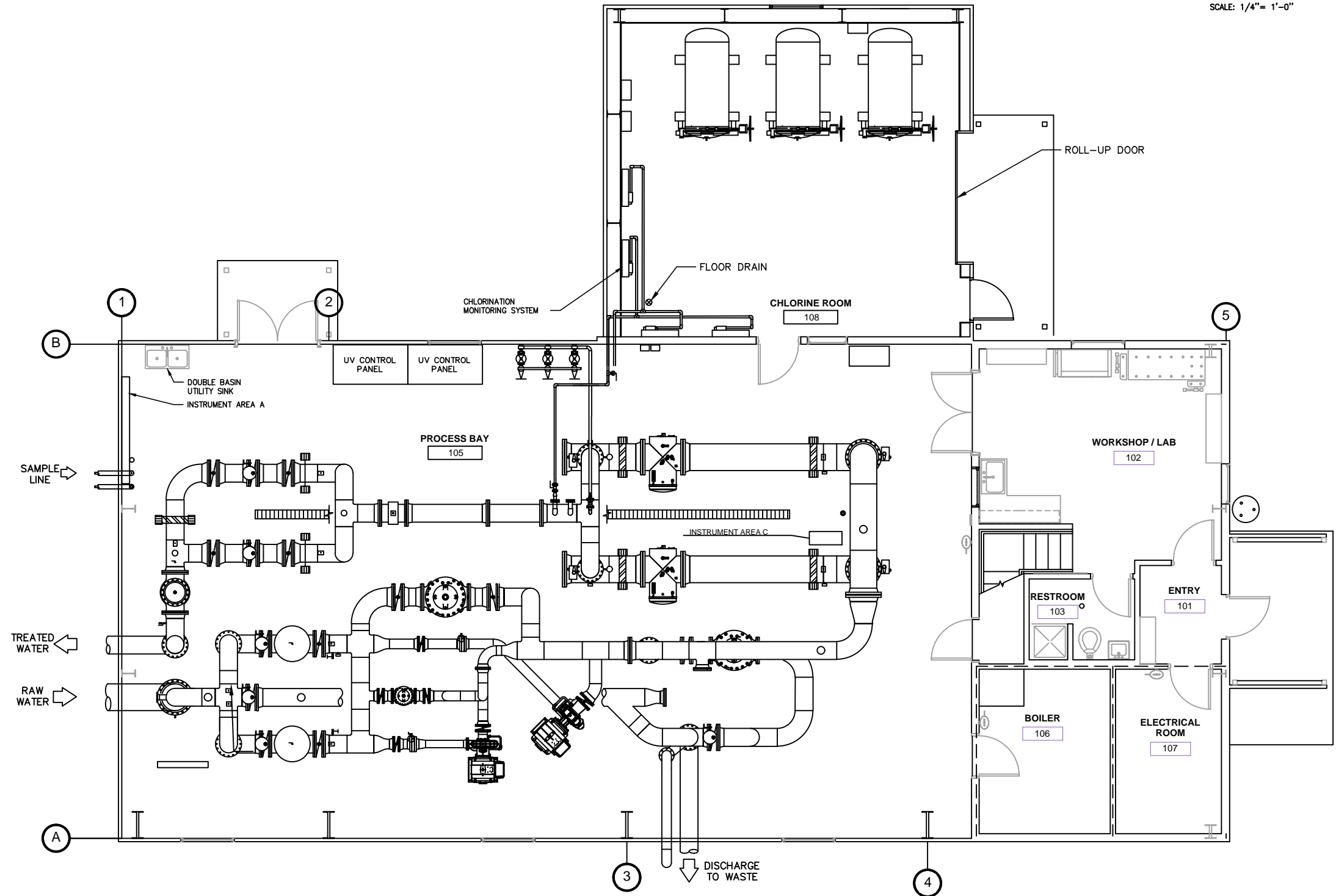
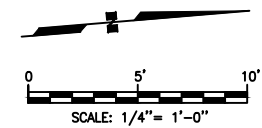
LOCATION MAP



DRAWING INDEX

DRAWING #	DRAWING TITLE	DRAWING #	DRAWING TITLE
G1.0	COVER PAGE	E6.0D	ONE-LINE DIAGRAM – DEMO
G2.0	WTP FLOORPLAN	E6.0	ONE-LINE DIAGRAM
G3.0	P&ID LEGEND SHEET	E6.1D	PANEL SCHEDULES – DEMO
P1.4D	CHLORINATION ELEVATION – PHASE 1 DEMO	E6.1	PANEL SCHEDULES
P1.4	CHLORINATION ELEVATION – PHASE 1 CONST.	E6.2	CIRCUIT SCHEDULE
P1.4D	CHLORINATION ELEVATION – PHASE 2 DEMO	E7.0	NETWORK DIAGRAM
P1.4	CHLORINATION ELEVATION – PHASE 2 CONST.	E7.6D	MCP ANALOG INPUT – DEMO
P1.5D	CHLORINATION P&ID – PHASE 1 DEMO	E7.6	MCP ANALOG INPUT
P1.5A	CHLORINATION P&ID – PHASE 1 CONST. SH1	E7.8D	MCP ANALOG OUTPUT – DEMO
P1.5A	CHLORINATION P&ID – PHASE 1 CONST. SH2	E7.8	MCP ANALOG OUTPUT
P1.5A	CHLORINATION P&ID – PHASE 1 CONST. SH3	C4.0	CIVIL DETAILS
P1.5D	CHLORINATION P&ID – PHASE 2 DEMO		
P1.5	CHLORINATION P&ID – PHASE 2 CONST. SH1		
P1.5	CHLORINATION P&ID – PHASE 2 CONST. SH2		
P1.5	CHLORINATION P&ID – PHASE 2 CONST. SH3		
P1.7D	EQUIPMENT PLAN DEMO – PHASE 1		
P1.7	EQUIPMENT PLAN – PHASE 1		
P1.7D	EQUIPMENT PLAN DEMO – PHASE 2		
P1.7	EQUIPMENT PLAN – PHASE 2		
P3.0D	VALVE SCHEDULE DEMO		
P3.1D	VALVE SCHEDULE DEMO		
P3.2D	VALVE SCHEDULE DEMO		
P3.0	VALVE SCHEDULE		
P3.1	VALVE SCHEDULE		
P3.2	VALVE SCHEDULE		
P3.3	VALVE SCHEDULE		
M5.3	MECHANICAL DETAILS		
E1.6D	ELECTRICAL PLAN – DEMO		
E1.6	ELECTRICAL PLAN		

			 406 W Fireweed Ln, Anchorage, AK 99503 PHONE: 907-433-1125 LIC.# AECL890	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>DWN</th> <th>CKD</th> <th>APP</th> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>DWN</th> <th>CKD</th> <th>APP</th> </tr> <tr> <td>A</td> <td>6/21</td> <td>35% SCHEMATIC DESIGN</td> <td>RFK</td> <td>ZBB</td> <td>ZBB</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>B</td> <td>9/21</td> <td>65% DETAILED DESIGN</td> <td>RFK</td> <td>ZBB</td> <td>ZBB</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>10/21</td> <td>95% CONSTRUCTION DESIGN</td> <td>RFK</td> <td>AB</td> <td>AB</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>D</td> <td>3/22</td> <td>100% IFC</td> <td>RFK</td> <td>RAN</td> <td>WMC</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>E</td> <td>6/22</td> <td>100% IFC RE-ISSUE</td> <td>RFK</td> <td>RAN</td> <td>WMC</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP	A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB							B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB							C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB							D	3/22	100% IFC	RFK	RAN	WMC							E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC							DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG COVER PAGE
REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP																																																																		
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REFERENCE DRAWINGS				REVISIONS		REVISIONS		REVISIONS		REVISIONS																																																																			
										DATE: 6/8/22 SCALE: NTS SHEET 1 OF --																																																																			



1 EXISTING WATER TREATMENT PLANT FLOOR PLAN
1/4" = 1'-0"

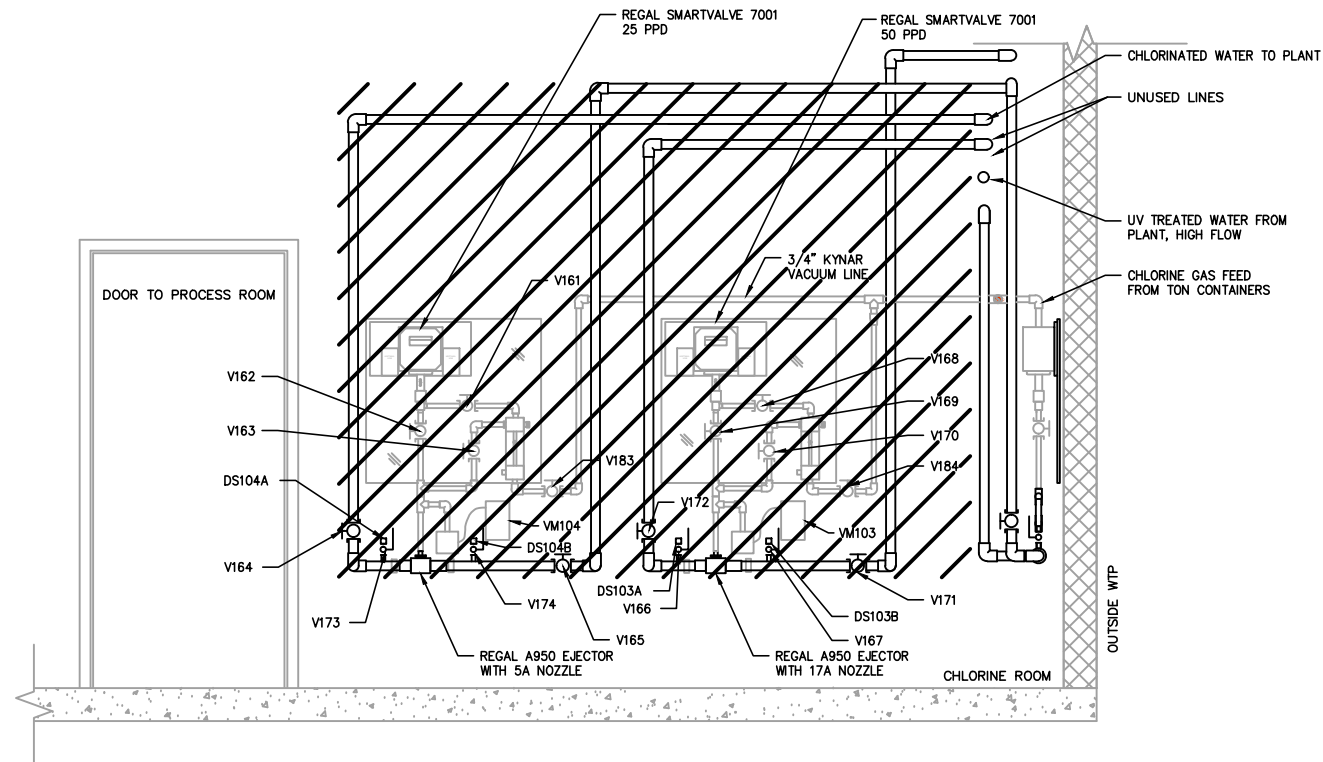
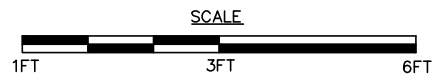


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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

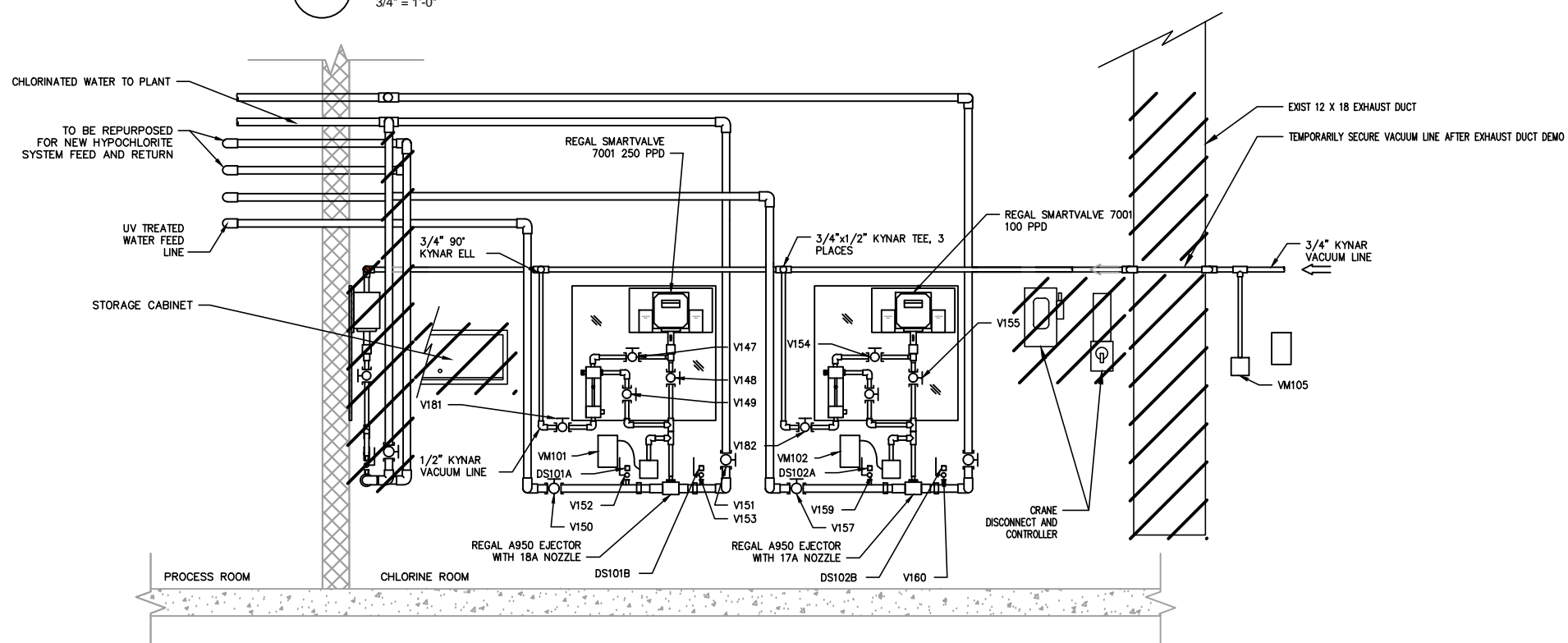
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CKD: RAN	APP:	G2.0	E
DATE: 6/8/22	SCALE: AS SHOWN	SHEET 1 OF 1	

NUMBER	TITLE
	REFERENCE DRAWINGS



- DEMOLITION NOTES:**
1. DEMOLISH 25 PPD AND 50 PPD CHLORINE INJECTION UNITS.
 2. CAP ALL OPEN CHLORINE GAS PIPING ENDS WITH KYNAR THREADED PLUG.
 3. DEMOLISH EXHAUST DUCT TO 8' AFF.
 4. RELOCATE CRANE DISCONNECT SWITCH AND CONTROLLER
 5. RELOCATE STORAGE CABINET FOR REUSE.

1 CHLORINATION ELEVATION EAST WALL - PHASE 1 DEMO
3/4" = 1'-0"



2 CHLORINATION ELEVATION SOUTH WALL - PHASE 1 DEMO
3/4" = 1'-0"

DEMOLITION

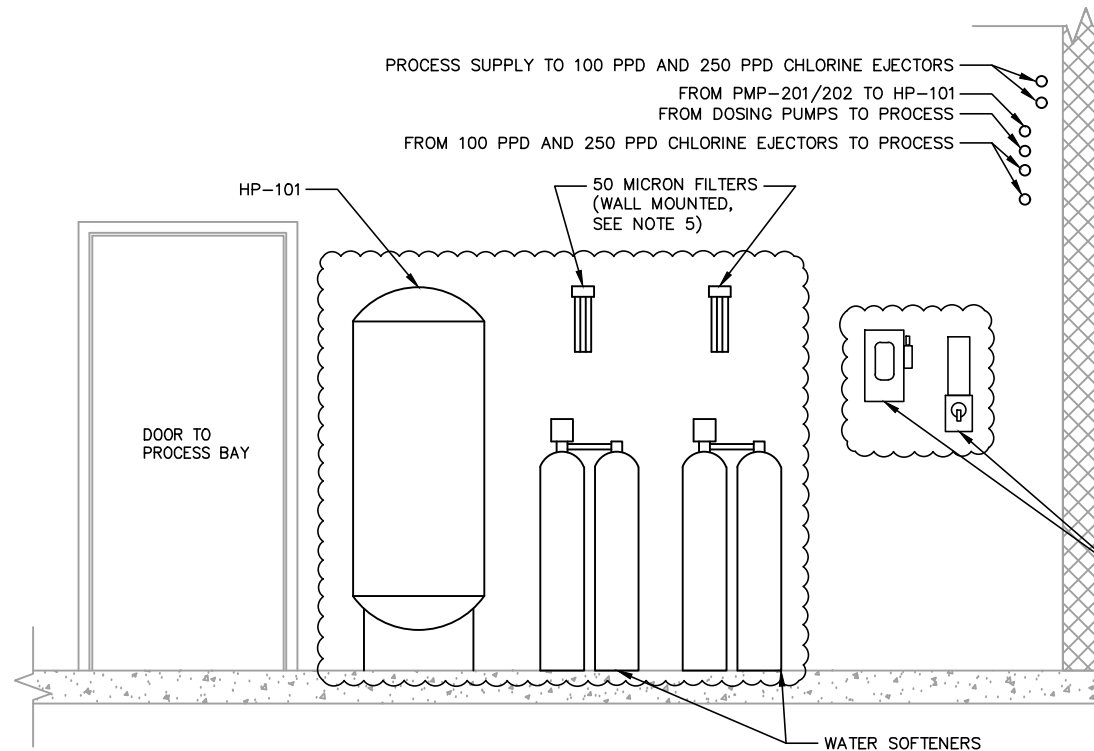
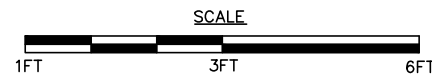


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C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALAKSA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION ELEV. - DEMO PHASE 1											
DWN: RFK	APP: WMC	DRAWING NUMBER		REV							
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DATE: 6/8/22	SCALE: AS SHOWN	SHEET 1 OF 1									

NUMBER	TITLE
	REFERENCE DRAWINGS

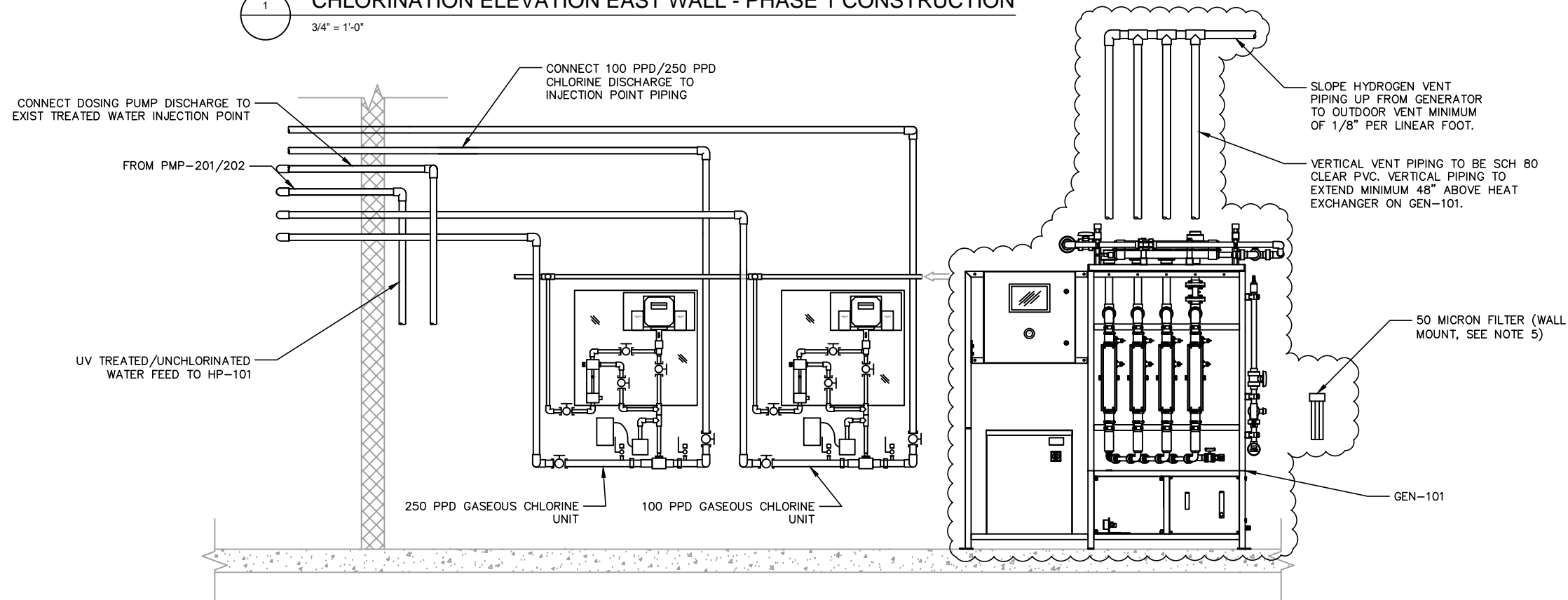


- CONSTRUCTION NOTES:**
1. CONNECT 100 PPD/250 PPD INJECTOR DISCHARGE CONNECTION TO EXISTING TREATED WATER INJECTION POINT. USE THE LINE FOR TEMPORARY GASEOUS CHLORINE OPERATION DURING CONSTRUCTION.
 2. REPURPOSE 50 PPD/100 PPD INJECTION LINE FOR SODIUM HYPOCHLORITE GENERATION INJECTION POINT.
 3. REPURPOSE PMP-103 AND PMP-104 SUCTION LINES FOR SODIUM HYPOCHLORITE GENERATION INLET.
 4. THIS DRAWING IS FOR PHASING PURPOSES. SEE P1.4 PHASE 2 CONSTRUCTION FOR FINAL INSTALLATION DETAILS.
 5. MOUNT 50 MICRON FILTERS WITH TOP OF FILTER AT 30" A.F.F.
 6. HP-101 TO BE ASME-CERTIFIED PRESSURE VESSEL.

RELOCATE CRANE DISCONNECT AND CONTROLLER TO SOUTHEAST CORNER AS SPACE ALLOWS

1 CHLORINATION ELEVATION EAST WALL - PHASE 1 CONSTRUCTION

3/4" = 1'-0"



2 CHLORINATION ELEVATION SOUTH WALL - PHASE 1 CONSTRUCTION

3/4" = 1'-0"

DSGN/CNST

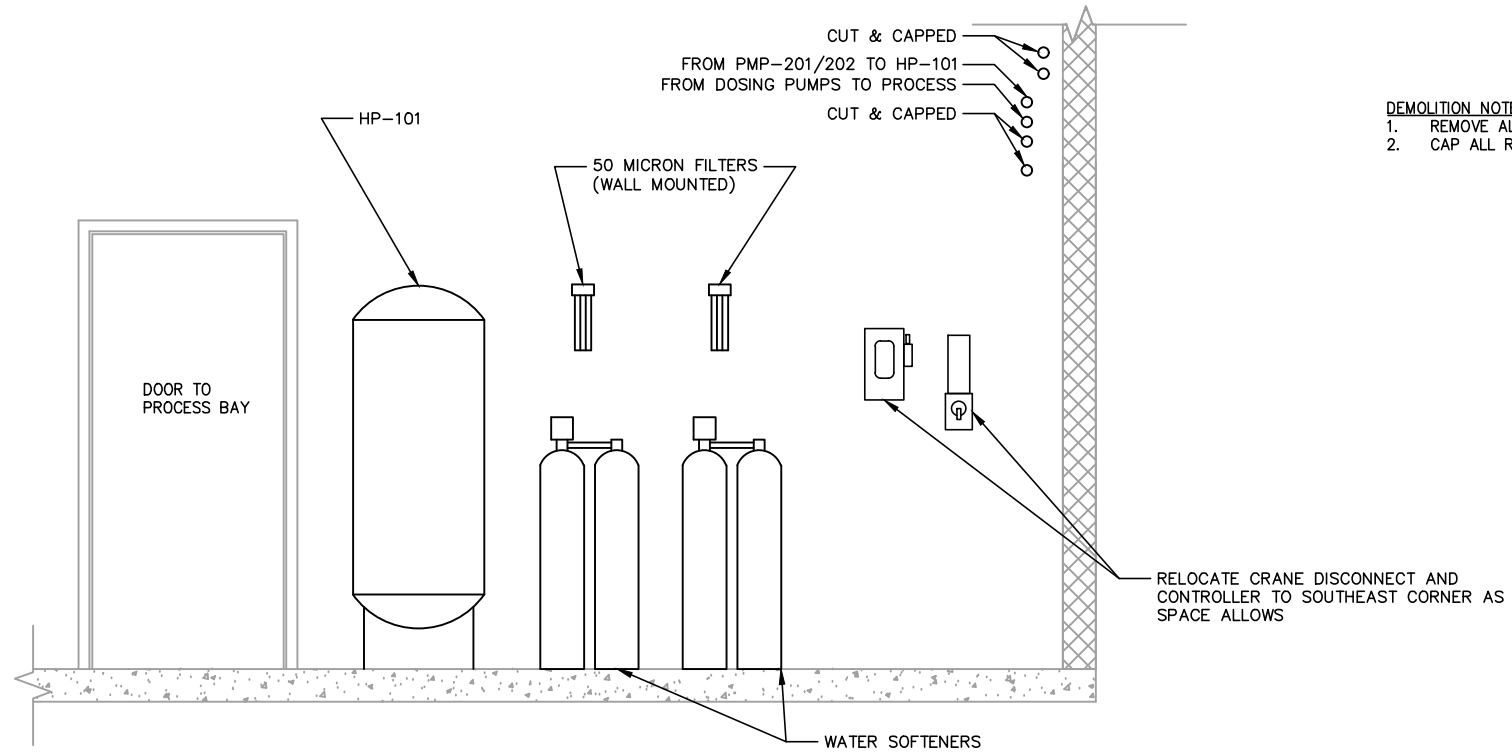
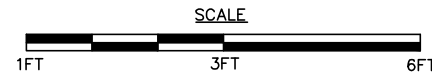


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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
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D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

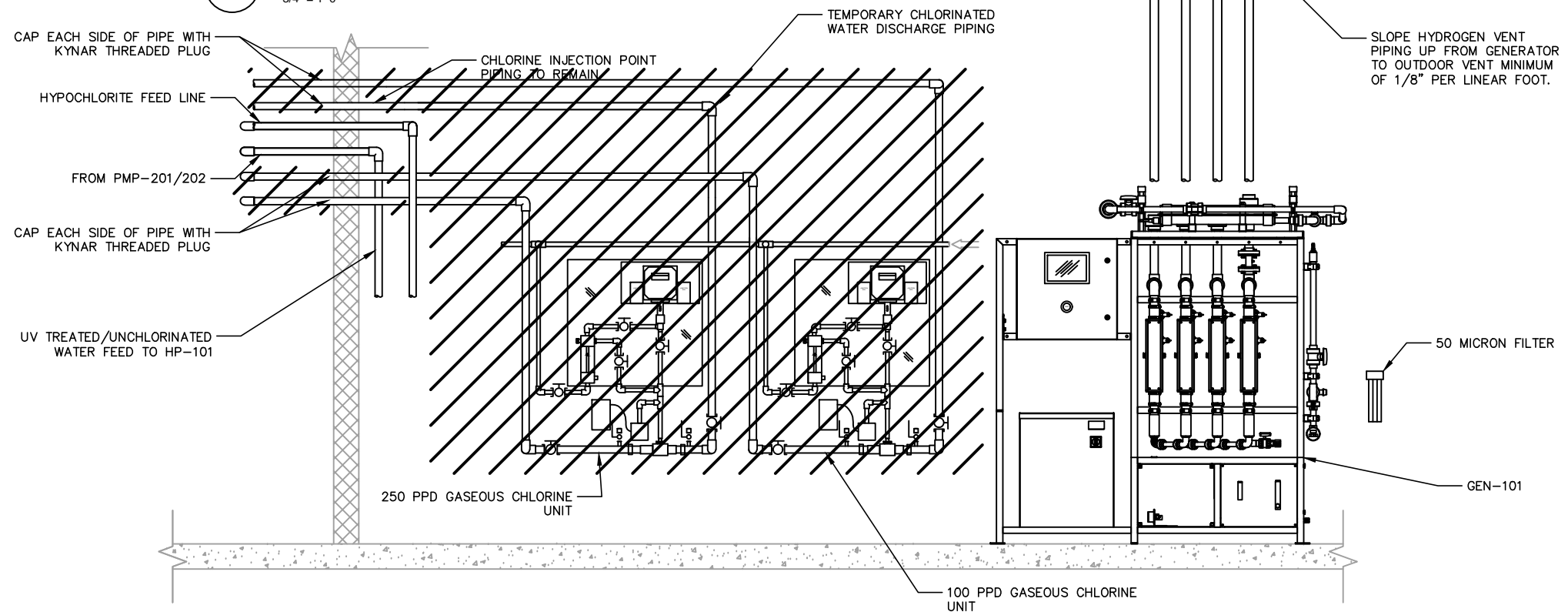
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CKD: RAN	APP:	P1.4	E
DATE: 6/8/22	SCALE: AS SHOWN	SHEET 1 OF --	

NUMBER	TITLE
	REFERENCE DRAWINGS



- DEMOLITION NOTES:**
1. REMOVE ALL REMAINING GASEOUS CHLORINE EQUIPMENT
 2. CAP ALL REMAINING OPEN PIPES WITH KYNAR THREADED PLUG.

1 CHLORINATION ELEVATION EAST WALL - DEMO PHASE 2
3/4" = 1'-0"



2 CHLORINATION ELEVATION SOUTH WALL - DEMO PHASE 2
3/4" = 1'-0"

DEMOLITION

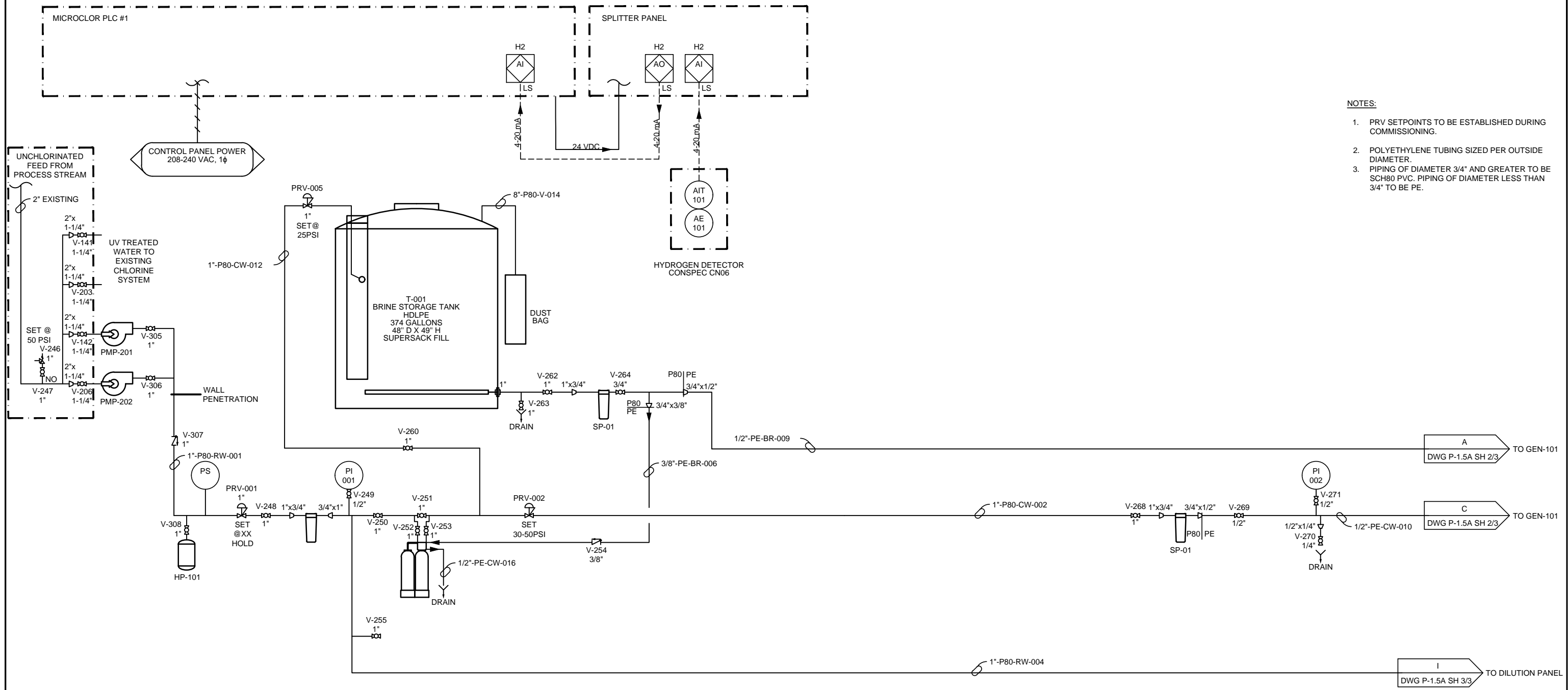


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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
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B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DRAWING	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSC CHLORINATION - PHASE 2 DEMO											
DWN: RFK	APP: WMC	DRAWING NUMBER		REV							
CKD: RAN	APP:	P1.4D		E							
DATE: 6/8/22	SCALE: AS SHOWN	SHEET 1 OF									

NUMBER	TITLE
	REFERENCE DRAWINGS



- NOTES:**
1. PRV SETPOINTS TO BE ESTABLISHED DURING COMMISSIONING.
 2. POLYETHYLENE TUBING SIZED PER OUTSIDE DIAMETER.
 3. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.

SERVICE CODES:

RW - RAW WATER
 CW - CONDITIONED WATER
 HC - HYPOCHLORITE
 V - VENT
 H - HYDROGEN
 BR - BRINE

PIPE MATERIAL CODES:

P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL (NOTE 2)

PMP-201, 202
 RAW WATER PUMP
 CAPACITY: 5 GPM
 TDH: 225 FT
 POWER: 3/4 HP
 GOULDS ISV8GB3J20

HP-101
 SURGE SUPPRESSOR
 CAPACITY: 112 GAL
 MAWP: 150 PSI
 DIMENSIONS: 30" DIA. x 52" H
 AMERICAN WHEATLY BDT-112

PHASE 1 DSGN/CNST

NUMBER	TITLE

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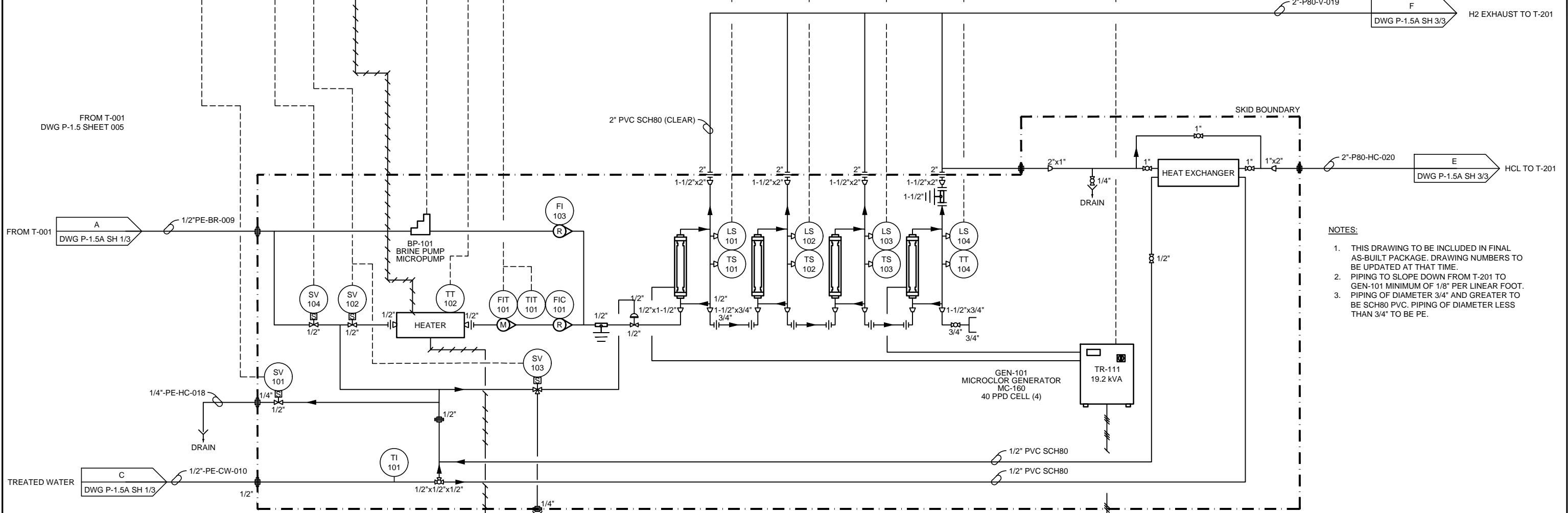
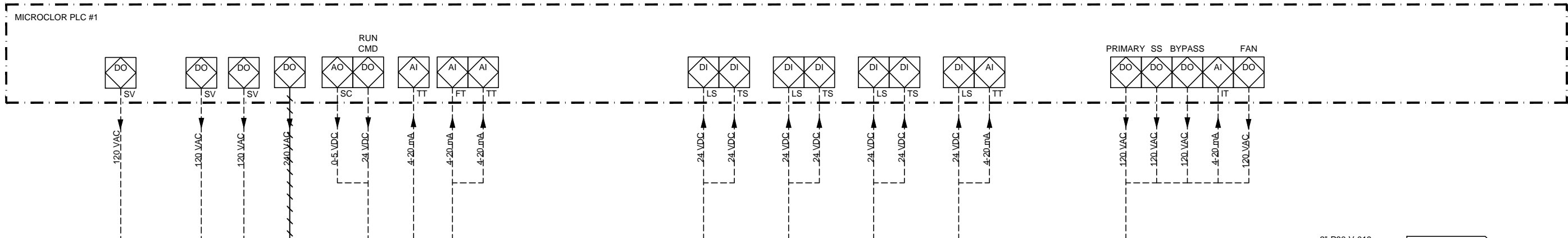
406 W Fireweed Ln, Anchorage, AK 99503
 PHONE: 907-433-1125
 LIC.# AECL890

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B	6/22	100% IFC RE-ISSUE	BWL	RFK	WMC						

DRAWING TITLE:
 CITY OF UNALASKA
 PWTP-SODIUM HYPOCHLORITE OSG
 CHLORINATION P&ID - PHASE 1 CNST

DWN: BWL APP: WMC DRAWING NUMBER: P1.5A REV: B

CKD: RFK APP: DATE: 6/8/22 SCALE: NTS SHEET 1 OF 3



- NOTES:**
1. THIS DRAWING TO BE INCLUDED IN FINAL AS-BUILT PACKAGE. DRAWING NUMBERS TO BE UPDATED AT THAT TIME.
 2. PIPING TO SLOPE DOWN FROM T-201 TO GEN-101 MINIMUM OF 1/8" PER LINEAR FOOT.
 3. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.

SERVICE CODES:

RW - RAW WATER
 CW - CONDITIONED WATER
 HC - HYPOCHLORITE
 V - VENT
 H - HYDROGEN
 BR - BRINE

PIPE MATERIAL CODES:

P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL

PHASE 1 DSGN/CNST

NUMBER		TITLE		REV		DATE		DESCRIPTION		DWN		CKD		APP		REV		DATE		DESCRIPTION		DWN		CKD		APP	
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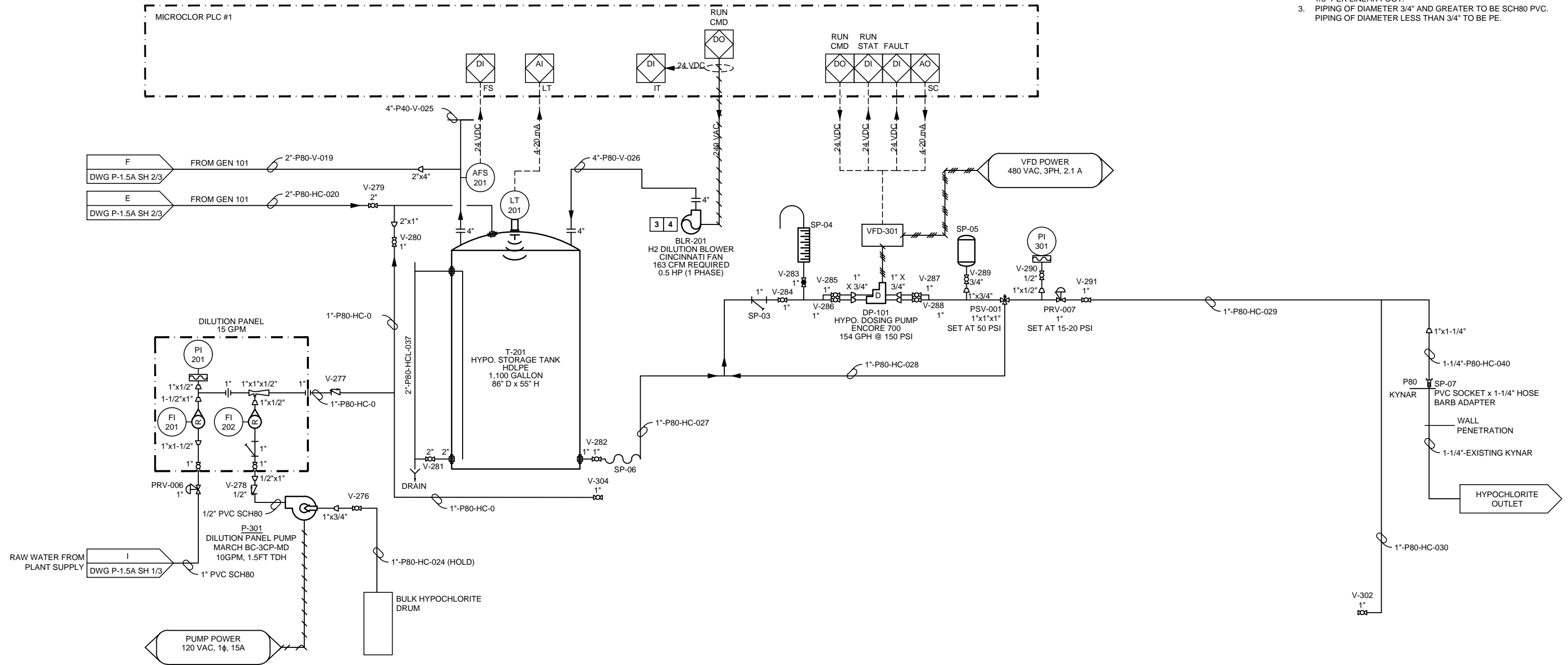
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DRAWING TITLE:		CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION P&ID - PHASE 1 CONST.																											
DWN:		BWL		APP:		WMC		DRAWING NUMBER		REV																			
CKD:		RFK		APP:		P1.5A		B																					
DATE:		6/8/22		SCALE:		NTS		SHEET		2		OF		3															

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 LIC.# AECL890

- NOTES:
1. PRV SET POINTS TO BE FINALIZED DURING COMMISSIONING.
 2. PIPING TO SLOPE DOWN FROM T-201 TO GEN-101 MINIMUM 1/8" PER LINEAR FOOT.
 3. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.



SERVICE CODES:

RW - RAW WATER
 CW - CONDITIONED WATER
 HC - HYPOCHLORITE
 V - VENT
 H - HYDROGEN
 BR - BRINE

PIPE MATERIAL CODES:

P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL

PHASE 1 DSGN/CNST

NUMBER	TITLE

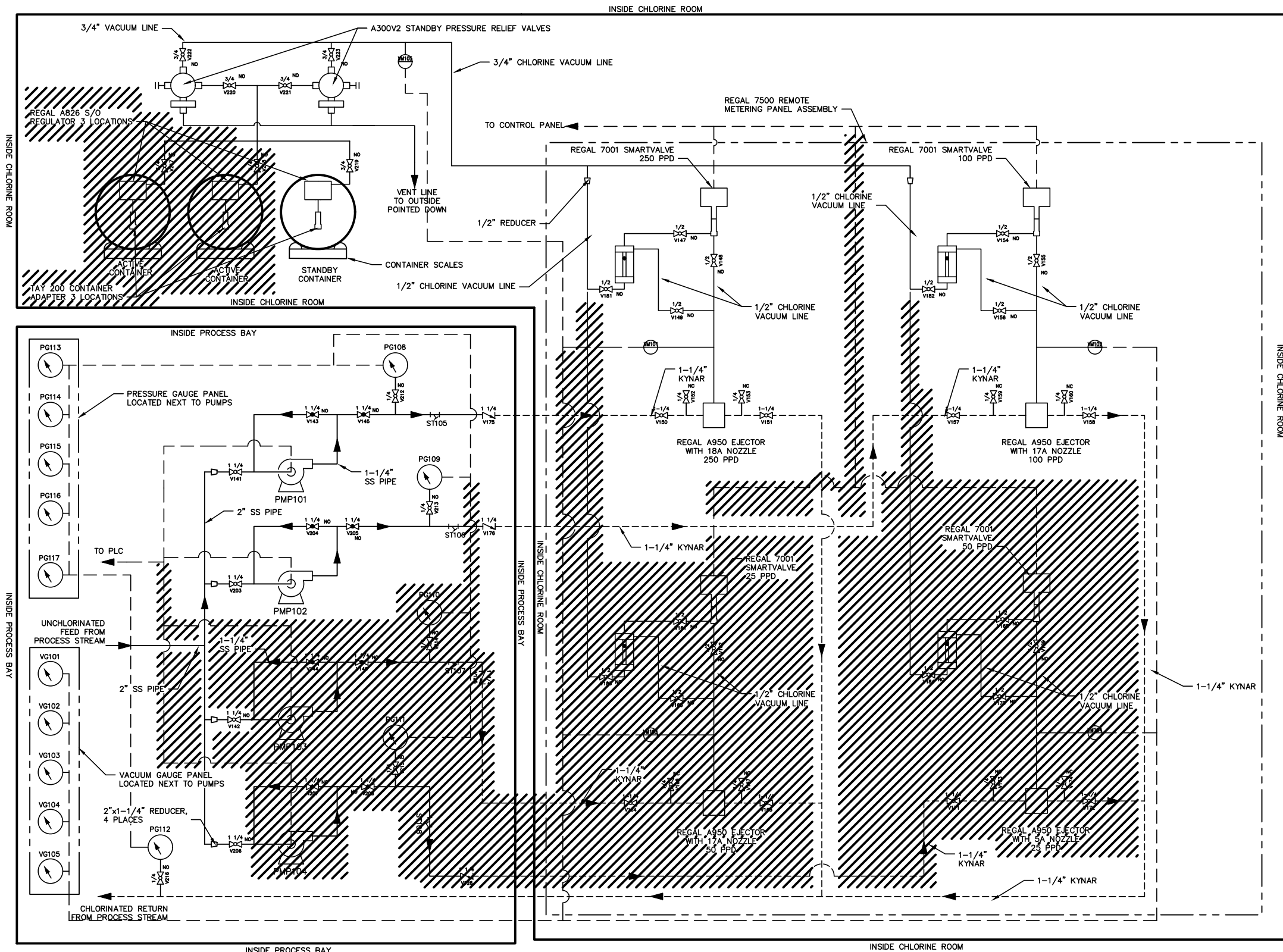


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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	3/22	100% IFC	BWL	RFK	WMC						
B	6/22	100% IFC RE-ISSUE	BWL	RFK	WMC						

DRAWING TITLE:												
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION PHASE 1 CONST.												
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CKD:	RFK	APP:		P1.5A				B				
DATE:	6/8/22	SCALE:	NTS	SHEET 3 OF 3								



LEGEND	
SYMBOL	DESCRIPTION
	REGAL SMARTVALVE
	FLOWMETER
	BALL VALVE
	GLOBE VALVE
	CHLORINE EJECTOR
	STANDBY PRESSURE RELIEF VALVE
	TAY 200 ADAPTER
	PUMP
	Y-STRAINER
	CHECK VALVE
	KYNAR PIPING
	KYNAR VACUUM LINE
	REMOTE METERING PANEL ASSEMBLY
	SS PIPING
	CONTROL SIGNAL LINE
	PRESSURE GAUGE
	CHLORINE REGULATOR

PHASE 1 DEMOLITION

CHLORINATION PROCESS & INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE

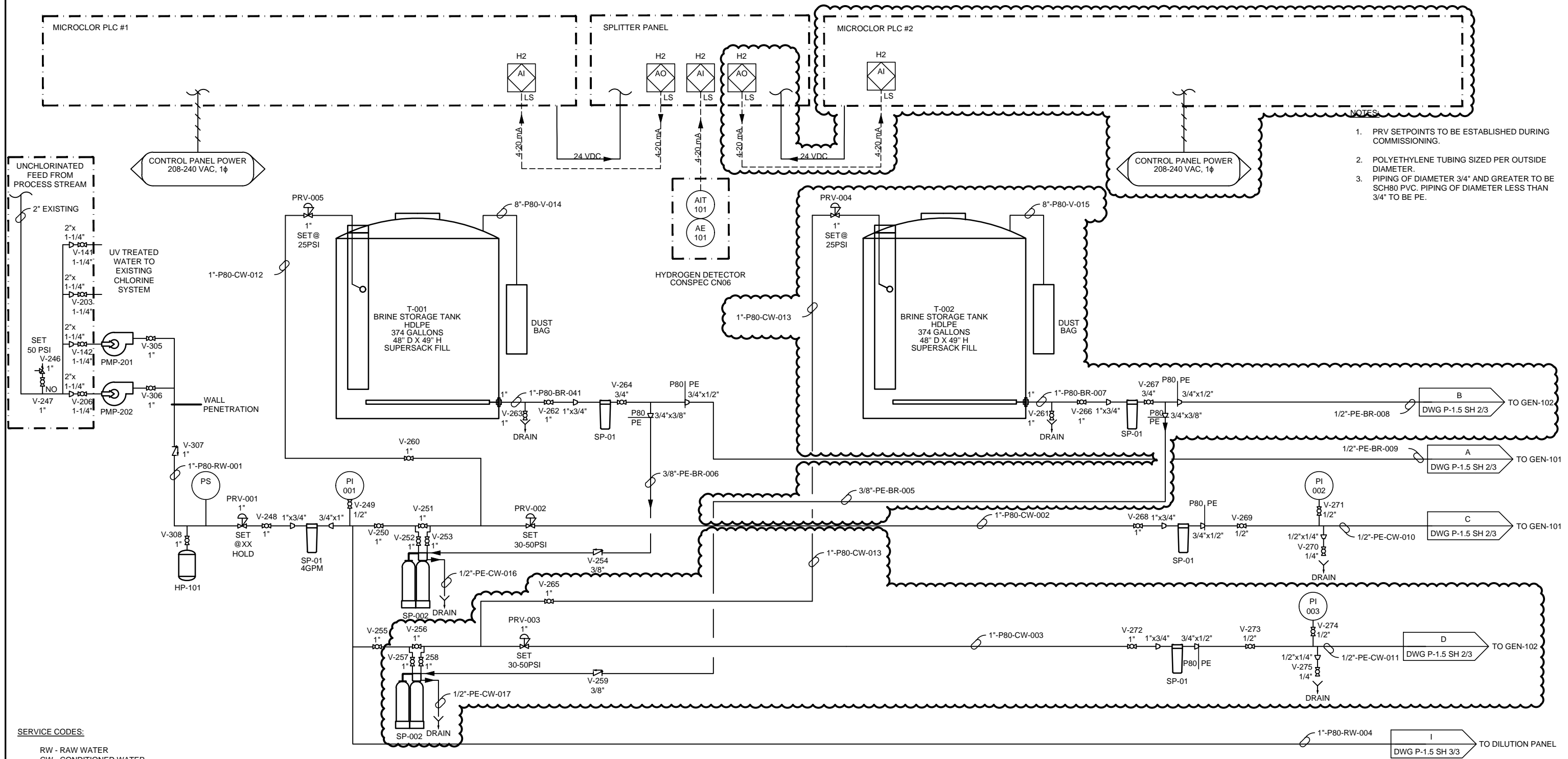
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LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
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1	3/22	100% IFC	RFK	RAN	WMC						
2	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION P&ID - PHASE 1 DEMO											
DWN: RFK	APP: WMC	DRAWING NUMBER		REV							
CKD: RAN	APP:	P1.5D		2							
DATE: 6/8/22	SCALE: NTS	SHEET 1 OF --									



- NOTES:
1. PRV SETPOINTS TO BE ESTABLISHED DURING COMMISSIONING.
 2. POLYETHYLENE TUBING SIZED PER OUTSIDE DIAMETER.
 3. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.

SERVICE CODES:
 RW - RAW WATER
 CW - CONDITIONED WATER
 HC - HYPOCHLORITE
 V - VENT
 H - HYDROGEN
 BR - BRINE

PIPE MATERIAL CODES:
 P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL

PMP-201, -202
 RAW WATER PUMP
 CAPACITY: 5 GPM
 TDH: 225 FT
 POWER: 3/4 HP
 GOULDS ISV8GB3J20

HP-101
 SURGE SUPPRESSOR
 CAPACITY: 112 GAL
 MAWP: 150 PSI
 DIMENSIONS: 30" DIA. x 52" H
 AMERICAN WHEATLY BDT-112

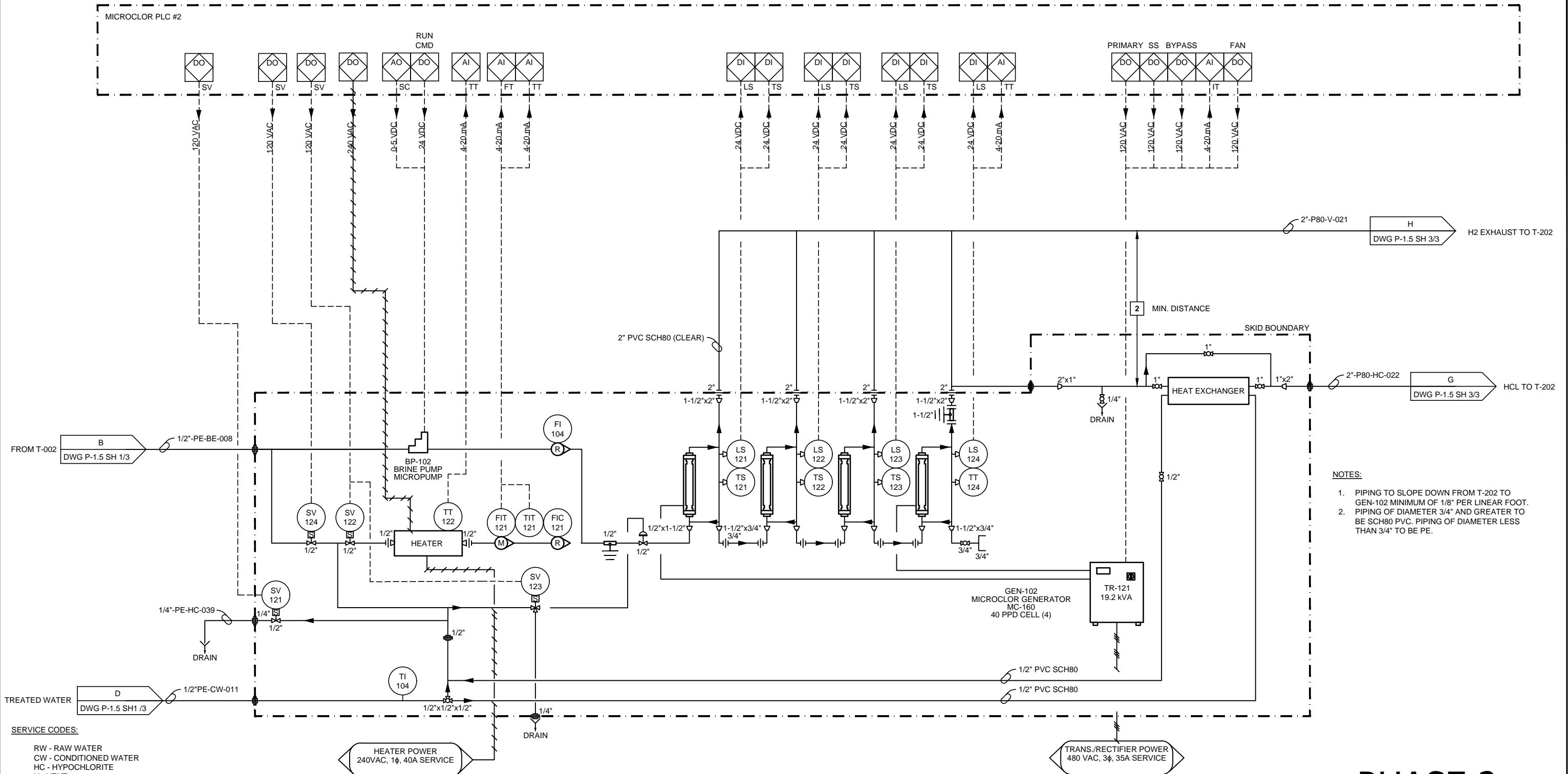
PHASE 2 DSGN/CNST

NUMBER	TITLE

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 PHONE: 907-433-1125
 LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	3/22	100% IFC	BWL	RFK	WMC						
B	6/22	100% IFC RE-ISSUE	BWL	RFK	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION P&ID PHASE 2 CONST.			
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CKD: RFK	APP: WMC	DATE: 6/8/22	SCALE: NTS
DATE: 6/8/22		SCALE: NTS	SHEET 1 OF 3



- NOTES:**
1. PIPING TO SLOPE DOWN FROM T-202 TO GEN-102 MINIMUM OF 1/8" PER LINEAR FOOT.
 2. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.

SERVICE CODES:
 RW - RAW WATER
 CW - CONDITIONED WATER
 HC - HYPOCHLORITE
 V - VENT
 H - HYDROGEN
 BR - BRINE

PIPE MATERIAL CODES:
 P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL

PHASE 2 DSGN/CNST

NUMBER	TITLE

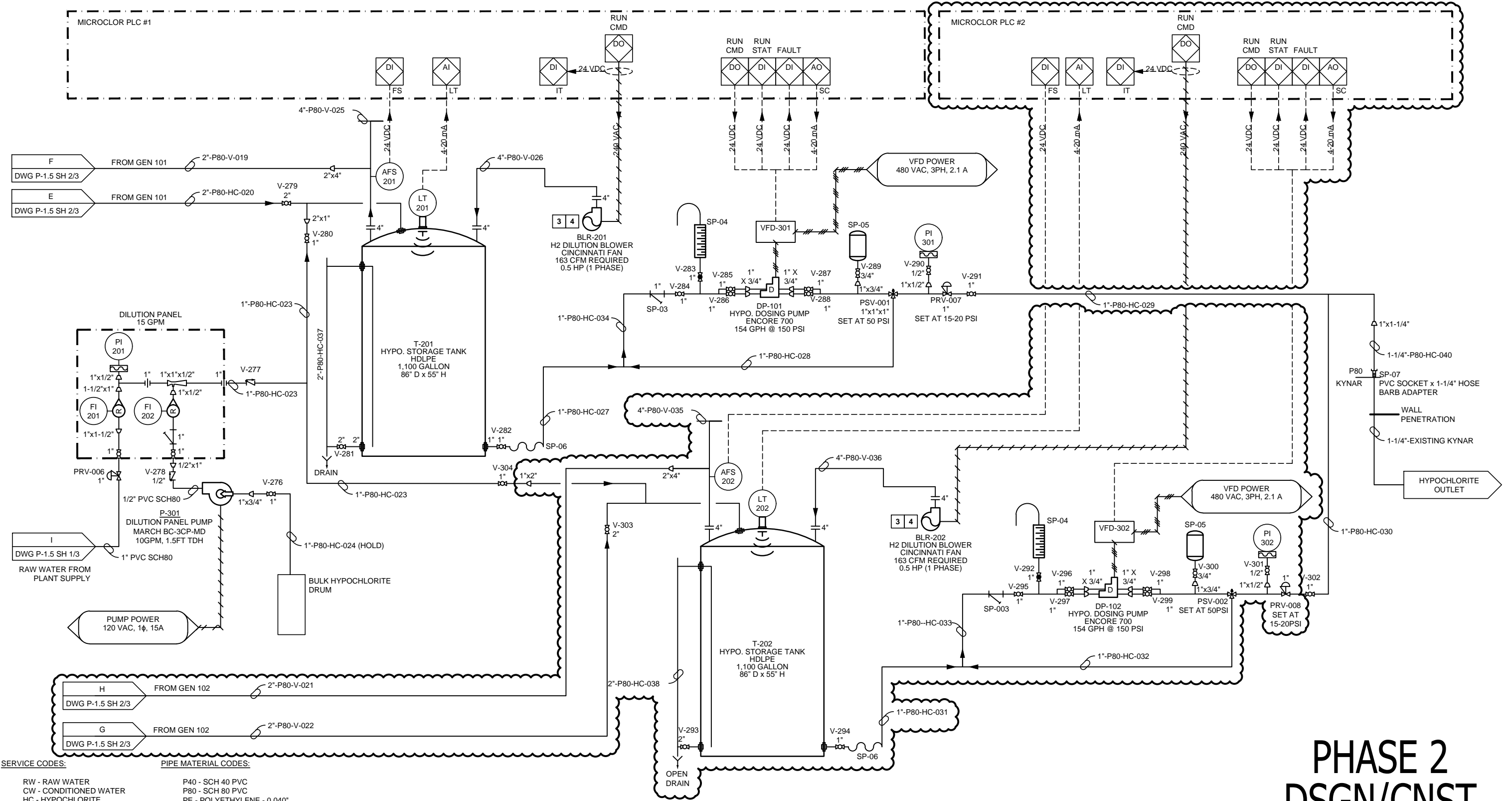


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CKD: RFK	APP:										
DATE: 6/8/22	SCALE: NTS	SHEET 2 OF 3									

- NOTES:
1. PRV SET POINTS TO BE FINALIZED DURING COMMISSIONING.
 2. PIPING TO SLOPE DOWN FROM T-202 TO GEN-102 MINIMUM OF 1/8" PER LINEAR FOOT.
 3. PIPING OF DIAMETER 3/4" AND GREATER TO BE SCH80 PVC. PIPING OF DIAMETER LESS THAN 3/4" TO BE PE.



SERVICE CODES:

RW - RAW WATER
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PIPE MATERIAL CODES:

P40 - SCH 40 PVC
 P80 - SCH 80 PVC
 PE - POLYETHYLENE - 0.040" WALL

PHASE 2 DSGN/CNST

NUMBER	TITLE
	REFERENCE DRAWINGS

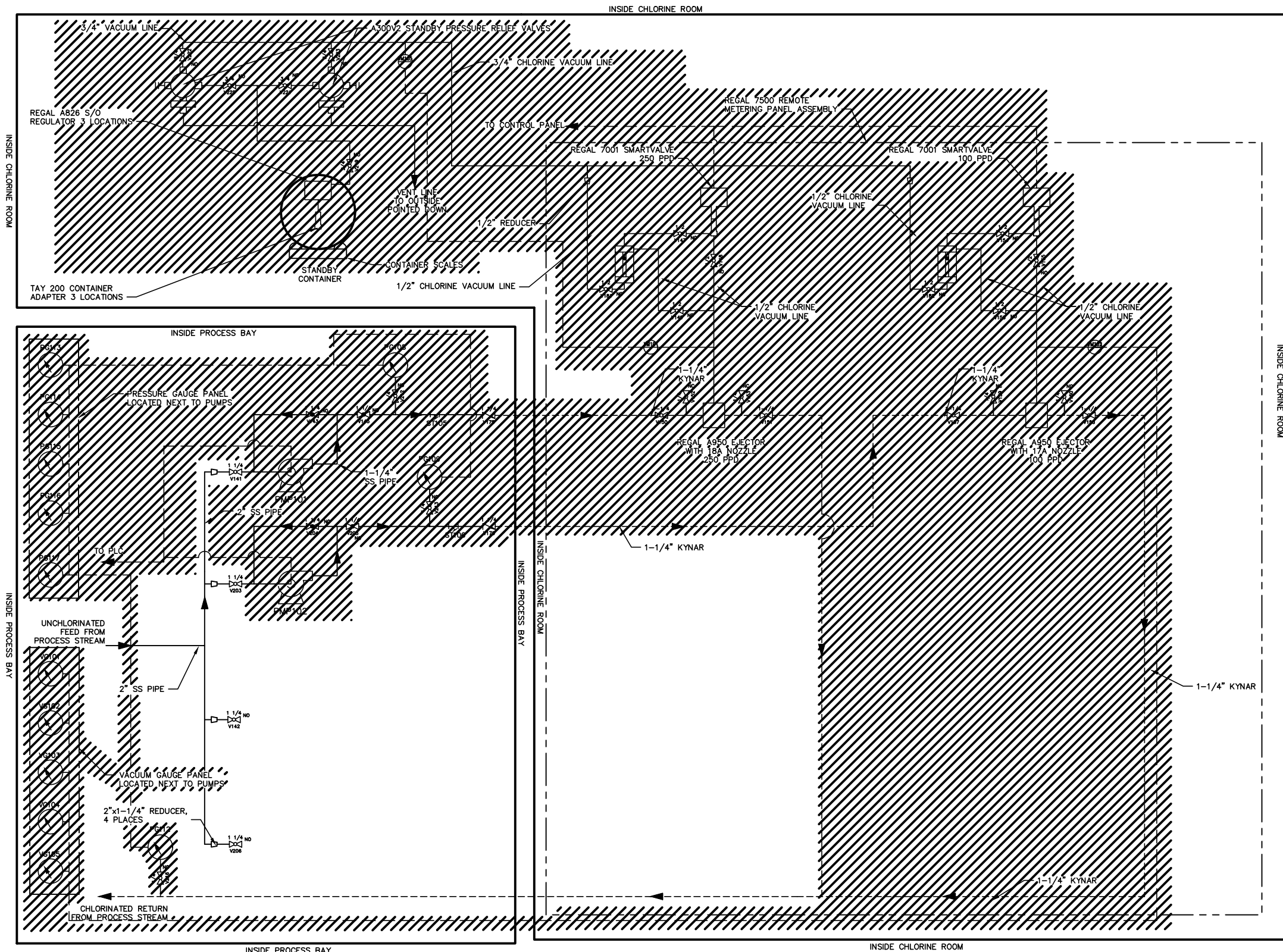


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 LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	3/22	100% IFC				BWL	RFK	WMC			
B	6/22	100% IFC RE-ISSUE				BWL	RFK	WMC			

DRAWING TITLE:											
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION P&ID PHASE 2 CONST.											
DWN:	BWL	APP:	WMC	DRAWING NUMBER		REV					
CKD:	RFK	APP:		P1.5		B					
DATE:	6/8/22	SCALE:	NTS	SHEET 3 OF 3							



LEGEND	
SYMBOL	DESCRIPTION
	REGAL SMARTVALVE
	FLOWMETER
	BALL VALVE
	GLOBE VALVE
	CHLORINE EJECTOR
	STANDBY PRESSURE RELIEF VALVE
	TAY 200 ADAPTER
	PUMP
	Y-STRAINER
	CHECK VALVE
	KYNAR PIPING
	KYNAR VACUUM LINE
	REMOTE METERING PANEL ASSEMBLY
	SS PIPING
	CONTROL SIGNAL LINE
	PRESSURE GAUGE
	CHLORINE REGULATOR

PHASE 2 DEMOLITION

CHLORINATION PROCESS & INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE

NUMBER	TITLE



taku engineering
406 W Fireweed Ln, Anchorage, AK 99503
PHONE: 907-433-1125
LIC.# AECL890

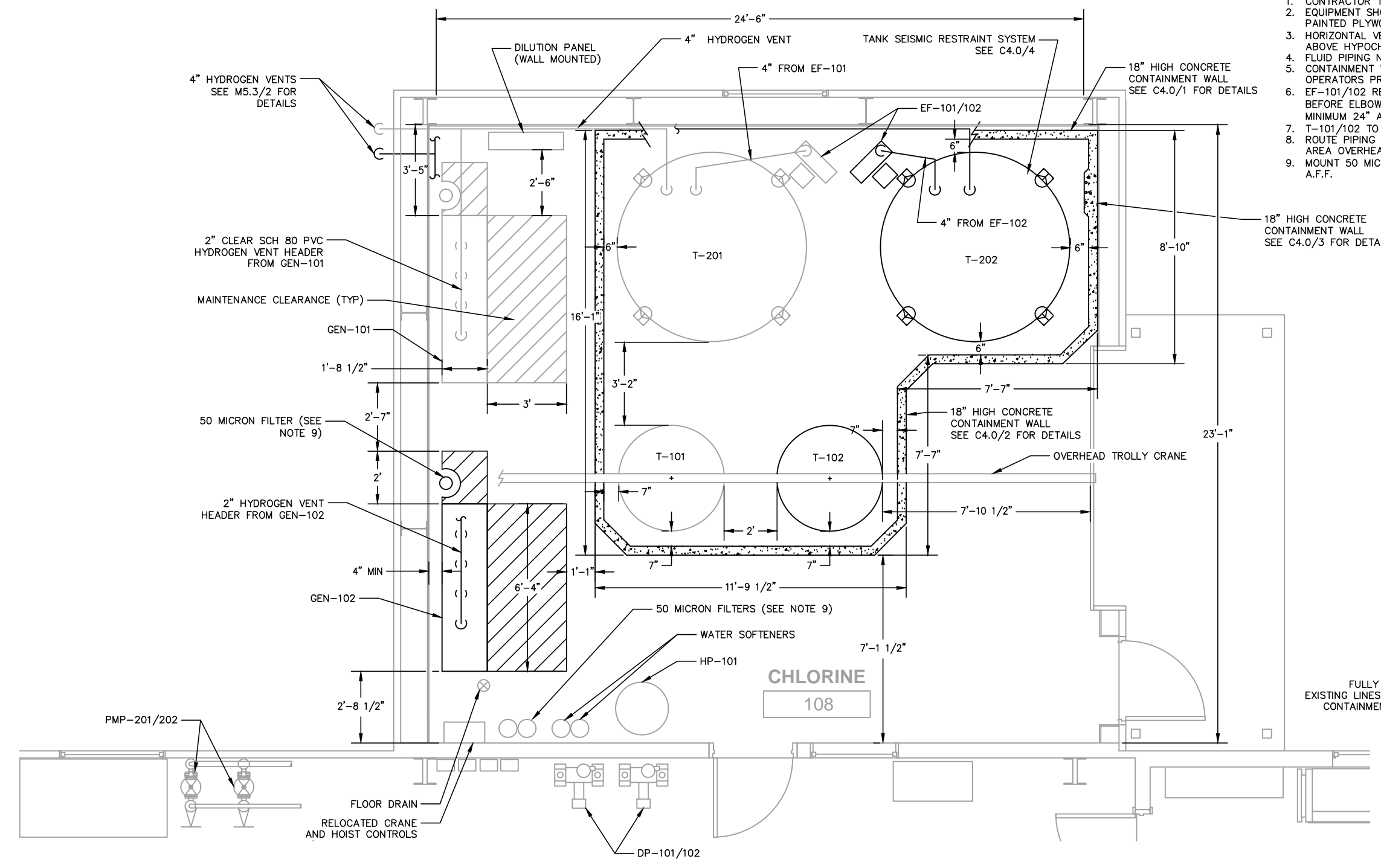
REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
0	4/20	ISSUED FOR CONSTRUCTION	RFK	ZBB	ZBB						
1	3/22	100% IFC	RFK	RAN	WMC						
2	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE:			
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION P&ID - PHASE 2 DEMO			
DWN: RFK	APP: WMC	DRAWING NUMBER	REV
CKD: RAN	APP:	P1.5D	2
DATE: 6/8/22	SCALE: NTS	SHEET 1 OF --	

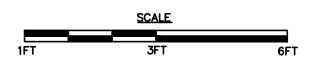


CONSTRUCTION NOTES:

1. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
2. EQUIPMENT SHOWN IN APPROXIMATE LOCATION AGAINST PAINTED PLYWOOD FALSE WALL.
3. HORIZONTAL VENT HEADERS INSTALLED MIN OF 48" ABOVE HYPOCHLORITE DISCHARGE CONNECTION LEVEL.
4. FLUID PIPING NOT SHOWN FOR CLARITY
5. CONTAINMENT WALL LAYOUT REQUIRES APPROVAL FROM OPERATORS PRIOR TO CONSTRUCTION.
6. EF-101/102 REQUIRE MIN 32" OF STRAIGHT PIPE BEFORE ELBOWS OR VALVES. MOUNT EF-101/102 MINIMUM 24" A.F.F.
7. T-101/102 TO BE CENTERED UNDER HOIST
8. ROUTE PIPING IN AND OUT OF CONTAINMENT WALL AREA OVERHEAD.
9. MOUNT 50 MICRON FILTER WITH TOP OF FILTER AT 30" A.F.F.



FULLY ENCASE EXISTING LINES IN NEW CONTAINMENT WALL
RELOCATE PULLBOX TO ABOVE NEW CONTAINMENT WALL



1 CHLORINATION EQUIPMENT PLAN - PHASE 2 CONSTRUCTION
1/2" = 10"

DSGN/CNST

NUMBER	TITLE



taku engineering
406 W Fireweed Ln, Anchorage, AK 99503
PHONE: 907-433-1125
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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE:					
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG EQUIPMENT PLAN - PHASE 2					
DWN: RFK	APP: WMC	DRAWING NUMBER		REV	
CKD: RAN	APP:	P1.7		E	
DATE: 6/8/22	SCALE: AS SHOWN	SHEET 1 OF 1			



DEMOLITION

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V107A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3/V24.3/AM01.2	
V107B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3/V24.3/AM01.2	
V108A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	N/A	
V108B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	N/A	
V109A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/V24.3/AC01.2	
V109B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/V24.3/AC01.2	
V110	CHECK VALVE - SWING	AUTOMATED	BACKFLOW PREVENTION	16	FLOWMATIC	92LW	OP/CL	N/A	
V111	BALL VALVE	MANUAL	ISOLATION OF UV1-1	1/4	-	-	OP/CL	N/A	
V112A	BALL VALVE	MANUAL	DRAIN UVR101A REACTOR LINE	2	-	-	OP/CL	N/A	
V112B	BALL VALVE	MANUAL	DRAIN UVR101B REACTOR LINE	2	-	-	OP/CL	N/A	
V113	BALL VALVE	MANUAL	ISOLATION OF UV1-2	1/4	-	-	OP/CL	N/A	
V114	BALL VALVE	MANUAL	ISOLATION OF CL17 AND HACH 1720E	1/2	-	-	OP/CL	N/A	
V115	BALL VALVE	MANUAL	SAMPLE	1/2	-	-	OP/CL	N/A	
V116	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V117A	BALL VALVE	MANUAL	VENT ON STRAINER ST101A	1/2	-	-	OP/CL	N/A	
V117B	BALL VALVE	MANUAL	VENT ON STRAINER ST101B	1/2	-	-	OP/CL	N/A	
V118	HOSE BIBB	MANUAL	SAMPLE	3/4	-	-	MODULATING	N/A	
V119	VACUUM BREAKER	AUTOMATIC	PREVENTS NEGATIVE PRESSURE IN DISCHARGE LINE	8	VALMATIC	1808VB.1	AUTOMATIC	N/A	
V120	BALL VALVE	MANUAL	DRAIN AT INLET TO STRAINERS	2	-	-	OP/CL	N/A	
V121	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG101	1/2	-	-	OP/CL	N/A	
V122A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102A	1/2	-	-	OP/CL	N/A	
V122B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102B	1/2	-	-	OP/CL	N/A	
V123A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103A	1/2	-	-	OP/CL	N/A	
V123B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103B	1/2	-	-	OP/CL	N/A	
V124A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104A	1/2	-	-	OP/CL	N/A	
V124B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104B	1/2	-	-	OP/CL	N/A	
V125	STAINLESS STEEL CHECK VALVE	-	CHECK VALVE PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V126	STAINLESS STEEL CHECK VALVE	-	CHECK VALVE PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V127A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105A	1/2	-	-	OP/CL	N/A	
V127B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105B	1/2	-	-	OP/CL	N/A	
V128	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG106	1/2	-	-	OP/CL	N/A	
V129	BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-1	1/4	-	-	OP/CL	-	
V130	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-2	1/4	-	-	OP/CL	N/A	
V131A	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE A (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V131B	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE B (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V132	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V133	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V134A	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131A AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V134B	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131B AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V135	BALL VALVE	MANUAL	ISOLATION VALVE FOR V132 AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V136	BALL VALVE	MANUAL	ISOLATION VALVE FOR V133 AIR/VACUUM RELEASE	1	-	-	OP/CL	N/A	
V137	AIR RELEASE VALVE	AUTOMATIC	RELEASE AIR COLLECTED BETWEEN STRAINERS AND UV REACTORS (DURING OPERATOR)	1	VALMATIC	VMC-38	AUTOMATIC	N/A	
V138	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V139	BALL VALVE	MANUAL	ISOLATION VALVE FOR V137 AIR RELEASE	1	-	-	MANUAL	N/A	
V140	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V141	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP101	1 1/4	-	-	MANUAL	N/A	
V142	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP102	1 1/4	-	-	MANUAL	N/A	
V143	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 250 PPD	1 1/4	-	-	MANUAL	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V144	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 50 PPD	1 1/4	-	-	MANUAL	N/A	
V145	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP101 (250 PPD)	1 1/4	-	-	MANUAL	N/A	
V146	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP103 (50 PPD)	1 1/4	-	-	MANUAL	N/A	
V147	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 200 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V148	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V149	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 200 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V150	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 250 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V151	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 250 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V152	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V153	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V154	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V155	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V156	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V157	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 100 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V158	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 100 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V159	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V160	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V161	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V162	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V163	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V164	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 50 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V165	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 50 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V166	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V167	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V168	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V169	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V170	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V171	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 25 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V172	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 25 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V173	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V174	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V175	STAINLESS STEEL CHECK VALVE	-	PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V176	STAINLESS STEEL CHECK VALVE	-	PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V177	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101A	3/4	-	-	MANUAL	N/A	
V178	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101B	3/4	-	-	MANUAL	N/A	
V178A	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101A	3/4	-	-	OP/CL	N/A	
V178B	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101B	3/4	-	-	OP/CL	N/A	
V179	REMOVED FROM SYSTEM	-	-	-	-	-	MANUAL	N/A	
V180	BALL VALVE	MANUAL	ISOLATION FOR WATER TO CHLORINE PUMPS	2	-	-	MANUAL	N/A	
V181	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V182	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V183	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V184	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V185	KYNAR BALL VALVE	MANUAL	ISOLATION VALVE ON CHLORINE RETURN LINE	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V186	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR PH/TEMP INSTRUMENT	1/2	GEORGE FISHER	514	MANUAL	N/A	
V187	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-2	1/4	-	-	MANUAL	N/A	
V188A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118A	1/2	-	-	MANUAL	N/A	
V188B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118B	1/2	-	-	MANUAL	N/A	
V189A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119A	1/2	-	-	MANUAL	N/A	
V189B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119B	1/2	-	-	MANUAL	N/A	
V190	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG123	1/4	-	-	MANUAL	N/A	
V191	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG122	1/4	-	-	MANUAL	N/A	
V192	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V193	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V194	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V195	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-1	1/4	GEMU	TYPE 611	MANUAL	N/A	
V196	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH PH/TEMP	3/8	GEMU	TYPE 611	MANUAL	N/A	
V197	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-2	1/4	GEMU	TYPE 611	MANUAL	N/A	
V198	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V199	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V200	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V201	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	



taku engineering
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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSC VALVE SCHEDULE - DEMO											
DWN: RFK	APP: WMC	DRAWING NUMBER P3.1D		REV E							
DATE: 6/8/22	SCALE: NTS	SHEET 1 OF 1									

NUMBER	TITLE
	REFERENCE DRAWINGS



TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V202	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V203	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP102	1 1/4	-	-	MANUAL	N/A	
V204	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 100 PPD	1 1/4	-	-	MANUAL	N/A	
V205	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP102 (100 PPD)	1 1/4	-	-	MANUAL	N/A	
V206	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP104	1 1/4	-	-	MANUAL	N/A	
V209	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-3	1/4	-	-	OP/CL	N/A	
V210	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V211	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V212	BALL VALVE	MANUAL	ISOLATION OF PG108	1/4	-	-	OP/CL	N/A	
V213	BALL VALVE	MANUAL	ISOLATION OF PG109	1/4	-	-	OP/CL	N/A	
V214	BALL VALVE	MANUAL	ISOLATION OF PG110	1/4	-	-	OP/CL	N/A	
V216	BALL VALVE	MANUAL	ISOLATION OF PG112	1/4	-	-	OP/CL	N/A	
V217	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V218	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V219	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V220	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V221	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V222	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V223	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V224	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-4	1/4	-	-	OP/CL	N/A	
V225	ISOLATION VALVE	MANUAL	ISOLATION OF PRESSURE GAUGE TO PH/TEMP INSTRUMENT	3/8	-	-	MANUAL		
V229	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	TEMPORARY PROCESS BYPASS	10	PRATT	HP250II	OP/CL	N/A	
V230A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-A	8	PRATT	HP250II	OP/CL	N/A	
V230B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	
V231A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-A	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	
V231B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-B	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	
V232A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION TG-A	10	PRATT	HP250II	OP/CL	N/A	
V232B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	
V233A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	
V233B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	
V234A	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	631G-36BCSY	MODULATING	N/A	
V234B	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	SURGE RELIEF/FLOW CONTROL	8	CLA-VAL	690G-01BCP1P2SYKCO W/CRD-34	MODULATING	N/A	
V235A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	
V235B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	
V236	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT115	1/2	-	-	OP/CL	N/A	
V237	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DISCHARGE PRV ISOLATION	16	PRATT	HP250II	OP/CL	N/A	
V238	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	50-90 PRESS SUSTAINING TRIM	MODULATING	N/A	
V239	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT114	1/2	-	-	OP/CL	N/A	
V240A	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-A	1/2	-	-	OP/CL	N/A	
V240B	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-B	1/2	-	-	OP/CL	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V241	BALL VALVE	MANUAL	LOW POINT DRAIN ON DISCHARGE PIPE	1/2	-	-	OP/CL	N/A	
V242	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED INCOMING RAW WATER LINE	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V243	BALL VALVE	MANUAL	ISOLATION VALVE FOR V242 AIR RELEASE	1	-	-	MANUAL	N/A	
V244	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR AFTER ALL TURBINES	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V245	BALL VALVE	MANUAL	ISOLATION VALVE FOR V244 AIR RELEASE	1	-	-	MANUAL	N/A	
V246	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UNCHLORINATED FEED FROM PROCESS STREAM	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V247	BALL VALVE	MANUAL	ISOLATION VALVE FOR V246 AIR RELEASE	1	-	-	MANUAL	N/A	
VG101	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 250 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG102	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 100 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG103	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 50 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG104	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 25 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG105	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 25 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VM101	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM102	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM103	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM104	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM105	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	

PUMP NO.	MAX FLOW			MAX HEAD		MANUFACTURER/SUPPLIER	PRODUCT LINE	RPM	NO. OF STAGES	CONFIG OPTIONS	HP RATING	VOLTAGE		ENCLOSURE		MODEL NO.	
	GPM	M3/HR	CALLOUT	PSI	FT							VOLTAGE	CALLOUT	TYPE	CALLOUT		
PMP 101	29.1	6.61	5	185	450	GOULD	SV	3500	17	ROUND 304	7.5	2/60/3	230/460	F	TEFC	2	5SV12FG4F60
PMP 102	24.0	5.85	5	185	427	GOULD	SV	3500	15	ROUND 304	5	2/60/3	230/460	F	TEFC	2	5SV15FG4F60
PMP 103	23.7	5.38	5	182	420	GOULD	SV	3500	14	ROUND 304	5	2/60/3	230/460	F	TEFC	2	5SV14FG4F60
PMP 104	14.4	3.27	5	153	353	GOULD	SV	3500	12	ROUND 304	5	2/60/3	230/460	F	TEFC	2	5SV12FG4F60

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	NOTES
TG-A	TURBINE	AUTOMATED	POWER GENERATION	8	CORNELL	8TR3	
TG-B	TURBINE	AUTOMATED	POWER GENERATION	6	CORNELL	6TR3	

DEMOLITION



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REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSC VALVE SCHEDULE - DEMO

DWN: RFK APP: RAN DRAWING NUMBER: P3.2D REV: E

CKD: AB APP: WMC

DATE: 6/8/22 SCALE: NTS SHEET 1 OF 1

NUMBER	TITLE
	REFERENCE DRAWINGS



TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
CL17-1	DPD CHLORINE ONLINE TEST	-	MONITOR TREATED WATER INITIAL CHLORINE LEVEL	-	HACH	CL17	-	N/A	
CL17-2	DPD CHLORINE ONLINE TEST	-	MONITOR CHLORINE LEVEL ON EFFLUENT FROM STORAGE	-	HACH	CL17	-	N/A	
DIF1	DIFFUSER	-	INJECT CHLORINATED WATER INTO THE PROCESS FLOW	2	INYO PROCESS	CS2005K8F	-	N/A	
DS101A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS101B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS102A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS102B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS103A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS103B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS104A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS104B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
EJCT1	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 250 PPD	-	REGAL	950/18A NOZZLE	-	N/A	
EJCT2	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 100 PPD	-	REGAL	950/17A NOZZLE	-	N/A	
EJCT3	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 50 PPD	-	REGAL	950/17A NOZZLE	-	N/A	
EJCT4	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 25 PPD	-	REGAL	950/5A NOZZLE	-	N/A	
F101	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
F102	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
F103	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
M101	MAGNETIC FLOWMETER	-	MONITOR TREATED WATER FLOW	16	ROSEMOUNT 8750WA	8750WA 32ES T 1 A 1 F T S A 160 S A1 DA1 L1 DW	REMOTE MOUNTED TRANSMITTER	N/A	
M102	MAGNETIC FLOWMETER - BYPASS LINE	-	MONITOR WATER ROUTED THROUGH THE BYPASS LINE	16	ROSEMOUNT 8750WA	8750WA 32ES T 1 A 1 F T S A 160 S A1 DA1 L1 DW	REMOTE MOUNTED TRANSMITTER	N/A	
PG101	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER INLET	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG102A	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER OUTLET ST101A	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG102B	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER OUTLET ST101B	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG103A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO UV REACTOR 101A	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG103B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET UV REACTOR 101B	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG104A	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO UV REACTOR 101A	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG104B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO UV REACTOR 101B	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG105A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO CLA-VAL VALVE V109A	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG105B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO CLA-VAL VALVE V109B	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG106	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF CLA-VAL VALVE	-	ASHCROFT	45-12795L04LM0/160	1279	N/A	
PG107A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO EJECTOR NOZZLE	1/2	ASHCROFT	45-12795L04LM0/300	2279	N/A	
PG107B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO EJECTOR NOZZLE	1/2	ASHCROFT	45-12795L04LM0/300	2279	N/A	
PG118A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET OF V109A	1/2	ASHCROFT	45-2279504LMF0/300	2279	N/A	
PG118B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET OF V109B	1/2	ASHCROFT	45-2279504LMF0/300	2279	N/A	
PG119A	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF V109A	1/2	ASHCROFT	45-2279504LMF0/300	2279	N/A	
PG119B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF V109B	1/2	ASHCROFT	45-2279504LMF0/300	2279	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
PG120	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	-
PG121	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	-
PG122	LOW RANGE PRESSURE GAUGE, 0 - 5 PSI	-	MONITOR PRESSURE AT INLET TO CL17-1	1/4	WIKA 611.10	9851933	-	N/A	
PG123	LOW RANGE PRESSURE GAUGE, 0 - 5 PSI	-	MONITOR PRESSURE AT INLET TO CL17-2	1/4	WIKA 611.10	9851933	-	N/A	
PH/TEMP1	PH/TEMPERATURE MEASUREMENT	-	MEASURE PH & TEMPERATURE	-	HACH	DPD1P1/9180100	-	-	
PT101	PRESSURE TRANSDUCER	-	MONITOR INLET PRESSURE	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT102	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AFTER STRAINERS	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT103	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	-
PT104	PRESSURE TRANSDUCER	-	MONITOR INLET PRESSURE	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT105	PRESSURE TRANSDUCER	-	MONITOR PRESSURE - OUTLET TO UV REACTOR 101A	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT106	PRESSURE TRANSDUCER	-	MONITOR PRESSURE - OUTLET TO UV REACTOR 101B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT107	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT INLET OF FLOW CONTROL VALVES V109A/B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT108	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT OUTLET OF FLOW CONTROL VALVES V109A/B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT114	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT TURBINE INLET	-	ROSEMOUNT	3051TG2A2B21J	-	N/A	
PT115	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT TURBINE DISCHARGE	-	ROSEMOUNT	3051TG2A2B21J	-	N/A	
DP101	DIFFERENTIAL PRESSURE GAUGE	-	MEASURE DIFFERENTIAL PRESSURE ACROSS STRAINERS	-	ASHCROFT	60-1132-SS-25S-L-X V2-8PSI	-	-	
SM101	STATIC MIXER	-	MIX CHLORINE INTO TREATED WATER STREAM	16	KOMAX	60270	-	-	
ST101A	BASKET STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER	16	KECKLEY	FBQ-SS-150-16	-	-	
ST101B	BASKET STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER	16	KECKLEY	FBQ-SS-150-16	-	-	
ST103	IN LINE STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER (UVT1)	1/2	EATON	85Y	Y STRAINER	-	
ST104	IN LINE STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER (UVT2)	1/2	EATON	85Y	Y STRAINER	-	
ST105	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST106	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST107	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST108	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
TURB-2	TURBIDIMETER	-	MONITOR INCOMING WATER TURBIDITY	-	HACH	1720E	-	-	
TURB-3	TURBIDIMETER	-	MONITOR INCOMING WATER TURBIDITY	-	HACH	1720E	-	-	
TURB-4	TURBIDIMETER	-	MONITOR TURBIDITY IN WATER FROM CT TANK	-	HACH	1720E	-	-	
UVR-101A	UV REACTOR	-	DISINFECTION	24	CALGON	5X10	-	-	
UVR-101B	UV REACTOR	-	DISINFECTION	25	CALGON	5X10	-	-	
UVT-2	UV TRANSMITTANCE METER	-	MEASURE UVT IN WATER	-	HACH	UVAS SC	-	-	
UVT-3	UV TRANSMITTANCE METER	-	MEASURE UVT IN WATER	-	HACH	UVAS SC	-	-	
V100	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	-
V101	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	BYPASS CONTROL VALVE	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V102A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO STRAINER ST101A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V102B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO STRAINER ST101B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V103A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET CONTROL FROM STRAINER ST101A	16	PRATT	HP250II	OP/CL	N/A	
V103B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET CONTROL FROM STRAINER ST101B	16	PRATT	HP250II	OP/CL	N/A	
V104	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	DISCHARGE CONTROL VALVE	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V105A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO UV REACTOR UVR101A	24	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V105B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO UV REACTOR UVR101B	24	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V106A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	OUTLET CONTROL FROM UV REACTOR UVR101A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	
V106B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	OUTLET CONTROL FROM UV REACTOR UVR101B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /V24.3/AM01.2	

DSGN/CNST



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A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB
D	3/22	100% IFC	RFK	RAN	WMC
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC
REV	DATE	DESCRIPTION	DWN	CKD	APP

DRAWING TITLE:			
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSC VALVE SCHEDULE			
DWN: RFK	APP: AB	DRAWING NUMBER	REV
CKD: AB	APP:	P3.0	E
DATE: 6/8/22	SCALE: NTS	SHEET 1 OF	

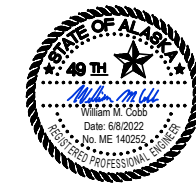
NUMBER	TITLE
	REFERENCE DRAWINGS



TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V107A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3/VZ4.3/AM01.2	
V107B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3/VZ4.3/AM01.2	
V108A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	N/A	
V108B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	N/A	
V109A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/VZ4.3/AC01.2	
V109B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/VZ4.3/AC01.2	
V110	CHECK VALVE - SWING	AUTOMATED	BACKFLOW PREVENTION	16	FLOWMATIC	92LW	OP/CL	N/A	
V111	BALL VALVE	MANUAL	ISOLATION OF UV-1	1/4	-	-	OP/CL	N/A	
V112A	BALL VALVE	MANUAL	DRAIN UVR101A REACTOR LINE	2	-	-	OP/CL	N/A	
V112B	BALL VALVE	MANUAL	DRAIN UVR101B REACTOR LINE	2	-	-	OP/CL	N/A	
V113	BALL VALVE	MANUAL	ISOLATION OF UV-2	1/4	-	-	OP/CL	N/A	
V114	BALL VALVE	MANUAL	ISOLATION OF CL17 AND HACH 1720E	1/2	-	-	OP/CL	N/A	
V115	BALL VALVE	MANUAL	SAMPLE	1/2	-	-	OP/CL	N/A	
V116	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V117A	BALL VALVE	MANUAL	VENT ON STRAINER ST101A	1/2	-	-	OP/CL	N/A	
V117B	BALL VALVE	MANUAL	VENT ON STRAINER ST101B	1/2	-	-	OP/CL	N/A	
V118	HOSE BIBB	MANUAL	SAMPLE	3/4	-	-	MODULATING	N/A	
V119	VACUUM BREAKER	AUTOMATIC	PREVENTS NEGATIVE PRESSURE IN DISCHARGE LINE	8	VALMATIC	1808VB.1	AUTOMATIC	N/A	
V120	BALL VALVE	MANUAL	DRAIN AT INLET TO STRAINERS	2	-	-	OP/CL	N/A	
V121	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG101	1/2	-	-	OP/CL	N/A	
V122A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102A	1/2	-	-	OP/CL	N/A	
V122B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102B	1/2	-	-	OP/CL	N/A	
V123A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103A	1/2	-	-	OP/CL	N/A	
V123B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103B	1/2	-	-	OP/CL	N/A	
V124A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104A	1/2	-	-	OP/CL	N/A	
V124B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104B	1/2	-	-	OP/CL	N/A	
V127A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105A	1/2	-	-	OP/CL	N/A	
V127B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105B	1/2	-	-	OP/CL	N/A	
V128	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG106	1/2	-	-	OP/CL	N/A	
V129	BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-1	1/4	-	-	OP/CL	-	
V130	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-2	1/4	-	-	OP/CL	N/A	
V131A	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE A (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V131B	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE B (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V132	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V133	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V134A	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131A AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V134B	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131B AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V135	BALL VALVE	MANUAL	ISOLATION VALVE FOR V132 AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V136	BALL VALVE	MANUAL	ISOLATION VALVE FOR V133 AIR/VACUUM RELEASE	1	-	-	OP/CL	N/A	
V137	AIR RELEASE VALVE	AUTOMATIC	RELEASE AIR COLLECTED BETWEEN STRAINERS AND UV REACTORS (DURING OPERATION)	1	VALMATIC	VMC-38	AUTOMATIC	N/A	
V138	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V139	BALL VALVE	MANUAL	ISOLATION VALVE FOR V137 AIR RELEASE	1	-	-	MANUAL	N/A	
V140	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V141	BALL VALVE	MANUAL	UNUSED	1-1/4	-	-	MANUAL	N/A	
V142	BALL VALVE	MANUAL	INLET TO PUMP PMP201	1-1/4	-	-	MANUAL	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V177	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101A	3/4	-	-	MANUAL	N/A	
V178	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101B	3/4	-	-	MANUAL	N/A	
V178A	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101A	3/4	-	-	OP/CL	N/A	
V178B	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101B	3/4	-	-	OP/CL	N/A	
V179	REMOVED FROM SYSTEM	-	-	-	-	-	MANUAL	N/A	
V180	BALL VALVE	MANUAL	ISOLATION FOR WATER TO CHLORINE PUMPS	2	-	-	MANUAL	N/A	
V185	KYNAR BALL VALVE	MANUAL	ISOLATION VALVE ON CHLORINE RETURN LINE	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V186	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR PH/TEMP INSTRUMENT	1/2	GEORGE FISHER	514	MANUAL	N/A	
V187	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-2	1/4	-	-	MANUAL	N/A	
V188A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118A	1/2	-	-	MANUAL	N/A	
V188B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118B	1/2	-	-	MANUAL	N/A	
V189A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119A	1/2	-	-	MANUAL	N/A	
V189B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119B	1/2	-	-	MANUAL	N/A	
V190	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG123	1/4	-	-	MANUAL	N/A	
V191	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG122	1/4	-	-	MANUAL	N/A	
V192	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V193	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V194	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V195	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-1	1/4	GEMU	TYPE 611	MANUAL	N/A	
V196	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH PH/TEMP	3/8	GEMU	TYPE 611	MANUAL	N/A	
V197	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-2	1/4	GEMU	TYPE 611	MANUAL	N/A	
V198	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V199	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V200	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V201	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	

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taku engineering
 406 W Fireweed Ln, Anchorage, AK 99503
 PHONE: 907-433-1125
 LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG VALVE SCHEDULE

DWN: RFK APP: AB DRAWING NUMBER: P3.1 REV: E

CKD: AB APP: DATE: 6/8/22 SCALE: NTS SHEET 1 OF 1

NUMBER	TITLE
	REFERENCE DRAWINGS



TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V202	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V203	BALL VALVE 150 LB	MANUAL	UNUSED	1 1/4	-	-	MANUAL	N/A	
V206	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP202	1 1/4	-	-	MANUAL	N/A	
V209	BALL VALVE	MANUAL	ISOLATION VAVLE FOR TURB-3	1/4	-	-	OP/CL	N/A	
V210	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V211	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V224	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-4	1/4	-	-	OP/CL	N/A	
V225	ISOLATION VALVE	MANUAL	ISOLATION OF PRESSURE GAUGE TO PH/TEMP INSTRUMENT	3/8	-	-	MANUAL		
V229	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	TEMPORARY PROCESS BYPASS	10	PRATT	HP250II	OP/CL	N/A	
V230A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-A	8	PRATT	HP250II	OP/CL	N/A	
V230B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	
V231A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-A	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	
V231B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-B	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	
V232A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION TG-A	10	PRATT	HP250II	OP/CL	N/A	
V232B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	
V233A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	
V233B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	
V234A	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	631G-36BCSY	MODULATING	N/A	
V234B	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	SURGE RELIEF/FLOW CONTROL	8	CLA-VAL	690G-018CP1P25YKCO W/CRD-34	MODULATING	N/A	
V235A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	
V235B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	
V236	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT115	1/2	-	-	OP/CL	N/A	
V237	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DISCHARGE PRV ISOLATION	16	PRATT	HP250II	OP/CL	N/A	
V238	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	50-90 PRESS SUSTAINING TRIM	MODULATING	N/A	
V239	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT114	1/2	-	-	OP/CL	N/A	
V240A	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-A	1/2	-	-	OP/CL	N/A	
V240B	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-B	1/2	-	-	OP/CL	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V241	BALL VALVE	MANUAL	LOW POINT DRAIN ON DISCHARGE PIPE	1/2	-	-	OP/CL	N/A	
V242	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED INCOMING RAW WATER LINE	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V243	BALL VALVE	MANUAL	ISOLATION VALVE FOR V242 AIR RELEASE	1	-	-	MANUAL	N/A	
V244	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR AFTER ALL TURBINES	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V245	BALL VALVE	MANUAL	ISOLATION VALVE FOR V244 AIR RELEASE	1	-	-	MANUAL	N/A	
V246	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UNCHLORINATED FEED FROM PROCESS STREAM	1	VALMATIC	VMC-100S	AUTOMATIC	-	
V247	BALL VALVE	MANUAL	ISOLATION VALVE FOR V246 AIR RELEASE	1	-	-	MANUAL	N/A	

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	NOTES
TG-A	TURBINE	AUTOMATED	POWER GENERATION	8	CORNELL	8TR3	
TG-B	TURBINE	AUTOMATED	POWER GENERATION	6	CORNELL	6TR3	

PUMP NO.	DESIGN FLOW	DESIGN HEAD	MAUFACTURER/SUPPLIER	PRODUCT LINE	RPM	NO. OF STAGES	CONFIG OPTIONS	HP RATING	POLE/HZ/PHASE	VOLTAGE	ENCLOSURE TYPE	MODEL NO.	NOTES
PMP 201	5 GPM	97 PSI / 225 FT	GOULDS	SV	1750	8	ROUND 304	3/4	2/60/1	120V	TEFC	15V8GB3J20	OWNER PROVIDED
PMP 202	5 GPM	97 PSI / 225 FT	GOULDS	SV	1750	8	ROUND 304	3/4	2/60/1	120V	TEFC	15V8GB3J20	OWNER PROVIDED

TAG NO.	ITEM	MODEL	FUNCTION	TANK VOLUME (GAL)	ACCEPTANCE FACTOR	ACCEPTANCE VOLUME (GAL)	NOTES
HP-101	HYDROPNUEMATIC TANK	AMERICAN WHEATLEY BDT-112	SURGE SUPPRESSION	112	1.0	112	OWNER PROVIDED

TAG NO.	ITEM	MANUFACTURER	MODEL	VOLTAGE	MAX FLOW RATE	DISINFECTION GEN RATE	NOTES
GEN 101/102	ON-SITE HYPOCHLORITE GENERATOR	MICROCLOR	MC-160	480V	3 GPM	160 POUNDS PER DAY	OWNER PROVIDED

TAG NO.	ITEM	MANUFACTURER	MODEL	VOLTAGE	HP	MAX FLOW RATE	MAX PRESSURE	NOTES
DP-101/102	DOSING PUMPS	ENCORE	700	480V	3/4	1.6 GPM	150 PSIG	OWNER PROVIDED

TAG NO.	ITEM	MANUFACTURER	MODEL	VOLUME	DIAMETER	MATERIAL	NOTES
T-101/102	BRINE TANKS	BRINE MAKER	53X56FBDT	360 GAL	48"	HDPE	OWNER PROVIDED
T-201/202	SODIUM HYPOCHLORITE TANKS	SNYDER INDUSTRIES	1710000 N	1100 GAL	86"	HDPE	OWNER PROVIDED

TAG NO.	ITEM	MANUFACTURER	MODEL	FLOW RATE	STATIC PRESSURE	VOLTAGE	RPM	HP	NOTES
EF-101/102	HYDROGEN EXHAUST BLOWERS	CINCINNATI FAN	PB-8	163 CFM	3.10 IN. WG	240V	3600	1/2	OWNER PROVIDED

PUMP NO.	DESIGN FLOW	DESIGN HEAD	MAUFACTURER/SUPPLIER	RPM	HP RATING	HZ/PHASE	VOLTAGE	MODEL NO.	NOTES
P-301	10 GPM	0.65 PSI / 1.5 FT	MARCH	3450	1/14	60/1	120V	BC-3CP-MD	OWNER PROVIDED

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NUMBER	TITLE
	REFERENCE DRAWINGS



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 LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						
E	6/22	100% IFC RE-ISSUE	RFK	RAN	WMC						

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP

DRAWING TITLE:		CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG VALVE SCHEDULE			
DWN: RFK	APP: WMC	DRAWING NUMBER		REV	
CKD: RAN	APP:	P3.2		E	
DATE: 6/8/22	SCALE: NTS	SHEET 1 OF			



HYPOCHLORITE SYSTEM VALVES

Table with 6 columns: Number, Valve Type, Size, Connection, Material, Comments. Lists valves V248 through V302.

HYPOCHLORITE SYSTEM VALVES

Table with 6 columns: Number, Valve Type, Size, Connection, Material, Provided By. Lists valves V303 through V308.

HYPOCHLORITE SYSTEM PRVS

Table with 7 columns: Number, Size, Connection, Setpoint, BRAND/MODEL, Comments, Provided By. Lists PRV-001 through PRV-008.

HYPOCHLORITE SYSTEM PSVS

Table with 6 columns: Number, Size, Connection, Setpoint, BRAND/MODEL, Provided By. Lists PSV-001 and PSV-002.

HYPOCHLORITE SYSTEM SPECIALTY ITEMS

Table with 9 columns: Number, QTY, Description, Brand, Model, Capacity, MAWP, Dimensions, Connections. Lists specialty items SP-01 through SP-07.

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Table with 2 columns: NUMBER, TITLE. Row 1: REFERENCE DRAWINGS.



taku engineering logo and address: 406 W Fireweed Ln, Anchorage, AK 99503. Phone: 907-433-1125. Lic.# AECL890.

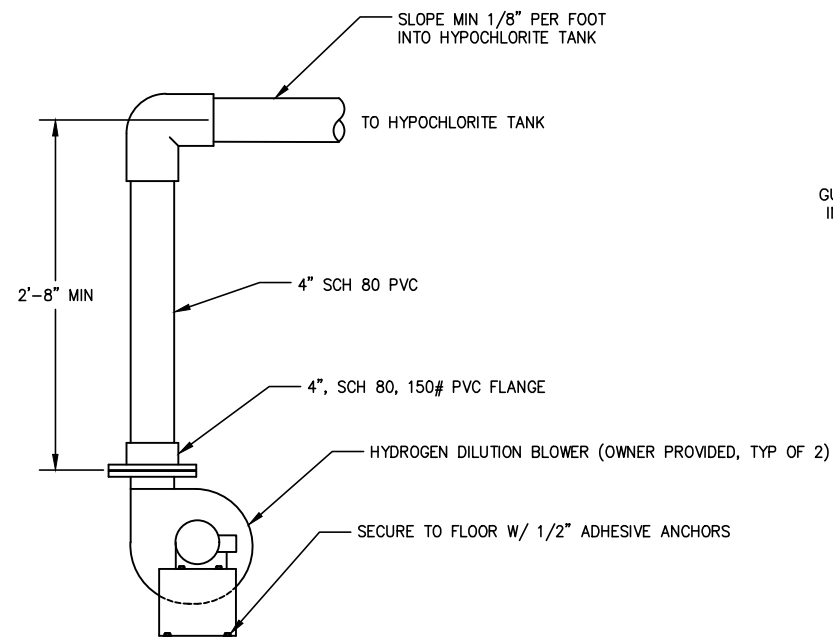
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Table with 4 columns: DWN, APP, DRAWING NUMBER, REV. Includes drawing title: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG VALVE SCHEDULE.

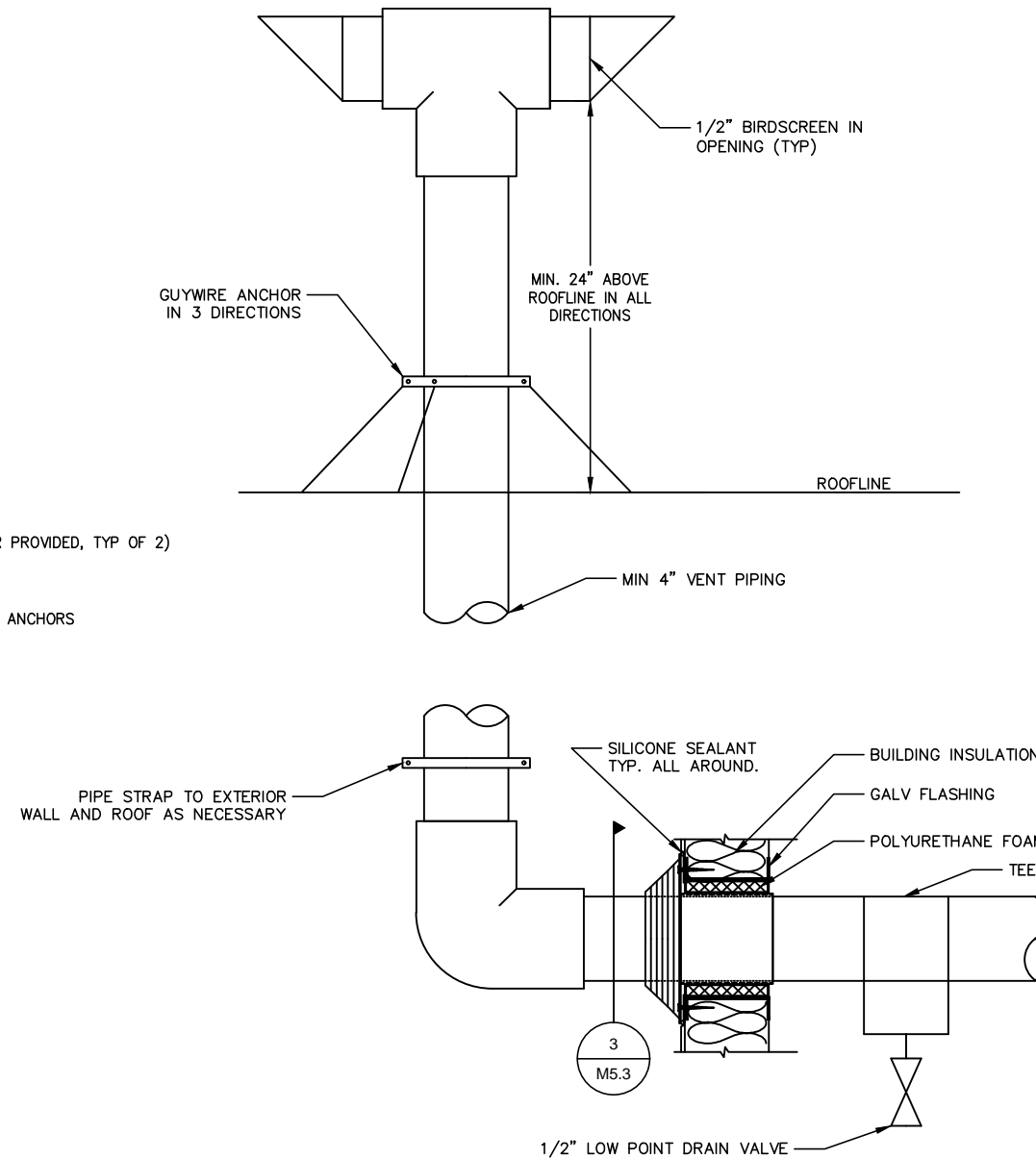


CONSTRUCTION NOTES:

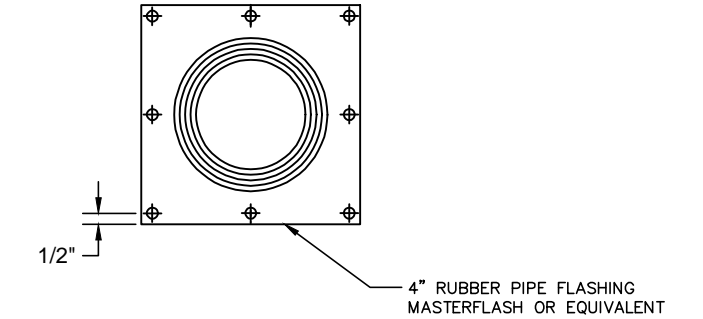
- EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT TZ SS 304 (OR APPROVED EQUAL) INSTALLED PER MANUFACTURE'S INSTRUCTIONS.
- SUBMIT DATA SHEETS FOR ALL EMBEDDED ANCHORS FOR APPROVAL.
- LOCATE EXISTING REBAR BY GPR, XRAY, OR OTHER MEANS PRIOR TO DRILLING TO AVOID HITTING REINFORCING REBAR.
- CONTRACTOR SHALL ENSURE INSTALLATION PERSONNEL ARE ADEQUATELY QUALIFIED AND FAMILIAR WITH THE MANUFACTURER'S INSTALLATION PROCEDURES.



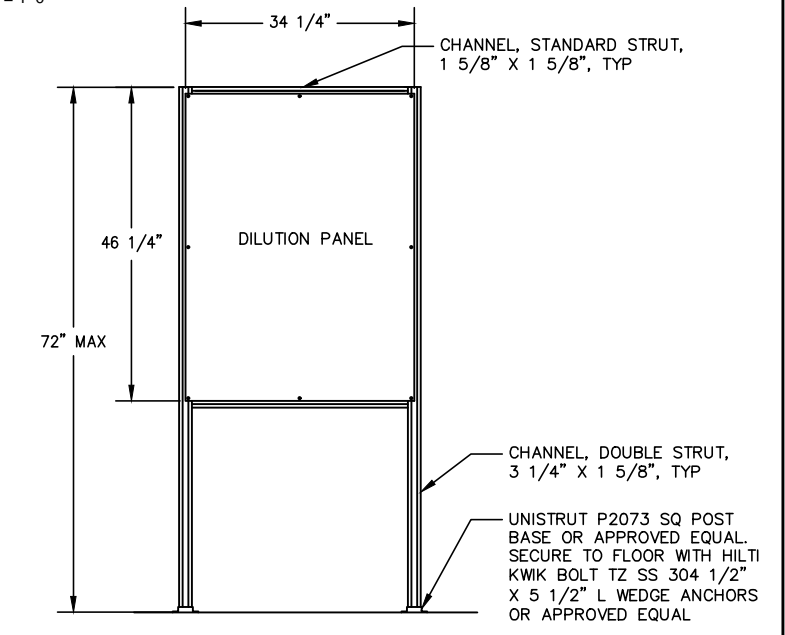
1
M5.3
1/2" = 1'0"
DILUTION BLOWER DETAIL



2
M5.3
NTS
HYDROGEN VENT SYSTEM (TYP OF 2)



3
M5.3
1 1/2" = 1'-0"
HYDROGEN VENT WALL PENETRATION (TYP OF 2)



4
M5.3
1" = 1'-0"
DILUTION PANEL MOUNTING

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LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
A	6/21	35% SCHEMATIC DESIGN	RFK	ZBB	ZBB						
B	9/21	65% DETAILED DESIGN	RFK	ZBB	ZBB						
C	10/21	95% CONSTRUCTION DESIGN	RFK	AB	AB						
D	3/22	100% IFC	RFK	RAN	WMC						

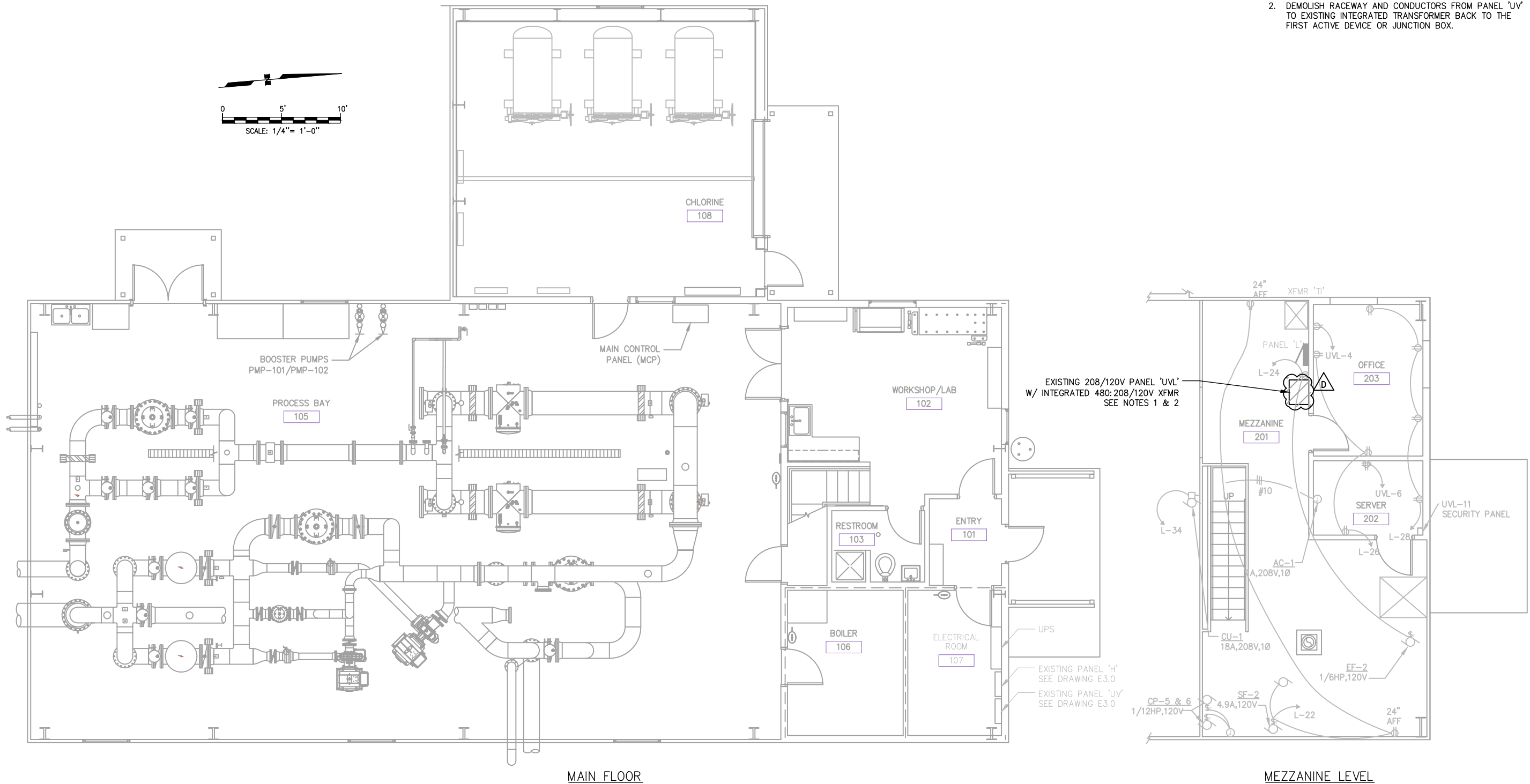
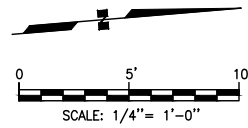
DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG MECHANICAL DETAILS											
DWN: RFK	APP: WMC	DRAWING NUMBER M5.3		REV D							
CKD: RAN	APP:	DATE: 3/25/22	SCALE: AS SHOWN	SHEET 1 OF --							

NUMBER	TITLE
	REFERENCE DRAWINGS



DEMOLITION NOTES:

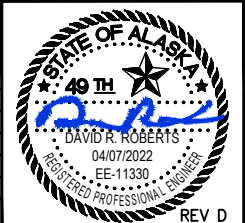
- DEMOLISH EXISTING PANEL 'UVL' AFTER INSTALLING NEW TRANSFORMER PER DRAWING E2.1. DE-TERMINATE ALL LOAD CONDUCTORS AND RETAIN IN PLACE FOR REUSE.
- DEMOLISH RACEWAY AND CONDUCTORS FROM PANEL 'UV' TO EXISTING INTEGRATED TRANSFORMER BACK TO THE FIRST ACTIVE DEVICE OR JUNCTION BOX.



1 ELECTRICAL EQUIPMENT PLAN - DEMO
1/4" = 1'-0"

DEMOLITION

P1.2	PROCESS FLOOR PLAN
NUMBER	TITLE
REFERENCE DRAWINGS	



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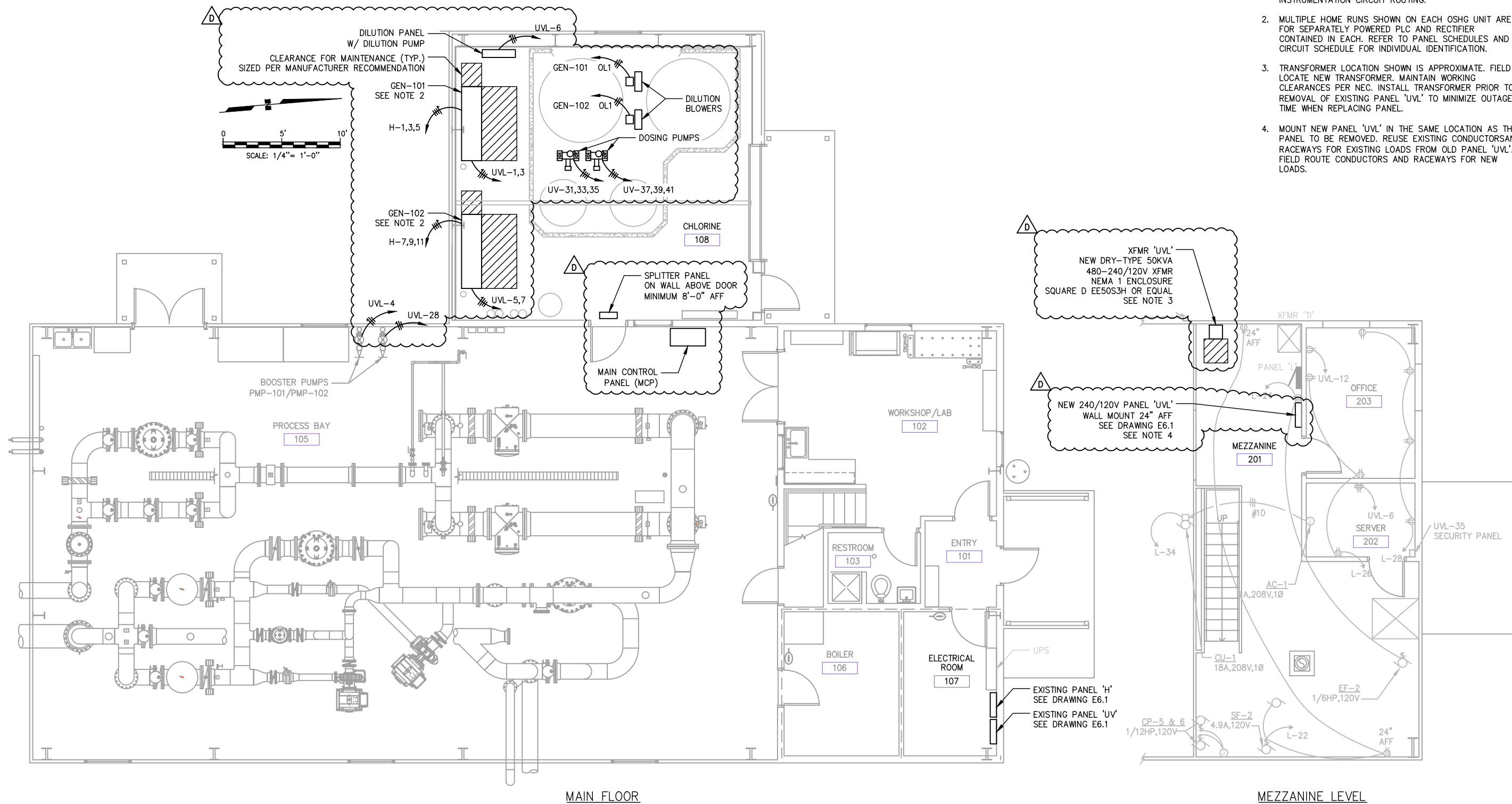
A	6/21	35% SCHEMATIC DESIGN	BPC	JDS	JDS						
B	9/21	65% SCHEMATIC DESIGN	BPC	JDS	JDS						
C	10/21	95% SCHEMATIC DESIGN	BPC	JDS	JDS						
D	3/22	100% SCHEMATIC DESIGN	BPC	DRR	DRR						
REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP

DRAWING TITLE:			
CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CHLORINATION SYSTEM ELECTRICAL PLAN			
DWN: BPC	APP: JDS	DRAWING NUMBER	REV
CKD: JDS	APP:	E1.6D	D
DATE: 6/18/21	SCALE: AS SHOWN	SHEET 1 OF 1	



NOTES:

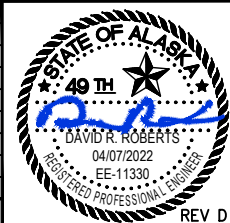
1. REFER TO DRAWING E6.2 FOR POWER AND INSTRUMENTATION CIRCUIT ROUTING.
2. MULTIPLE HOME RUNS SHOWN ON EACH OSHG UNIT ARE FOR SEPARATELY POWERED PLC AND RECTIFIER CONTAINED IN EACH. REFER TO PANEL SCHEDULES AND CIRCUIT SCHEDULE FOR INDIVIDUAL IDENTIFICATION.
3. TRANSFORMER LOCATION SHOWN IS APPROXIMATE. FIELD LOCATE NEW TRANSFORMER. MAINTAIN WORKING CLEARANCES PER NEC. INSTALL TRANSFORMER PRIOR TO REMOVAL OF EXISTING PANEL 'UVL' TO MINIMIZE OUTAGE TIME WHEN REPLACING PANEL.
4. MOUNT NEW PANEL 'UVL' IN THE SAME LOCATION AS THE PANEL TO BE REMOVED. REUSE EXISTING CONDUCTORS AND RACEWAYS FOR EXISTING LOADS FROM OLD PANEL 'UVL'. FIELD ROUTE CONDUCTORS AND RACEWAYS FOR NEW LOADS.



1 **ELECTRICAL EQUIPMENT PLAN**
 1/4" = 1'-0"

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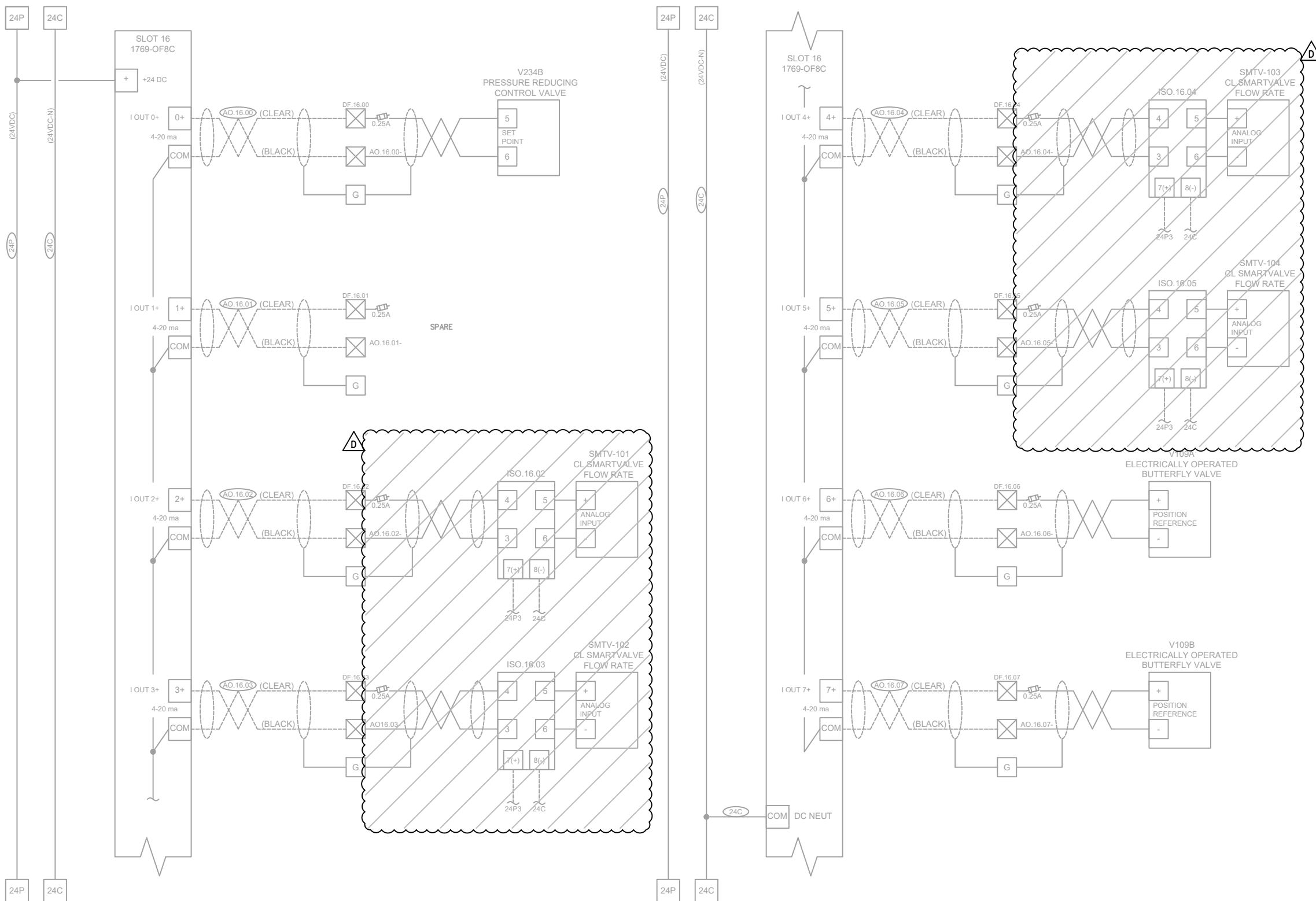
P1.2	PROCESS FLOOR PLAN
NUMBER	TITLE
REFERENCE DRAWINGS	



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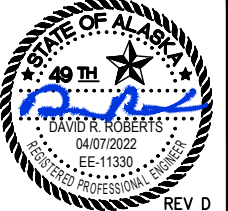
A	6/21	35% SCHEMATIC DESIGN	BPC	JDS	JDS			
B	9/21	65% SCHEMATIC DESIGN	BPC	JDS	JDS			
C	10/21	95% SCHEMATIC DESIGN	BPC	JDS	JDS			
D	3/22	100% SCHEMATIC DESIGN	BPC	DRR	DRR			
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CKD: JDS	APP:	E1.6	D	
DATE: 6/18/21	SCALE: AS SHOWN	SHEET 1 OF 1		



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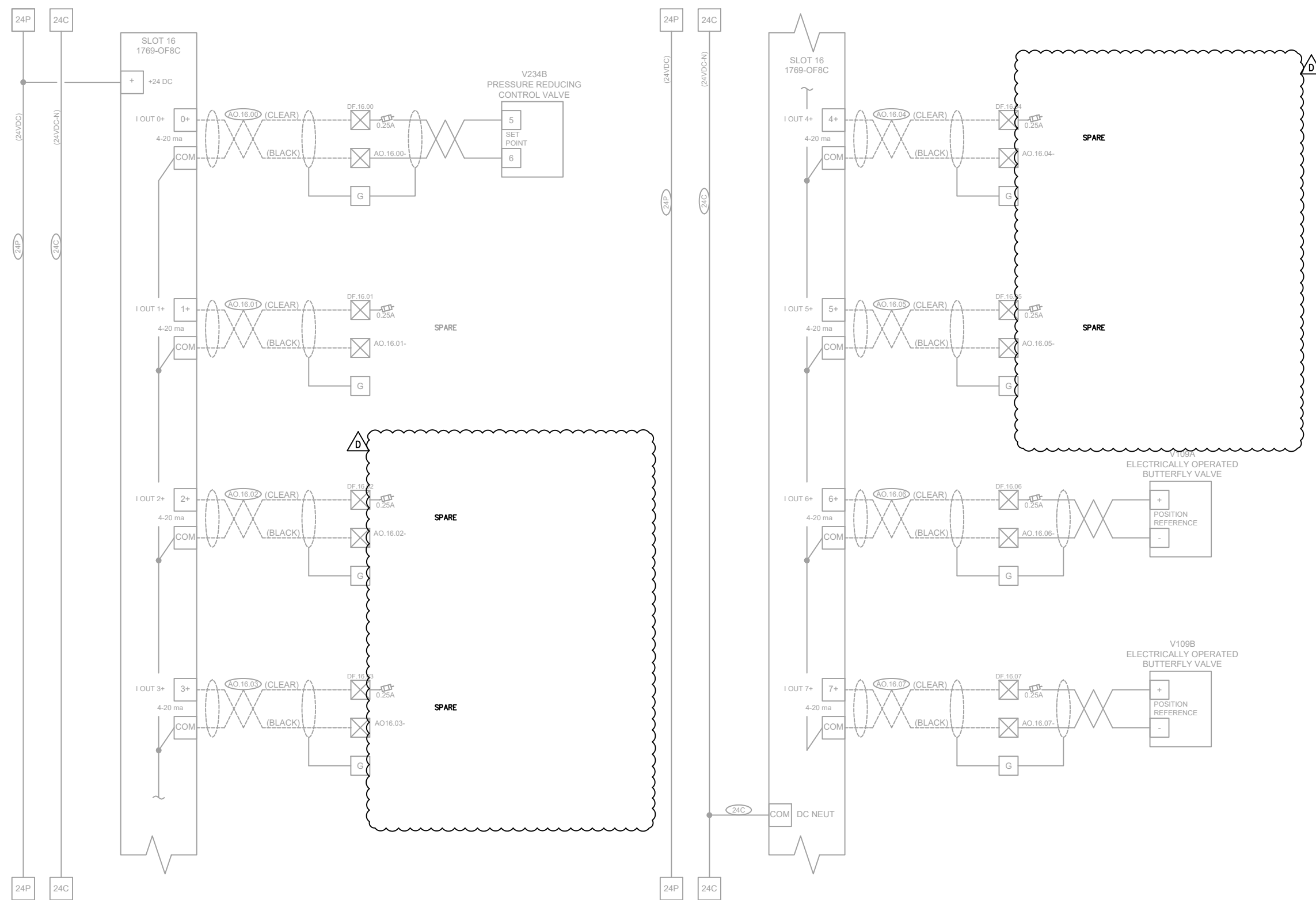
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taku Engineering
 406 W Fireweed Ln, Anchorage, AK 99503
 PHONE: 907-433-1125
 LIC.# AECL890

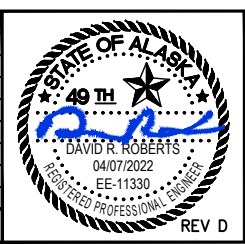
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DATE: 6/18/21	SCALE: NTS	SHEET	1 OF 1	



DSGN/CNST

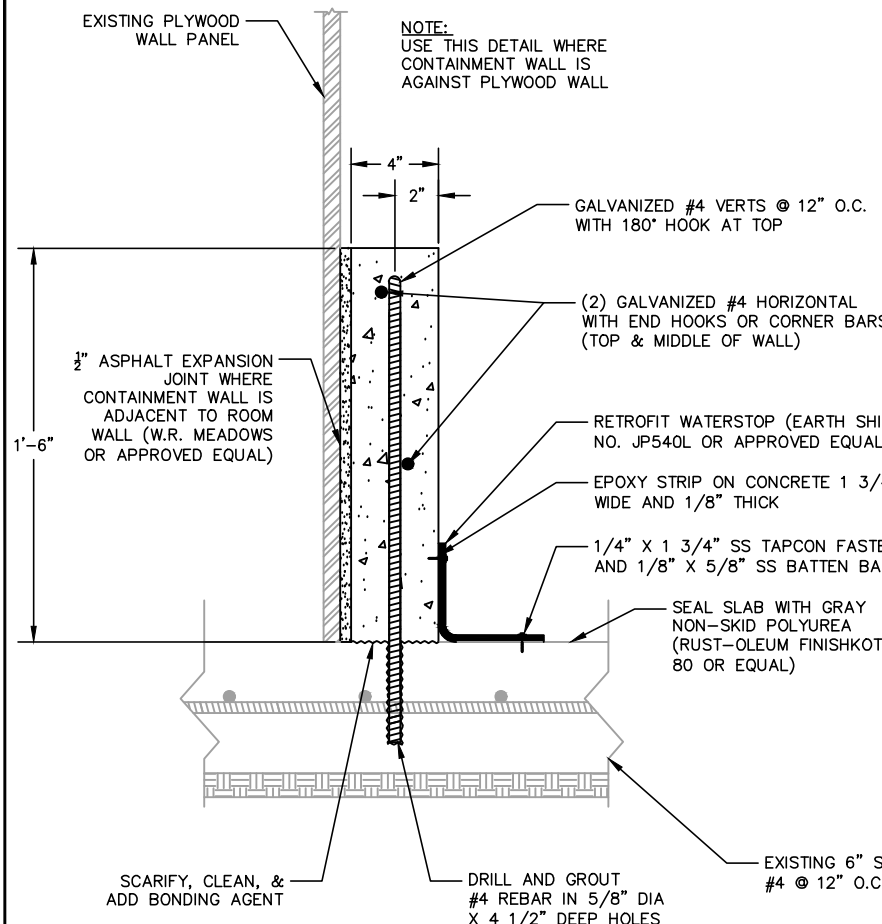
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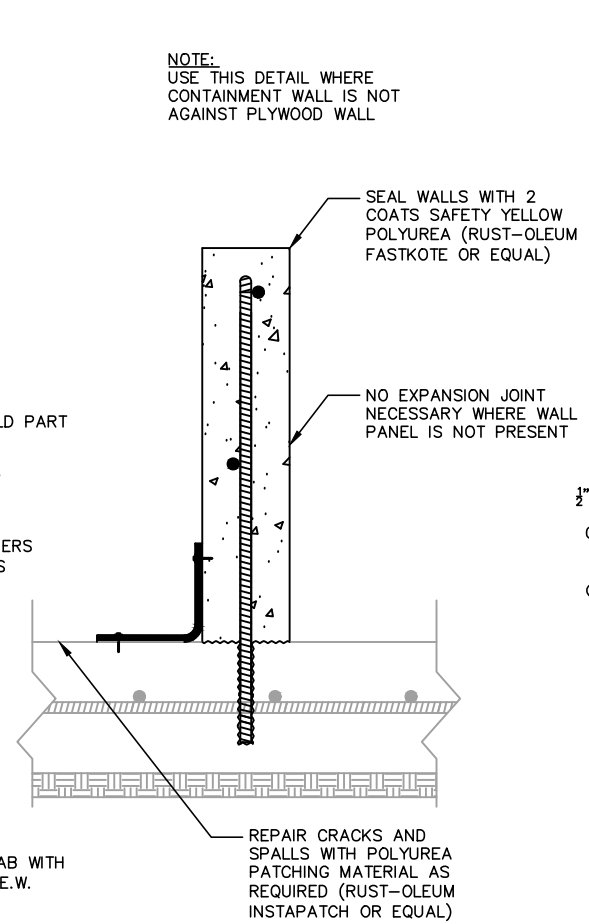
taku Engineering
 406 W Fireweed Ln, Anchorage, AK 99503
 PHONE: 907-433-1125
 LIC.# AECL890

REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP
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B	9/21	65% DESIGN	BPC	JDS	JDS						
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D	3/22	100% DESIGN	BPC	DRR	DRR						

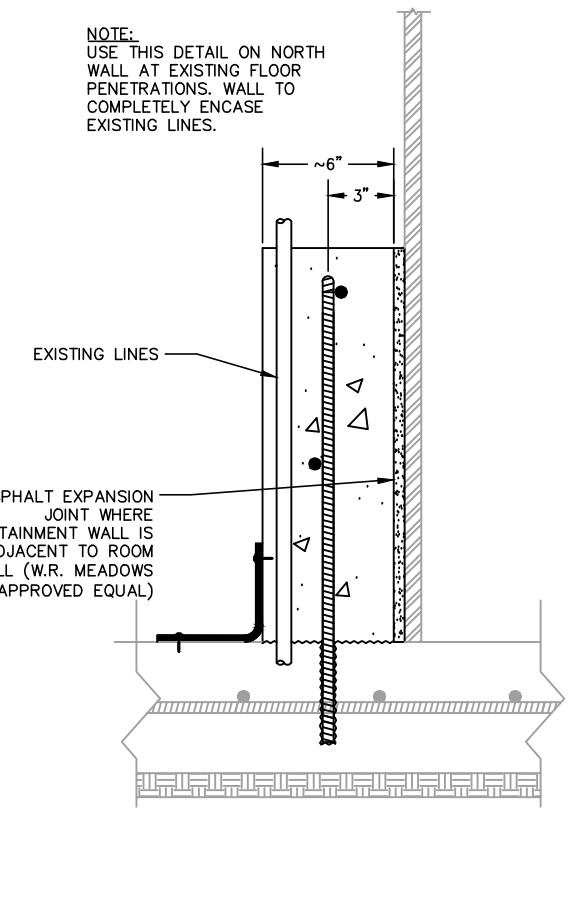
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DWN: BPC	APP: JDS	DRAWING NUMBER	REV
CKD: JDS	APP:	E7.8	D
DATE: 6/18/21	SCALE: NTS	SHEET 1 OF 1	



1 CONTAINMENT WALL - DETAIL 1
C4.0 3" = 1'-0"



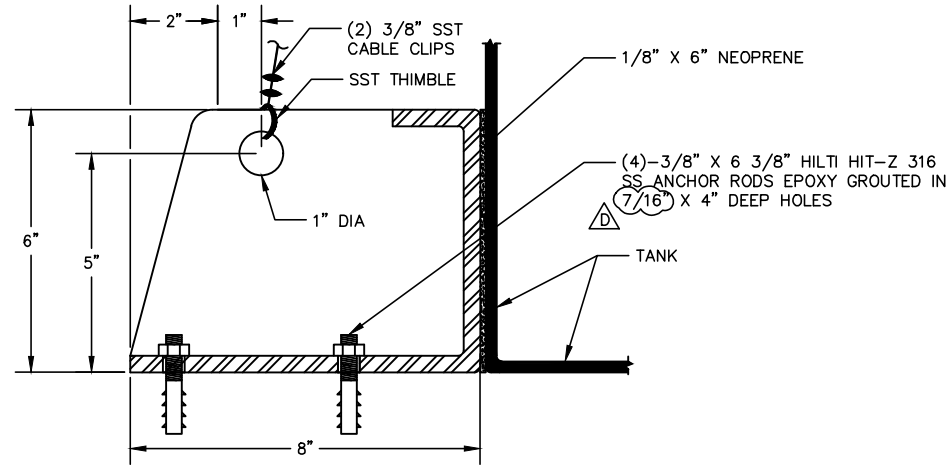
2 CONTAINMENT WALL - DETAIL 2
C4.0 3" = 1'-0"



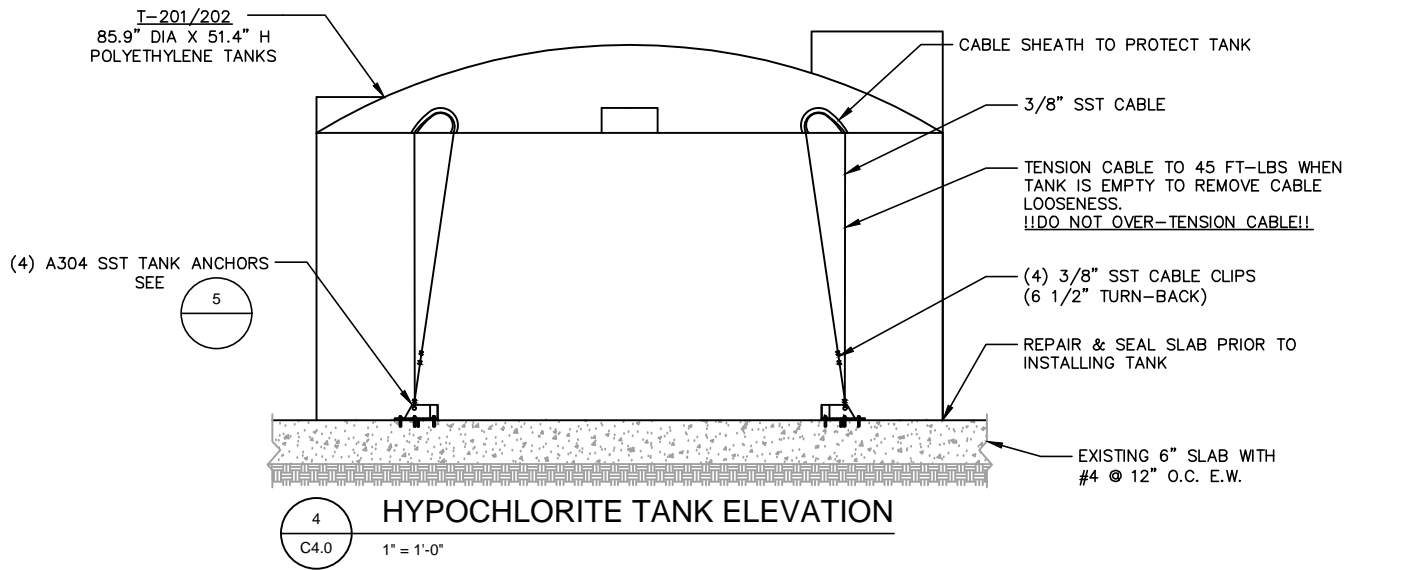
3 CONTAINMENT WALL - DETAIL 3
C4.0 3" = 1'-0"

INSTALLATION NOTES:

- 1) INSTALL TANK, ADHESIVE ANCHORS, AND SEALANTS PER MANUFACTURERS' INSTRUCTIONS
- 2) LAY OUT ALL ANCHORS REQUIRED EQUALLY SPACED, (4 ANCHORS MUST BE DIRECTLY BELOW THE TANK TIE DOWN LOCATIONS). MAKE SURE ALL ANCHORS ARE LOCATED NEXT TO THE TANK WITH THE FRONT FACE OF THE ANCHOR WELDMENT LOCATED NEXT TO THE TANK. MARK ALL THE ANCHOR BOLT LOCATIONS, REMOVE THE ANCHORS AND INSTALL THE ANCHOR BOLTS AS SPECIFIED IN THE ASSEMBLY DRAWING.
- 3) REPLACE THE ANCHORS AND SECURE THE ANCHORS TO THE CONCRETE. FASTEN THE TANK TO THE CONCRETE PAD WITH THE REQUIRED CABLE (MAKE SURE THE CABLE SHEATH IS ON THE CABLE AND LOCATED AROUND THE LUG LOCATIONS) AS SHOWN BY THE ASSEMBLY DRAWING UTILIZING THE CABLE THIMBLES AND CLAMPS PROVIDED. TENSION THE CABLE BEFORE FILLING THE TANK TO REMOVE CABLE LOOSENESS. DO NOT OVER-TENSION THE CABLES AS THIS MAY CAUSE TANK DAMAGE. THE CABLE TENSION WILL CHANGE WITH TANK LOADING AND TEMPERATURE CHANGES - DO NOT RE-TENSION THE CABLES.



5 HYPOCHLORITE TANK ANCHOR DETAILS (8 REQUIRED, 4 PER TANK)
C4.0 6" = 1'-0"



4 HYPOCHLORITE TANK ELEVATION
C4.0 1" = 1'-0"

DSGN/CNST

				406 W Fireweed Ln, Anchorage, AK 99503 PHONE: 907-433-1125 LIC.# AECL890		<table border="1"> <tr> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>DWN</th> <th>CKD</th> <th>APP</th> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> <th>DWN</th> <th>CKD</th> <th>APP</th> </tr> <tr> <td>A</td> <td>6/21</td> <td>35% SCHEMATIC DESIGN</td> <td>RFK</td> <td>CRN</td> <td>CRN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>B</td> <td>9/21</td> <td>65% DETAILED DESIGN</td> <td>RFK</td> <td>CRN</td> <td>CRN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>10/21</td> <td>95% CONSTRUCTION DESIGN</td> <td>RFK</td> <td>CRN</td> <td>CRN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>D</td> <td>3/22</td> <td>100% IFC</td> <td>RFK</td> <td>CRN</td> <td>CRN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			REV	DATE	DESCRIPTION	DWN	CKD	APP	REV	DATE	DESCRIPTION	DWN	CKD	APP	A	6/21	35% SCHEMATIC DESIGN	RFK	CRN	CRN							B	9/21	65% DETAILED DESIGN	RFK	CRN	CRN							C	10/21	95% CONSTRUCTION DESIGN	RFK	CRN	CRN							D	3/22	100% IFC	RFK	CRN	CRN							DRAWING TITLE: CITY OF UNALASKA PWTP-SODIUM HYPOCHLORITE OSG CIVIL DETAILS		
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Appendix B: Project Specifications

MECHANICAL SPECIFICATIONS

- 221113 – FACILITY WATER DISTRIBUTION PIPING
- 220523.12 – BALL VALVES FOR PROCESS PIPING
- 220523.14 – CHECK VALVES FOR PROCESS PIPING
- 221223.11 – POTABLE WATER STORAGE TANKS



These documents were prepared under the supervision of a registered Professional Engineer.

SECTION 221113 - FACILITY PIPING

1.1 SUMMARY

This specification covers the material selection and testing requirements for the following piping:

- A. Process Piping in Water Service, non-potable and potable
- B. Chlorine Treatment Piping, to include interconnecting piping for the hypochlorite skids
- C. Vent Piping
- D. Fire Water Piping

1.2 SUBMITTALS

- A. Shop Drawings/Weld Map Drawings identifying welders
- B. Welding Documentation
 - 1. PQR – Procedure Qualification Records of the weld procedure complying with ASME Section IX shall be submitted and approved by the owner for each weld type performed for this project.
 - 2. WPQ – Welder Performance Qualifications shall be submitted for each welder, performed to the PQR, and approved by the owner prior to the commencement of welding activities.
 - 3. NDE Records – Visual Examination (VT) and Radiographic Examination (RT) results
 - 4. Hydrostatic Test Results.
 - 5. Welding Inspector Qualifications – AWS CWI certification.
- C. Material Documentation
 - 1. MTR – For all stainless steel piping and fittings, material test reports shall be provided showing the materials comply with ASTM A312/A312M.

1.3 QUALITY ASSURANCE

- A. Quality Standard for Electrical Components, Devices, and Accessories: NFPA 70.
- B. Quality Standard for Water-Service Piping and Specialties for Domestic Water: NSF 61 Annex G.
- C. Inspectors/NDE personnel shall be certified per AWS QC1 and ASNT TC-1A. Radiographic (RT) film interpreters shall be level II at a minimum.

1.4 MATERIALS

- A. General

1. Piping shall be schedule 40 unless otherwise noted. Piping should be reused where possible.
2. Studs shall be A320 Gr B8M, nuts shall be A194 Gr 8M. Flange stud bolts and nuts shall not be reused.
3. All miscellaneous fasteners shall be 316 stainless steel in the treatment room.
4. Gaskets shall be SBR or EPDM, NSF 61 Certified. Gaskets shall not be reused.
5. When dissimilar metals are joined with flanges, isolation gasket kits shall be used: Pikotek VCS or equivalent.

A. Water Service

1. PIPE - Stainless steel, 304L, schedule 40, welded or seamless, ASTM A312/A312M
 - a. All pipe and fittings shall be joined by full penetration, butt welding with ends beveled prior to weld up.
2. FITTINGS - Stainless steel, 150# Raise Face Weld Neck Flanges, Schedule 40, ASTM A182 and ASME B16.5.

B. Chlorine Treatment Piping

1. Inside Chlorine Room
 - a. PIPE - Kynar/PVDF, schedule 40 and schedule 80
 - 1) Pipe, tees, and elbows fused by butt weld, IR fusion, or beadles welding. Socket shall not be allowed.
 - b. FITTINGS – Unions, valves, and flange adapters shall be butt weld, IR fusion, beadles welding, or socket connections, with bore to match piping.
2. Outside Chlorine Room
 - a. PIPE - Stainless steel, 304L, schedule 40, welded or seamless, ASTM A312/312M
 - 1) All pipe and fittings shall be joined by full penetration, butt welding with ends beveled prior to weld up, socket welding shall not be allowed.
 - b. FITTINGS – Stainless steel, 150# Raise Face Flanges, Schedule 40, ASTM A182 and ASME B16.5.
3. Interconnecting Piping for Hypochlorite Skids
 - a. PROCESS AND VENT PIPING – Clear Polyvinyl Chloride (PVC), schedule 80, ASTM D2467-04e1.
 - 1) Pipe and fittings to be joined by socket connections with PVC primer and cement. See Appendix A for maximum allowable working pressures.
 - 2) Fittings – PVC Schedule 80.
 - b. TUBING – Polyethylene (PE) instrument grade tubing – Parker E/EB Series. 0.040 in. wall thickness. Size specified by tube outside diameter. Color to suit. MAOP 125 psi.
 - 1) Fittings – Parker LIQUIfit or approved equal.

C. Vent Piping

1. PIPE - Stainless steel, 304L, schedule 40, welded or seamless, ASTM A312/312M
 - a. All pipe and fittings shall be joined by full penetration, butt welding with ends beveled prior to weld up.
2. FITTINGS - Stainless steel, 150# Raise Face Flanges, Schedule 40 Bore, ASTM A182 and ASME B16.5.

D. Fire Water Piping

1. PIPE – Galvanized carbon steel pipe, ASTM A-53, schedule 40, ends grooved.
2. FITTINGS – Grooved end fittings, Victualic or equal. Flange adapters shall be 150# raise face, schedule 40, ASME B16.5.

1.5 TESTING

A. Water Service Piping

1. All welds will be visually inspected (VT) by an inspector with an ASNT TC-1A level 1 certification
2. 10% or three welds, whichever is greater, shall be inspected by RT. Radiography shall be in accordance with API STD 1104.
 - a. Each welder shall have a minimum of one weld inspected by RT.
3. Hydrostatic Pressure Testing – Each spool, prior to be installed in service, shall undergo hydrostatic pressure testing with documented results. The test shall last not less than two hours at 150% of design pressure with chlorine-free water. The pressure shall be monitored and logged every 10 minutes.

B. Chlorine Treatment Piping – Kynar/PVDF, PVC, Polyethylene

1. All connections will be visually inspected by the owner or owner’s rep for approval prior to entering service.
2. Leak Testing – The piping shall be tested with water at 120% of design pressure for a minimum of two hours. Each connection will be snopped with soapy water to investigate for leaks. The pressure shall be monitored and logged every 10 minutes.

C. Chlorine Treatment Piping - Stainless Piping

1. All welds will be visually inspected (VT) by an inspector with an ASNT TC-1A level 1 certification
2. 10% or three welds, whichever is greater, shall be inspected by RT. Radiography shall be in accordance with API STD 1104.
 - a. Each welder shall have a minimum of one weld inspected by RT.
3. Hydrostatic Pressure Testing – Each spool, prior to be installed in service, shall undergo hydrostatic pressure testing with documented results. The test shall last not less than two hours at 150% of design pressure with chlorine-free water. The pressure shall be monitored and logged every 10 minutes.

D. Vent Piping

1. All welds or connections shall be visually inspected (VT) and approved by the owner prior to entering service.

E. Fire Water Piping

1. Hydrostatic Pressure Testing – Each spool, prior to be installed in service, shall undergo hydrostatic pressure testing with documented results. The test shall last not less than two hours at 150% of design pressure with chlorine-free water. The pressure shall be monitored and logged every 10 minutes.

APPENDIX A. Maximum Allowable Working Pressures for PVC Piping (from The Engineering Toolbox)

PVC				
Nominal Pipe Size (inches)	Required Minimum Burst Pressure (psi)		Maximum Operating Pressure (psi)	
	Sch 40	Sch 80	Sch 40	Sch 80
	1/2	1910	2720	358
3/4	1540	2200	289	413
1	1440	2020	270	378
1 1/4	1180	1660	221	312
1 1/2	1060	1510	198	282
2	890	1290	166	243
2 1/2	870	1360	182	255
3	840	1200	158	225
4	710	1110	133	194
5	620	1040	117	173
6	560	930	106	167
8	500	890	93	148
10	450	790	84	140
12	420	600	79	137

END OF SECTION 221113

SECTION 220523.12 - BALL VALVES FOR WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyvinyl Chloride (PVC) ball valves.

1.2 DEFINITIONS

- A. CWP: Cold working pressure
- B. RPTFE: Reinforced polytetrafluoroethylene
- C. WOG: Water, oil, gas.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion
2. Protect threads, flange faces, and soldered ends
3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of valve from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- B. Valve Sizes: Same as upstream piping unless otherwise indicated.
- C. Valve Actuator Type:
 - 1. Gear Actuator: For quarter-turn valves NPS 6 and larger
 - 2. Hand Lever: For quarter-turn valves smaller than NPS 6.

2.3 PVC BALL VALVES

- A. PE Union Ball Valves:
 - 1. Standards: MSS SP-122, ASTM D-1785, ASTM F-1970
 - 2. Pressure Rating and Temperature: 200 PSI at 75°F
 - 3. Body Material: PVC
 - 4. Body Design: Union type
 - 5. End Connections for Valves up to NPS 2-1/2: Butt-fusion or socket weld
 - 6. Ball: PE; full port
 - 7. Seals: PTFE or EPDM-rubber O-rings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

- E. Do not attempt to repair defective valves; replace with new valves. Remove defective valves from site.

3.2 INSTALLATION OF VALVES

- A. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.
- B. Provide support to piping adjacent to valves such that no force is imposed upon valves.
- C. Locate valves for easy access.
- D. For valves in horizontal piping, install valves with stem at or above center of pipe.
- E. Install valves in position to allow full valve actuation movement.
- F. Install valve tags.
- G. Adhere to manufacturer's written installation instructions.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, provide the same types of valves with higher CWP ratings.

END OF SECTION 220523.12

SECTION 220523.14 - CHECK VALVES FOR WATER DISRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyvinyl Chloride ball check valves.

1.2 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene-diene terpolymer.
- C. NBR: Nitrile butadiene rubber (also known as Buna-N).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, press connections, and weld ends.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use stems or other components as lifting or rigging points unless specifically indicated for this purpose in manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of valve from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Code Compliance:
 - 1. ASTM D-1784
 - 2. ASTM F-1970
 - 3. ASME B31.9 for building services piping valves.
- B. AWWA Compliance: Comply with AWWA C606 for groove-end connections.
- C. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- D. Valve Sizes: Same as upstream piping unless otherwise indicated.
- E. Valve Bypass and Drain Connections: MSS SP-45.

2.3 POLYVINYL CHLORIDE BALL CHECK VALVES

- A. Description:
 - 1. Pressure Rating and Temperature: 200 psi at 75°F.
 - 2. Body Material: PVC.
 - 3. Body Design: Union-type ball check.
 - 4. End Connections for Valves up to NPS 2-1/2: Butt-fusion or socket
 - 5. Ball: PE.
 - 6. Seals: EPDM- or FKM-rubber O-rings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.

- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Examine press fittings to verify they have been properly pressed.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION OF VALVES

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Provide support of piping adjacent to valves such that no force is imposed upon valves.
- C. Locate valves for easy access and where not blocked by equipment, other piping, or building components.
- D. Install valves so that stems are horizontal or slope upward from centerline of pipe.
- E. Install valves in position that does not project into aisles or block access to other equipment.
- F. Install valves in position to allow full stem and manual operator movement.
- G. Verify that joints of each valve have been properly installed and sealed to assure there is no leakage or damage.
- H. Check Valves: Install check valves for proper direction of flow.
 - 1. With flow arrow on valve in the same direction of liquid flow.
 - 2. In horizontal or vertical position, between flanges.
- I. Install valve tags.
- J. Adhere to manufacturer's installation instructions.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

END OF SECTION 220523

SECTION 221223.11 - POTABLE-WATER STORAGE TANKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel, precharged, potable-water storage tanks.

1.3 DEFINITIONS

- A. HDPE: High-density polyethylene plastic.
- B. LDPE: Low-density polyethylene plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Steel water tanks shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 .
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water storage tanks.
 - 2. Include rated capacities, operating characteristics, and furnished specialties and accessories.

1.6 INFORMATIONAL SUBMITTALS

1.7 QUALITY ASSURANCE

- A. ASME Compliance for Steel Tanks: Fabricate and label steel, ASME-code, potable-water storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 1.
- B. Comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects," for potable-water storage tanks. Include appropriate NSF marking.

1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 STEEL, PRECHARGED, POTABLE-WATER STORAGE TANKS

- A. Steel, Precharged, Diaphragm, Water Storage Tanks:
 - 1. Description: Steel, vertical, pressured-rated tank with cylindrical sidewalls and with air-charging valve and air precharge.
 - 2. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
 - 3. Operation: Factory-installed, butyl-rubber diaphragm.
- B. Steel, Precharged, Bladder, Water Storage Tanks:
 - 1. Description: Steel, vertical, pressured-rated tank with cylindrical sidewalls and with air-charging valve and air precharge.
 - 2. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
 - 3. Operation: Factory-installed, butyl-rubber bladder.
- C. Construction: ASME code, steel, constructed with nontoxic welded joints, for 150-psig working pressure.
- D. Tappings: Factory-fabricated steel, welded to tank before testing and labeling.
 - 1. NPS 2 and Smaller: ASME B1.20.1, with female thread.
 - 2. NPS 2-1/2 and Larger: ASME B16.5, flanged.
- E. Specialties and Accessories: Include tappings in tank and the following:
 - 1. Pressure gage.

- F. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank before testing and labeling.
- G. Tank Interior Finish: Materials and thicknesses complying with NSF 61 Annex G barrier materials for potable-water tank linings. Extend finish into and through tank fittings and outlets.
- H. Exterior Coating: Manufacturer's standard enamel paint.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install water storage tanks on concrete bases, level and plumb, firmly anchored. Arrange so devices needing servicing are accessible.
 - 1. Install horizontal tanks on fabricated steel supports and saddles.
- B. Anchor tank supports and tanks to substrate.
 - 1. Use steel or FRP straps over or around plastic tanks.
- C. Install tank seismic restraints.
- D. Install thermometers and pressure gages on water storage tanks and piping if indicated.
- E. Install the following devices on tanks where indicated:
 - 1. Pressure relief valves.
 - 2. Temperature and pressure relief valves.
 - 3. Vacuum relief valves.
 - 4. Connections to accessories.
- F. After installing tanks with factory finish, inspect finishes and repair damages to finishes.

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to potable-water storage tanks to allow service and maintenance.
- C. Connect water piping to water storage tanks with unions or flanges and with shutoff valves. Connect tank drains with shutoff valves and discharge over closest floor drains.
 - 1. General-duty valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping"
 - a. Valves NPS 2 and Smaller: Gate or ball.
 - b. Valves NPS 2-1/2 and Larger: Gate or butterfly.

- c. Drain Valves: NPS 3/4 gate or ball valve. Include outlet with, or nipple in outlet with, ASME B1.20.7, 3/4-11.5NH thread for garden-hose service, threaded cap, and chain.
2. Water Piping Connections: Make connections to dissimilar metals with dielectric fittings. Dielectric fittings are specified in Section 221116 "Domestic Water Piping."
3. Connect air piping to hydropneumatic tanks with unions or flanges and gate or ball valves. Make connections to dissimilar metals with dielectric fittings.

3.3 FIELD QUALITY CONTROL

- A. Perform the following final checks before filling:
 1. Verify that air precharge in precharged tanks is correct.
 2. Test operation of tank accessories and devices.
 3. Verify that pressure relief valves have correct setting.
 - a. Manually operate pressure relief valves.
 - b. Adjust pressure settings.
 4. Verify that vacuum relief valves are correct size.
 - a. Manually operate vacuum relief valves.
 - b. Adjust vacuum settings.
- B. Filling Procedures: Follow manufacturer's written procedures. Fill tanks with water to operating level.

3.4 CLEANING

- A. Clean and disinfect potable-water storage tanks.
- B. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed, use procedure described in AWWA C652 or as described below:
 1. Purge water storage tanks with potable water.
 2. Disinfect tanks by one of the following methods:
 - a. Fill tanks with water-chlorine solution containing at least 50 ppm of chlorine. Isolate tanks and allow to stand for 24 hours.
 - b. Fill tanks with water-chlorine solution containing at least 200 ppm of chlorine. Isolate tanks and allow to stand for three hours.
 3. Flush tanks, after required standing time, with clean, potable water until chlorine is not present in water coming from tank.
 4. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination made by authorities having jurisdiction shows evidence of contamination.
- C. Prepare written reports for purging and disinfecting activities.

END OF SECTION 221223.11

ELECTRICAL SPECIFICATIONS

262416 - PANELBOARDS

262213 – LOW-VOLTAGE DISTRIBUTION TRANSFORMERS



These documents were prepared under the supervision of a registered Professional Engineer.

SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution, dry-type transformers with nominal primary and secondary rating of 600 V and less, with capacities up to 1500 kVA.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
 - b. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.

1.3 INFORMATIONAL SUBMITTALS

- ##### A. Source quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

- ##### A. Inspection: On receipt, inspect for and note shipping damage to packaging and transformer.

1. If manufacturer packaging is removed for inspection, and transformer will be stored after inspection, re-package transformer using original or new packaging materials that provide protection equivalent to manufacturer's packaging.

- ##### B. Storage: Store in warm, dry, and temperature-stable location in original shipping packaging.

- ##### C. Temporary Heating: Apply temporary heat in accordance with manufacturer's published instructions within enclosure of ventilated-type units, throughout periods during which equipment is not energized and when transformer is not in space that is continuously under normal control of temperature and humidity.

- ##### D. Handling: Follow manufacturer's instructions for lifting and transporting transformers.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

- A. Basis for Pricing: Hammond Sentinel SG3A0045KBOR.
- B. Description: floor mount 480V-240/120V 1-phase transformer with NEMA 3R enclosure.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain each type of transformer from single source from single manufacturer.

2.3 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60 Hz service.
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- C. Transformers Rated 15 kVA and Larger:
 - 1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
 - 2. Marked as compliant with DOE 2016 efficiency levels by qualified electrical testing laboratory recognized by authorities having jurisdiction.
- D. Shipping Restraints: Paint or otherwise color-code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside transformer enclosure.

2.4 DISTRIBUTION TRANSFORMERS

- A. Comply with NFPA 70.
- B. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
 - 1. One leg per phase.
 - 2. Core volume must allow efficient transformer operation at 10 percent above nominal tap voltage.
 - 3. Grounded to enclosure.
- C. Coils: Continuous windings without splices except for taps.
 - 1. Coil Material: Copper.
 - 2. Internal Coil Connections: Brazed or pressure type.
 - 3. Terminal Connections: Bolted.

- D. Enclosure: Totally enclosed, nonventilated.
 - 1. Core and coil must be encapsulated within resin compound to seal out moisture and air.
 - 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
 - 3. Wiring Compartment: Sized for conduit entry and wiring installation.
 - 4. Environmental Protection:
 - a. Outdoor: UL 50E, Type 3R.
 - 5. Finish Color: ANSI 61 Grey.
- E. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with maximum of 150 deg C rise above 40 deg C ambient temperature.
- F. Grounding: Provide ground-bar kit or ground bar installed on inside of transformer enclosure.
- G. K-Factor Rating: Transformers indicated to be K-factor rated must comply with UL 1561 requirements for nonsinusoidal load current-handling capability to degree defined by designated K-factor.
 - 1. Unit may not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor, without exceeding indicated insulation class in 40 deg C maximum ambient and 24-hour average ambient of 30 deg C.
 - 2. Indicate value of K-factor on transformer nameplate.
 - 3. Unit must comply with requirements of DOE 2016 efficiency levels when tested in accordance with NEMA TP 2 with K-factor equal to one.
- H. Electrostatic Shielding: Windings must have independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.
 - 1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
 - 2. Include special terminal for grounding shield.
- I. Neutral: Rated 200 percent of full load current for K-factor-rated transformers.
- J. Low-Sound-Level Requirements: Maximum sound levels when factory tested in accordance with IEEE C57.12.91, as follows:
 - 1. 30.01 to 50.00 kVA: 45 dB(A-weighted) for K-factors of 1, 4, and 9 .

2.5 IDENTIFICATION

- A. Nameplates:
 - 1. Self-adhesive label for distribution transformers. Self-adhesive labels are specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for transformers.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's published instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance must be 5 Ω at location of transformer.
- E. Environment: Enclosures must be rated for environment in which they are located.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install transformers level and plumb on concrete pad.
- B. Secure covers to enclosure and tighten bolts to manufacturer-recommended torques to reduce noise generation.
- C. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

- A. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Tighten electrical connectors and terminals in accordance with manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- D. Provide flexible connections at conduit and conductor terminations and supports to eliminate sound and vibration transmission to building structure.

3.4 ADJUSTING

- A. Record transformer secondary voltage at unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare written report recording output voltages and tap settings.

3.5 MAINTENANCE

- A. Infrared Scanning: Two months after Substantial Completion, perform infrared scan of transformer connections.
 - 1. Use infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
 - 2. Perform two follow-up infrared scans of transformers, one at four months and another at 11 months after Substantial Completion.
 - 3. Prepare certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial actions taken, and scanning observations after remedial action.

END OF SECTION 262213

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power panelboards.

1.2 DEFINITIONS

A. GFEP: Ground-fault equipment protection.

B. MCCB: Molded-case circuit breaker.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Power panelboards.
2. Disconnecting and overcurrent protective devices.
3. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
4. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

1.6 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation in accordance with NEMA PB 1.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Surface-mounted, dead-front cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Locations: UL 50E, Type 12
 - 2. Height: 7 ft maximum.
 - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims must cover live parts and may have no exposed hardware.
 - 4. Finishes:
 - a. Panels and Trim: Steel factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Same finish as panels and trim.
- F. Incoming Mains:
 - 1. Location: Top.
 - 2. Main Breaker: Main lug interiors up to 400 A must be field convertible to main breaker.
- G. Phase, Neutral, and Ground Buses:
 - 1. Material: Tin-plated aluminum.
 - a. Plating must run entire length of bus.
 - b. Bus must be fully rated for entire length.
 - 2. Interiors must be factory assembled into unit. Replacing switching and protective devices may not disturb adjacent units or require removing main bus connectors.
 - 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
 - 4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure.
 - 5. Do not mount neutral bus in gutter.
- H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum.
 2. Terminations must allow use of 75 deg C rated conductors without derating.
 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
 4. Main and Neutral Lugs: Compression type, with lug on neutral bar for each pole in panelboard.
 5. Ground Lugs and Bus-Configured Terminators: type, with lug on bar for each pole in panelboard.
 6. Feed-Through Lugs: type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 7. Subfeed (Double) Lugs: type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 8. Gutter-Tap Lugs: type suitable for use with conductor material and with matching insulating covers. Locate at same end of bus as incoming lugs or main device.
- I. Quality-Control Label: Panelboards or load centers must be labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers must have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- J. Panelboard Short-Circuit Current Rating:
1. Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by qualified electrical testing laboratory recognized by authorities having jurisdiction. Include label or manual with size and type of allowable upstream and branch devices listed and labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for series-connected short-circuit rating.
 - a. Panelboards rated 240 V or less must have short-circuit ratings as shown on Drawings, but not less than 10 000 A(rms) symmetrical.
- K. Surge Suppression: Factory installed as integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

2.2 POWER PANELBOARDS

- A. Listing Criteria: NEMA PB 1, distribution type.
- B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
1. For doors more than 36 inches high, provide two latches, keyed alike.
- C. Mains: Circuit breaker
- D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards in accordance with NEMA PB 1.1.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's published instructions.
- B. Reference Standards:
 - 1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA PB 1.1.
 - 2. Consult Architect for resolution of conflicting requirements.
- C. Special Techniques:
 - 1. Equipment Mounting:
 - a. Attach panelboard to vertical finished or structural surface behind panelboard.
 - 2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
 - 3. Mount panelboard cabinet plumb and rigid without distortion of box.
 - 4. Install overcurrent protective devices and controllers not already factory installed.
 - a. Set field-adjustable, circuit-breaker trip ranges.
 - b. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver in accordance with manufacturer's published instructions.
 - 5. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
 - 6. Install filler plates in unused spaces.
 - 7. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.3 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.4 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature in accordance with manufacturer's published instructions.

END OF SECTION 262416



Appendix C: Line List

Line Number	Size (inch)	Spec	Service	Origin	Termination	Working Pressure PSI	P&ID Sheet	COMMENTS
001	1	P80	RW	INLET WATER SUPPLY	INLET WATER FILTER	50-80	P1.5A / P1.5 Sh.1	
002	1	P80	CW	WATER SOFTENER 1	010	50-80	P1.5A / P1.5 Sh.1	
003	1	P80	CW	WATER SOFTENER 2	011	50-80	P1.5A / P1.5 Sh.1	
004	1	P80	RW	INLET WATER SUPPLY	DILUTION PANEL	50-80	P1.5A / P1.5 Sh.1	
005	3/8	PE	BR	T-002	WATER SOFTENER 2	50-80	P1.5A / P1.5 Sh.1	
006	3/8	PE	BR	T-001	WATER SOFTENER 1	50-80	P1.5A / P1.5 Sh.1	
007	1	P80	BR	T-002	008	50-80	P1.5A / P1.5 Sh.1	
008	1/2	PE	BR	007	GEN-102	50-80	P1.5A / P1.5 Sh.1 and P1.5 Sh. 2	
009	1/2	PE	BR	041	GEN-101	50-80	P1.5A / P1.5 Sh.1 and P1.5A Sh. 2	
010	1/2	PE	CW	002	GEN-101	50-80	P1.5A / P1.5 Sh.1 and P1.5A Sh. 2	
011	1/2	PE	CW	003	GEN-102	50-80	P1.5A / P1.5 Sh.1 and P1.5 Sh. 2	
012	1	P80	CW	002	T-001	50-80	P1.5A / P1.5 Sh.1	
013	1	P80	CW	003	T-002	50-80	P1.5A / P1.5 Sh.1	
014	8	P80	V	T-001	DUST BAG	ATM	P1.5A / P1.5 Sh.1	
015	8	P80	V	T-002	DUST BAG	ATM	P1.5A / P1.5 Sh.1	
016	1/2	PE	CW	WATER SOFTENER 1	DRAIN	ATM	P1.5A / P1.5 Sh.1	
017	1/2	PE	CW	WATER SOFTENER 2	DRAIN	ATM	P1.5A / P1.5 Sh.1	
018	1/4	PE	HC	GEN-101	DRAIN	ATM	P1.5A Sh. 2	
019	2	P80	V	GEN-101	T-201 VENT	ATM	P1.5A Sh. 2	
020	2	P80	HC	GEN-101	T-201	50-80	P1.5A Sh. 2	
021	2	P80	V	GEN-102	T-202 VENT	ATM	P1.5A Sh. 2	HYDROGEN VENT
022	2	P80	HC	GEN-102	T-202	50-80	P1.5A Sh. 2	
023	1	P80	HC	DILUTION PANEL	T-201, T-202	50-80	P1.5A / P1.5 Sh.3	
024	1	P80	HC	BULK HCL DRUM	DILUTION PANEL	ATM	P1.5A / P1.5 Sh.3	
025	4	P80	V	T-201	TO ATMOSPHERE	ATM	P1.5A / P1.5 Sh.3	VENT ABOVE ROOFLINE
026	4	P80	V	BLR-201	T-201	ATM	P1.5A / P1.5 Sh.3	EXHAUST AIR
027	1	P80	HC	T-201	028, 034	3	P1.5A / P1.5 Sh.3	T-201 OUTLET TO TEE
028	1	P80	HC	PSV-001	027, 034	50	P1.5A / P1.5 Sh.3	PSV OUTLET
029	1	P80	HC	P-301	HYPOCHORITE OUTLET	50-80	P1.5A / P1.5 Sh.3	
030	1	P80	HC	P-302	029, HYPOCHLORITE OUTLET	50-80	P1.5A / P1.5 Sh.3	
031	1	P80	HC	T-202	HYPOCHORITE OUTLET	3	P1.5A / P1.5 Sh.3	
032	1	P80	HC	PSV-002	031, 033	50	P1.5A / P1.5 Sh.3	PSV OUTLET
033	1	P80	HC	031	P-302	3	P1.5A / P1.5 Sh.3	TO PUMP SUCTION
034	1	P80	HC	027	P-301	3	P1.5A / P1.5 Sh.3	TO PUMP SUCTION
035	4	P80	V	T-202	VENT TO ROOF	ATM	P1.5A / P1.5 Sh.3	EXHAUST AIR
036	4	P80	V	BLR-202	T-202	ATM	P1.5A / P1.5 Sh.3	
037	2	P80	HC	T-201	DRAIN	ATM	P1.5A / P1.5 Sh.3	OVERFLOW FROM T-201
038	2	P80	HC	T-202	DRAIN	ATM	P1.5A / P1.5 Sh.3	OVERFLOW FROM T-202
039	1/4	PE	HC	GEN-102	DRAIN	ATM	P1.5A Sh. 2	DRAIN FROM GEN 102
040	1-1/4	P80	HC	P-301, 302	OUTLET	15-20	P1.5A / P1.5 Sh.3	
041	1	P80	BR	T-001	009	50-80	P1.5A / P1.5 Sh.1	

Service Codes

RW - Raw Water
CW - Conditioned Water
HC - Hypochlorite

BR - Brine
V - Vent
H - Hydrogen

Specification Codes

P40 - PVC SCH 40, Clear
PE - Linear Low Density Polyethylene - Parker E/EB series - 0.040" wall. Size based on Outer Diameter. Color per Client choice.