CONTRACT DOCUMENTS AND SPECIFICATIONS FOR CONSTRUCTION OF

# CITY OF UNALASKA ROBERT STORRS HARBOR C FLOAT REPLACEMENT

DPW Project No. 12601

Prepared for:

CITY OF UNALASKA P.O. Box 610 Unalaska, Alaska 99685

(907) 581-1251



Prepared by:

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ENGINEERS, INC.

September 2014

# DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

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# **END OF SECTION**

#### SECTION 00030 - INVITATION TO BID

Sealed bids for the City of Unalaska **ROBERT STORRS HARBOR – C FLOAT REPLACEMENT**, addressed to the City of Unalaska, will be received at the following locations:

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

PND Engineers, Inc. 1506 West 36<sup>th</sup> Avenue Anchorage Alaska 99503 Phone: 907-561-1011 Fax: 907-563-4220

Other pertinent bidding/project information is listed below:

Design Engineers – PND Engineers, Inc. and Morris Engineering Group, LLC.

**Pre-Bid Meeting** – Monday, October 6<sup>th</sup>, 2014, 2:00 pm (AK), at PND Engineers, Inc. office in Juneau, Alaska and City Public Works office in Unalaska. Prospective bidders wishing to participate via teleconference may call the following number: Phone: 1-800-315-6338 with access code 132021#

**Bids Due** – Tuesday, October 21<sup>st</sup>, 2014, 2:00 pm (AK). Bid opening may be monitored via teleconference by calling the following number: Phone: 1-800-315-6338 with access code 132021#

Sealed bids will be received until the local time (Alaska) and date specified above and then will be opened and read. Any bids received after the time and date specified will not be considered.

Substantial Completion Date – August 17<sup>th</sup>, 2015

**Final Completion Date** – August 31<sup>st</sup>, 2015

#### Work Scope:

The work will include, but not be limited to, furnishing all labor, tools, equipment, and materials, and performing all operations in connection with the City of Unalaska **ROBERT STORRS HARBOR – C FLOAT REPLACEMENT**.

- **Base Bid:** The WORK generally consists of various quantities of mobilization, demobilization, demolition, disposal, salvage, construction surveying, uplands improvements, armor rock slope protection, cast-in-place concrete abutment, aluminum gangway, steel pipe pontoon floats, steel pipe mooring piles, domestic water system, dry fire line, floatation billets, life ring and fire extinguisher cabinets, hose mounts, electrical system, electrical support assemblies, signage assemblies and other miscellaneous related improvements and appurtenances.
- Additive Alternate A: The WORK generally consists of various quantities of mobilization, demobilization, installation of Owner supplied anodes, and field testing for continuity and potential readings.
- Additive Alternate B: The WORK consists of furnishing pile anodes as indicated on the Plans.

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#### **Engineer's Estimate:**

The Engineers Estimate is within a US DOT Federal Highway Administration Project Classification F. <u>http://www.fhwa.dot.gov/programadmin/contracts/ta508046.cfm</u>

<b>Project Classification</b>	Project Cost
А	\$0 - \$100,000
В	\$100,000 - \$250,000
С	\$250,000 - \$500,000
D	\$500,000 - \$1,000,000
Е	\$1,000,000 - \$2,500,000
F	\$2,500,000 - \$5,000,000
G	\$5,000,000 - \$10,000,000
Н	\$10,000,000 - \$15,000,000
Ι	\$15,000,000 - \$25,000,000
J	\$25,000,000 - greater

# **Project Location:**

The site of the WORK is located at Robert Storrs Harbor, in Dutch Harbor, Alaska.

# **Prevailing Wage Requirements:**

Contractor must pay minimum rates of pay as established by the State of Alaska Department of Labor, under AS 36.05.010 and AS 36.10. A copy of the rates effective for the project is included in the Contract Documents.

#### **Bid Requirements:**

Each Bid must be submitted on the prescribed form and accompanied by bid security as prescribed in the Instructions to Bidders, payable to the City of Unalaska, Alaska, in an amount not less than 5 (five) percent of the Total Bid amount. The successful Bidder will be required to furnish the necessary additional bond(s) for the faithful performance of the Contract, as prescribed in the Bidding/Contract Forms.

A site visit by all Bidders is strongly recommended.

The successful Bidder shall hold such Contractors and Business Licenses as required by State Statutes and City of Unalaska Municipal Code Section 9.30.010. 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.

#### SECTION 00030 - INVITATION TO BID

A digital copy of the Bidding Documents may be obtained free of charge from the City of Unalaska website at <u>http://www.ci.unalaska.ak.us/rfps</u>. Interested bidders should email or fax their contact information on official letterhead to the City of Unalaska c/o Tom Cohenour at <u>tcohenour@ci.unalaska.ak.us</u>, Fax (907) 581-2187, or Phone (907) 581-1260. Contact information should include company name, company address, contact name, phone, fax, and email address.

Technical questions shall be directed in writing to John DeMuth (PND Engineers, Inc.) at the address shown below:

PND Engineers, Inc.
9360 Glacier Hwy, Suite #100
Juneau, AK 99801
Phone: (907) 586-2093 Fax: (907) 586-2099
Attn: John DeMuth, P.E., S.E.
Email: jdemuth@pndengineers.com
Cc: rlund@ci.unalaska.ak.us

#### 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. <u>Bidder</u> one who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.
- B. <u>Bidding Documents</u> the Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
- C. <u>Bidding Requirements</u> the Invitation to Bid, Instructions to Bidders, and Bid Form, plus additional documents that may be submitted with the Bid.
- D. <u>Issuing Office</u> 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 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 Bid items.
- F. <u>Successful Bidder</u> 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 businesses license in order to perform public work in the State of Alaska. Contractor's license and 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. Refer to Unalaska Code of Ordinances (UCO) Chapter 6.40 including 6.40.030(L) for further information.
- 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 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 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 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 vicepresident (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-ofstate 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, if applicable, the designated portion of the project for which the Bid is submitted) 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 Alaska 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 tabs are posted on the City of Unalaska website, 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, nonresponsive, 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, 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 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.

#### 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.

All workers shall be paid prevailing wage rates as described in the State of Alaska LABORERS' AND MECHANICS' MINIMUM RATES OF PAY, Title 36, Public Contracts, AS 36.05 & AS 35.10 Wage and Hour Administration Pamphlet No. 600 – Latest revision.

#### 20. **Construction Coordination**

Construction activities must be coordinated with the normal operation of the Port facilities/docks being affected. The Contractor shall develop a plan for review to coordinate and schedule work with these groups to minimize impacts to their operation. This will require weekly construction schedules and meetings or other means of communication so shipping operations can be coordinated.

The Contractor shall coordinate staging, storage, and construction activities with the City. Staging areas allocated to the Contractor for each site are shown on the project drawings. The Contractor must consider if the size and location of the designated staging areas are adequate, and if not, should consider lease of additional areas. This must be considered in the Bid cost.

The City's intent is to work with the Contractor to provide prompt decisions and minimize the impact of delays. The Contractor is asked to work with the City and its Contracting Officer to resolve all issues and build a successful project. The Port will be the project contact for communication of dock logistics.

When certain vessels are in Port (such as container ships, fuel barges, foreign flag vessels, ferries, or passenger ships), access to the secure areas of the Port facilities (including the staging area) will be restricted unless the Contractor possesses the required Transportation Worker Identification Credential (TWIC) cards.

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

То:	City of Unalaska, Department of Public Works
Address:	P.O. Box 610, Unalaska, Alaska 99685
Project Identification:	City of Unalaska ROBERT STORRS HARBOR – C FLOAT REPLACEMENT

#### **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.

#### 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 \_\_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_\_, \_\_, \_\_, \_\_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_\_, \_

#### 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 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 ROBERT STORRS HARBOR – C FLOAT REPLACEMENT

#### **BIDDER**

		whose address is	
S	treet	City,	
State	Zip		
BIDDER			
An Individual			
Ву			(SEAL)
		(Individual's name)	、 ,
doing business as			
Business address:			
Phone No.:			
Fax No.:			
Email address:			

<u>A Partnership</u>		
By		(SEAL)
	(Firm name)	
	(general partner)	
Business address:		
Phone No.:		
Fax No.:		
Email address:		
A Corporation		
By		
	(Corporation name)	
	(state of incorporation)	
Ву		
	(name of person authorized to sign)	
	(Title)	
(Corporate Seal)		
Attest		
Attest	(Secretary)	
Business address:		
Phone No.:		
Fax No.:		
Email address:		

<u>A Joint Venture</u>
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\_\_\_.

# **BASE BID**

Pay Bay Itom Description		Pay A	Approximate	Unit Price		Amount	
Item No.	Fay item Description	Unit	Quantity	Dollars	Cents	Dollars	Cents
1505.1	Mobilization	LS	All Reqd	LUMP	SUM	\$	
1580.1	Contaminated Materials- Excavation, Bagging and Stockpiling	CY	90			\$	
2060.1	Demolition & Disposal	LS	All Reqd	LUMP	SUM	\$	
2200.1	Upland Construction	LS	All Reqd	LUMP	SUM	\$	
2500.1	Storm Drain System	LS	All Reqd	LUMP	SUM	\$	
2601.1	Domestic Water System	LS	All Reqd	LUMP	SUM	\$	
2601.2	Board Insulation	BD	120			\$	
2603.1	Fire Hydrant	LS	All Reqd	LUMP	SUM	\$	
2611.1	Fire Suppression Standpipe System	LS	All Reqd	LUMP	SUM	\$	
2702.1	Construction Surveying	LS	All Reqd	LUMP	SUM	\$	
2718.1	Signage and Assemblies	LS	All Reqd	LUMP	SUM	\$	
2894.1	7'x 80' Aluminum Gangway	LS	All Reqd	LUMP	SUM	\$	
2895.1	Mainwalk Float, 12' x 360'	LS	All Reqd	LUMP	SUM	\$	
2895.2	20'x24' Gangway Landing Float	LS	All Reqd	LUMP	SUM	\$	
2896.1	Float Mooring Pile, 16" Dia. x 0.500" thick	EA	20			\$	
2896.2	Predrilled Pile Socket, 16" Dia. Piles	EA	20			\$	
2897.1	Supply Flotation Billet	EA	15			\$	
2897.2	Install Flotation Billet	EA	15			\$	
2899.1	Life Ring Cabinet and Base	EA	3			\$	
2899.2	Fire Extinguisher Cabinet and Base	EA	4			\$	
2899.4	Safety Ladders	EA	6			\$	
2900.1	Marine Mammal Observance Contingency	HR	10				
3305.1	Concrete Abutment	LS	All Reqd	LUMP	SUM	\$	
16000.1	Electrical and Lighting Systems	LS	All Reqd	LUMP	SUM	\$	
16000.2	Electrical Support Assemblies	LS	All Reqd	LUMP	SUM	\$	

### **SECTION 00310 – BID SCHEDULE**

# TOTAL BASE BID AMOUNT IN FIGURES: <u>\$</u>\_\_\_\_\_\_

# TOTAL BASE BID AMOUNT IN WORDS: \_\_\_\_\_

BIDDER NAME:

#### **ADDITIVE ALTERNATE A – PILE ANODES**

Pay	Pay Item Description	Pay Unit	Approximate	Unit ]	Price	Amount	
Item No.			Quantity	Dollars	Cents	Dollars	Cents
1505.1A	Mobilization	LS	All Reqd	LUMP	SUM	\$	
2996.2A	Install Anodes	EA	40			\$	
2996.3A	Field Photos, Continuity, Potential Readings and Report	LS	All Reqd	LUMP	SUM	\$	

#### TOTAL ADDITIVE ALTERNATE A AMOUNT IN FIGURES: <u>\$</u>\_\_\_\_\_

#### TOTAL ADDITIVE ALTERNATE A AMOUNT IN WORDS: \_\_\_\_\_

BIDDER NAME:

#### **ADDITIVE ALTERNATE B – PILE ANODES**

Pay	Pay Item Description	Pay Unit	Approximate	oroximate Unit		Amount	
Item No.			Quantity	Dollars	Cents	Dollars	Cents
2996.1B	Supply Anodes	EA	40			\$	

# TOTAL ADDITIVE ALTERNATE B AMOUNT IN FIGURES: <u>\$</u>\_\_\_\_\_

#### TOTAL ADDITIVE ALTERNATE B AMOUNT IN WORDS:

BIDDER NAME:

#### **SECTION 00320 - 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)

P.O. Box 610, Unalaska, Alaska 99685

(Address of Owner)

WHEREAS, the Principal has submitted a bid for the City of Unalaska **ROBERT STORRS HARBOR** – **C FLOAT REPLACEMENT** 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 \_\_\_\_\_, 2014

**ROBERT STORRS HARBOR – C FLOAT REPLACEMENT DPW Project No. 12601**  BID BOND Page 00320-1

# SECTION 00320 - BID BOND

	(Principal)	Seal
(Witness)	_	
	(Title)	Seal
	(Surety)	Seal
(Witness)	_	
	(Title)	Seal

#### SECTION 00360 - SUBCONTRACTOR REPORT

#### LIST OF SUBCONTRACTORS

The apparent low Bidder must submit a list of Subcontractors that the Bidder proposes to use in the performance of this contract and all Subcontractor Sales Tax Forms by close of business on the fifth calendar day following the posting notice of Bids. If the fifth calendar day falls on a weekend or holiday, the report is due by close of business on the next business day following the weekend or holiday. The list must include each Subcontractor's name, address, location, evidence of valid Alaska Business License, and valid Alaska Contractor's Registration under AS 08.18. *If no Subcontractors are to be utilized in the performance of the WORK, write in ink or type ''NONE'' on line (1) below.* 

	SUBCONTRACTOR	<sup>1</sup> AK Contractor <u>License No.</u>	<sup>1</sup> Contact Name	Type of	Contract	./ :0
	ADDRESS	<sup>2</sup> AK Business License No.	<sup>2</sup> Phone No.	Work	Amount	V II DBE
1.		1			\$	
		۷				
2.		1			\$	
		2				
3.		1			\$	
		2				
4.		1			\$	
		2				

I certify that the above listed Alaska Business License(s) and CONTRACTOR Registration(s), if applicable, were valid at the time Bids were opened for this Project.

CONTRACTOR, Authorized Signature

CONTRACTOR, Printed Name

# COMPANY

**ROBERT STORRS HARBOR – C FLOAT REPLACEMENT DPW Project No. 12601**  SUBCONTRACTOR REPORT Page 00360-1

### SECTION 00360 - SUBCONTRACTOR REPORT

- A. A Bidder may replace a listed Subcontractor if the Subcontractor:
  - 1. fails to comply with AS 08.18;
  - 2. files for bankruptcy or becomes insolvent;
  - 3. fails to execute a contract with the Bidder involving performance of the WORK for which the Subcontractor was listed and the Bidder acted in good faith;
  - 4. fails to obtain bonding;
  - 5. fails to obtain insurance acceptable to the OWNER;
  - 6. fails to perform the contract with the Bidder involving work for which the Subcontractor was listed;
  - 7. must be substituted in order for the CONTRACTOR to satisfy required state and federal affirmative action requirements;
  - 8. refuses to agree or abide with the Bidder's labor agreement; or
  - 9. is determined by the OWNER not to be a responsible Bidder.
  - 10. is not financially in "Good Standing" with the OWNER
- B. If a Bidder fails to list a Subcontractor or lists more than one Subcontractor for the same portion of WORK, the Bidder shall be considered to have agreed to perform that portion of WORK without the use of a Subcontractor and to have represented the Bidder to be qualified to perform that WORK.
- C. A Bidder who attempts to circumvent the requirements of this section by listing as a Subcontractor another contractor who, in turn, sublets the majority of the WORK required under the contract violates this section.
- D. If a contract is awarded to a Bidder who violates this section, the OWNER may:
  - 1. cancel the contract; or
  - 2. after notice and a hearing, assess a penalty on the Bidder in an amount that does not exceed 10 percent of the value of the subcontract at issue.
- E. For contract award, the apparent low Bidder must submit one copy of each subcontract, to the Port Engineer, for WORK with a value of greater than one half of one percent of the intended award amount.
- F. An apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in this section will be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER will then consider the next lowest Bidder for award of the contract.

#### **SECTION 00500 - AGREEMENT**

THIS AGREEMENT is dated as of the \_\_\_\_\_ day of \_\_\_\_\_ in the year 2014, by and between the <u>City of Unalaska</u> (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 the 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, equipment, and materials and performing all operations in connection with the **City of Unalaska ROBERT STORRS HARBOR – C FLOAT REPLACEMENT**.

- Project Location: Robert Storrs Harbor; Dutch Harbor, AK
- <u>Owner</u>: City of Unalaska

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

- Invitation to Bid (Section 00030)
- Instructions to Bidders (Section 00100)
- Bid Forms (Sections 00300, Section 00310, Section 00320)
- Agreement (Section 00500)
- Performance Bond (Section 00610)
- Payment Bond (Section 00620)
- General Conditions (Section 00700)
- Supplementary Conditions (Section 00800)
- Alaska Labor Standards, Reporting, and Prevailing Wage Determination (Section 00830)
- Drawings and Specifications
- Geotechnical Report (Appendix A)
- 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 COMPLETION TIME**

- 2.1 For the Base Bid Items and all awarded Additive Bid Items, the Substantial Completion date shall be August 17, 2015 and the Final Completion date shall be August 31, 2015.
- 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 damages include, the potential loss of direct revenue from use of the Project Site, potential indirect loss of revenue resulting from vessels deciding to use other facilities, general inconvenience to the public and similar difficult to quantify elements of damage. They also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration preceding the actual loss suffered by the OWNER if the work is not substantially 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 Five Hundred Dollars (\$500.00) for each day that

#### **SECTION 00500 - AGREEMENT**

expires after the time specified above for **Substantial Completion** and **One Thousand Dollars** (**\$1,000.00**) **for each day** that expires after the time specified above for **Final Completion** and readiness for final payment. Should Substantial Completion not be accomplished before the specified Final Completion date, then the combined liquidated damages shall be **One Thousand Dollars** (**\$1,000.00**) **for each day**.

# **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").
- 3.2 The Contract Sum is based upon the Proposal Items which are set forth in the Contract Documents and which are hereby accepted by the OWNER.
- 3.3 The Contract Sum for the Base Bid and Awarded Additive Alternate Items is <u>\$\_\_\_\_\_</u>.

#### **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.

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 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.

#### **SECTION 00500 - AGREEMENT**

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

**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	, 2014.
CITY OF UNALASKA	
By Chris Hladick, City Manager	By
(CORPORATE SEAL)	(CORPORATE SEAL)
Attest City Clerk	Attest
<b>OWNER's Address for giving notices:</b> P.O. Box 610 Unalaska, Alaska 99685	CONTRACTOR's Address for giving notices:

#### **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 ROBERT STORRS HARBOR – C FLOAT REPLACEMENT

in accordance with the Specifications prepared by the **PND Engineers, Inc.**, 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.

#### **SECTION 00610 - PERFORMANCE BOND**

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	20	
		(Principal)	Seal
(Witness)			
		(Title)	Seal
		(Surety)	Seal
(Witness)			
		(Title)	Seal
		(Title)	Se

#### **SECTION 00620 - PAYMENT BOND**

#### KNOW ALL MEN BY THESE PRESENTS,

That	as	CONTRACTOR,	and
as	Surety, are held and firmly	/ bound unto the Cit	ty of
Unalaska hereinafter called "OWNER", in the sum	of	dollars, for the payr	ment
of which sum, well and truly made, we bind oursel	ves, our heirs, executors, ad	ministrators, success	sors,
and assigns, jointly and severally, firmly by these pre-	sents.		

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 **ROBERT STORRS HARBOR - C FLOAT REPLACEMENT**

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 \_\_\_\_\_, 20\_\_\_\_.

(SEAL)

(CONTRACTOR)

(Surety)

By: \_\_\_\_\_\_(Signature)

By: \_\_\_\_\_\_(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)
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#### 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.

Insurance requirements were modified March, 2001. Brooks Chandler review comments were incorporated January, 2005 and March, 2008.

#### **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.

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

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

<u>Application for Payment</u> - 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.

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

<u>A.S.</u> - Initials which stand for Alaska Statute.

<u>Award</u> - 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.

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

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

<u>Calendar Day</u> - 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.

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

<u>Conditions of the Contract</u> - 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.

 $\underline{Contract}$  - 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.

<u>Contract Documents</u> - 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.

<u>Contracting Officer</u> - 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.

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

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

<u>Contract Time</u> - 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.

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

<u>Defective</u> - 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.

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

<u>Drawings</u> - 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.

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

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

<u>General Requirements</u> - 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.

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

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

<u>Notice of Intent to Award</u> - 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.

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

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

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

<u>Project</u> - 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.

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

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

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

<u>Regulatory Requirement</u> - 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.

<u>Shop Drawings</u> - 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.

<u>Specification</u> - 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.

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

<u>Substantial Completion</u> - 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.

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

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

<u>Unit Price Work</u> - Work to be paid for on the basis of unit prices.

<u>Using Agency</u> - The entity who will occupy or use the completed Work.

<u>Work</u> - 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 ten 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 CON-TRACTOR 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 nonowned 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.
- 10. 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.
- 11. **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 officients, 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).
- 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 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 CON-TRACTOR.
  - 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, expediters, 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 subcontract 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.

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 lease 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 reprocurement. If a default termination occurs, the Contractor or his Surety shall pay <u>in addition to</u> 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 CON-TRACTOR 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

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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.

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#### 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 reinspection, 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 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.

#### 13.15 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 CON-TRACTOR 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 CON-TRACTOR, 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 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 reprocurement 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:

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. 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. The Claim, if not resolved, shall be presented to the Project Manager, in writing, within 60 days following receipt of the Intent to Claim. Receipt of the Claim will be acknowledged in writing by the Project Manager. The CONTRACTOR agrees that unless these written notices are provided, the CONTRACTOR will have no entitlement to additional time or compensation for such act, event or condition. The CONTRACTOR shall in any case continue diligent performance of the Contract.

#### 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.

#### **END OF SECTION**

REFERENCE: "GENERAL CONDITIONS OF THE CONTRACT", constitutes the General Conditions of this Contract and is further revised and supplemented by the provisions of these Supplementary Conditions to the Contract, hereinafter called the "Supplementary Conditions." The General Conditions and the Supplementary Conditions are applicable to all of the Work under this Contract and shall apply to the Contractor and all Subcontractors.

SUPPLEMENTS: The following supplements modify, change, delete, or add to the General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, subparagraph or clause thereof is modified, or deleted by these supplements, the unaltered provisions of such article, paragraph, subparagraph or clause shall remain in effect.

## SC-1 ARTICLE 1 - DEFINITIONS, *Add* the following:

OWNER - The OWNER and CONTRACTING OFFICER are further defined as:

City of Unalaska Department of Public Works P.O. Box 610 Unalaska, Alaska 99685-0610 Tel. (907) 581-1260 FAX (907) 581-2187 Attn: Tom Cohenour, Director of Public Works Email:tcohenour@ci.unalaska.ak.us

ENGINEER - The ENGINEER is further defined as:

PND Engineers, Inc. 9360 Glacier Hwy Suite #100 Juneau, AK 99801 Tel. (907) 586-2093 Fax. (907) 586-2099

#### SC-2 ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.2 Copies of Contract Documents; *Change* the paragraph to read:

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

#### SC-3 ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS

- 4.3 Explorations and Reports; *Add* the following:
- 4.3.1 In preparation of the Contract Documents, the Engineer of Record has relied upon:
  - 1. The following report of exploration and tests of subsurface conditions at the site of the WORK:
    - a. "City of Unalaska Robert Storrs Small Boat Harbor Replacement, Geotechnical Site Investigation, prepared by PND Engineers. Inc., August 2014"

- b. The report is included in in Appendix A of these documents. As stated in Paragraph 4.3 of the General Conditions, 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.
- 2. Field measurements and visual inspection of the existing structures and surface conditions.

# SC-4 ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS, Add the following section:

- 4.8 Hazardous Materials:
  - A. OWNER shall be responsible for any Asbestos, PCB's, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the site. OWNER will not be responsible for any such material brought to the site by the CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.
  - CONTRACTOR shall immediately stop all WORK in connection with such hazardous B. condition and any area affected thereby (except in an emergency as required in the General Conditions) and notify OWNER and ENGINEER (and thereafter confirm such notice in writing.) OWNER will promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume WORK in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto, and delivered to CONTRACTOR special written notice. Such written notice will specify that such condition and any affected area is or has been rendered safe for resumption of the WORK or specify any special conditions under which such WORK may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of adjustment, if any, in Contract Price or Contract Times as a result of such WORK stoppage or such special conditions under which WORK is agreed by CONTRACTOR to be resumed, either party may make a claim therefor and provided in Articles 10 and 11."

# SC-5 ARTICLE 5 – BONDS, INSURANCE, AND INDEMNIFICATION

5.4 Insurance Requirements; *Remove* paragraph 5.4.3.11

Builder's Risk Insurance is not required for the project.

# SC-6 ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.14 Use of Premises; *Add* the following sentence:

"It is the responsibility of the CONTRACTOR to obtain all required staging area for the project. CONTRACTOR shall coordinate with the City of Unalaska to determine available areas."

6.17 Safety and Protection; *Add* the following subsections:

6.17.5 The CONTRACTOR shall do whatever work is necessary for overall project safety and be solely and completely responsible for affected conditions of the job site, including safety of all persons (including employees) and property during the Contract period. This requirement shall apply continuously and is 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 Contracting Officer'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. CONTRACTOR shall 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, traffic control and blasting. Barricades, lanterns, temporary lighting and proper signs shall be furnished in sufficient amount to safeguard the public and the work. CONTRACTOR shall 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.

6.17.6 CONTRACTOR shall submit a specific traffic control plan for temporary traffic routing and signage during construction. Traffic control plan shall comply with rules and regulations of the City and state authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by written permission of the proper authority. CONTRACTOR shall assure the least possible obstruction to traffic and normal commercial pursuits.

CONTRACTOR shall notify the Department of Public Works, and Department of Public Safety before closing any street or portion thereof and notify said departments when the streets are again possible for emergency vehicles. Do not block off emergency vehicle access without written permission from the Unalaska Fire Department. CONTRACTOR shall conduct operations with the least interference to fire equipment access, and at no time prevent such access.

CONTRACTOR shall leave a night emergency telephone number or numbers with the Police Department, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

- 6.17.7 The CONTRACTOR shall provide a site specific Safety Plan which shall include but not be limited to regulations outlined within the Code of Federal Regulations 29 CFR within Part 1910 Occupational Safety and Health Administration (OSHA) standard number 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) training. The Safety Plan will include all applicable parts of these regulations.
- 6.22 Maintenance During Construction; *Add* the following subsections:
- 6.22.1 The CONTRACTOR shall assume the responsibility for protection of finished construction and shall repair and restore any and all damage to finished work to its original condition.

In unfinished areas, CONTRACTOR shall leave the site evenly graded as necessary, in a condition that will restore original drainage, and with an appearance equal to or better than original.

6.22.2 Any monument damaged or displaced by the Contractor shall be replaced in accordance with the Title 8 of the City of Unalaska Code of Ordinances. The cost of replacing or repairing damaged or displaced monuments shall be borne solely by the Contactor.

# SC-7 ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES, *Add* the following Section:

6.27 Meetings

The CONTRACTOR and all subcontractors currently working shall attend all weekly construction progress meetings held at the City Department of Public Works. CONTRACTOR shall provide construction progress update, weekly project schedule updates, construction issues, coordination with City, etc.

# SC-8 ARTICLE 11 - CONTRACT TIME; COMPUTATION AND CHANGE

11.2 Starting the Work; *Change* the second sentence to read as follows:

"CONTRACTOR shall notify the Contracting Officer at least fourteen (14) days in advance of the time actual construction operations will begin."

11.5 Extension Due to Delays; *Add* the following sentence:

"Normal weather in Unalaska shall not be cause for time extension and the CONTRACTOR shall allow ample time in his schedule to accommodate normal weather delays."

# SC-9 ARTICLE 13 – PAYMENTS TO CONTRACTOR AND COMPLETION

- 13.3 Application for Progress Payment; *Add* the following subsection:
- 13.3.1 The Contractor is required to submit a copy of the current red-lined as-built construction drawings with each monthly pay application. The City may withhold payment from the Contractor if the submitted as-builts are not current or are not in accordance with the General Notes of the contract drawings and all related contract documents.

13.8 Retainage; *Delete* the existing paragraph and *Replace* with the following:

"The CITY will retain a maximum amount equal to 10% of the total amount earned on all progress payments. Once 50 percent of the work is complete and if the character and progress of the work have been satisfactory to the City, the City 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. All retainage shall bear interest at the rate required by AS 36.90.250"

- 13.14 Final Payment and Final Completion; *Add* the following subsection:
- 13.14.4 The CONTRACTOR shall furnish the following forms fully executed prior to the City making final payment: Affidavit of Release of Liens by the Contractor, Lien Release Form, and Lien Release General to City. The forms will be made available to the CONTRACTOR in electronic format near the end of the project.

# END OF SECTION

# SECTION 00830 - ALASKA LABOR STANDARDS, REPORTING, AND PREVAILING WAGE RATE DETERMINATION

State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, are made a part of this contract by reference.

The CONTRACTOR is responsible for contacting the Alaska Department of Labor to determine compliance with current regulations.

<u>Required Reporting During Contract</u> (to be provided by <u>every</u> CONTRACTOR and Subcontractor):

A. Certified Payrolls must be submitted every two weeks. Before the second Friday, each CONTRACTOR and Subcontractor must file Certified Payrolls with Statements of Compliance for the previous two weeks. If there was no activity for that pay period, indicate "*No Activity*." Indicate "*Start*" on your first payroll, and "*Final*" on your last payroll for this Project. Send to:

Wage and Hour Section Labor Law Compliance Division Alaska Department of Labor P.O. Box 020630 Juneau, AK 99802-0630 (907) 465-4842

*Tom Cohenour* City of Unalaska P.O. Box 610 Unalaska, AK 99685 (907) 581-1260

B. Within 10 Days of "Notice of Award/Notice to Proceed" make a list of <u>all</u> Subcontractors. Include their name, address, phone, estimated subcontract amount, and estimated start and finish dates. Send to:

and

and

*Tom Cohenour* City of Unalaska P.O. Box 610 Unalaska, AK 99685 (907) 581-1260 Wage and Hour Section Labor Law Compliance Division Alaska Department of Labor P.O. Box 020630 Juneau, AK 99802-0630 (907) 465-4839/4842

C. As part of the **final payment request package**:

A completed Compliance Certificate and Release form (provided in Section 01700 - Project Closeout) from every CONTRACTOR and Subcontractor.

A final Subcontractor list complete with final subcontract amounts and including all equipment rentals (with operators).

**END OF SECTION** 

**ROBERT STORRS HARBOR – C FLOAT REPLACEMENT DPW Project No. 12601**  ALASKA LABOR STANDARDS, REPORTING AND PREVAILING WAGE RATE DETERMINATION Page 00830-1

## PART 1 - GENERAL

## 1.1 GENERAL

A. WORK to be performed under this contract shall consist of furnishing all plant, tools, equipment, materials, supplies, manufactured articles, labor, transportation and services, including fuel, power, water, and essential communications, and performing all WORK, or other operations required for the fulfillment of the contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents that may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The WORK generally consists of various quantities of mobilization, demolition, salvage, disposal, construction surveying, uplands improvements, contaminated material excavation and bagging, concrete abutment, gangway, steel pipe moorage floats, steel pipe mooring piles, domestic water system, dry fire line, floatation billets, safety ladders, life ring and fire extinguisher cabinets, electrical system, electrical support assemblies, signage assemblies, and other miscellaneous related improvements and appurtenances.
- B. Additive Alternate A WORK consists of various quantities of mobilization, supply and installation of OWNER supplied pile anodes, continuity and potential readings report, and miscellaneous associated appurtenances as identified on the Plans.
- C. Additive Alternate B WORK consists of furnishing pile anodes as identified on the Plans.

#### 1.3 SITE OF THE WORK

A. The site of the WORK is located at Robert Storrs Harbor, in Unalaska, Alaska.

## 1.4 BEGINNING AND COMPLETION OF THE WORK

A. Time is the essence of the contract. In accordance with the provisions of Article 2 of SECTION 00500 - AGREEMENT, the CONTRACTOR shall begin the WORK on the date specified in the written Notice to Proceed from the OWNER, and shall complete all the WORK in accordance with the following schedule:

WORK DESCRIPTION		DATE
1.	Earliest Field Start	April 15th, 2015
2.	Substantial Completion	August 17th, 2015
3.	Final Completion All WORK under the Contract Documents.	August 31st, 2015

#### 1.5 CONTRACT METHOD

A. The WORK hereunder will be constructed under a unit price Contract.

## 1.6 WORK By Others

- A. The CONTRACTOR's attention is directed to the fact that WORK may be conducted at the site by other contractors during the performance of the WORK under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the WORK of such other Contractors, and shall cooperate fully with such Contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.
- B. Interference With WORK On Utilities: The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

## 1.7 CONTRACTOR USE OF PROJECT SITE

- A. The CONTRACTOR's use of the Project site shall be limited to its construction operations, including on site storage of materials.
- B. Available on-site staging areas are shown on the Plans. Specific availability dates pertain separately to each staging area. CONTRACTOR shall field review the condition of each staging area prior to bid and shall perform a photographic inventory of conditions prior to mobilization onto the site. Any damage caused by CONTRACTOR operations to the existing features within the staging areas shall be repaired to the satisfaction of the OWNER at no additional cost.
- C. The CONTRACTOR shall assess the conditions and load limits of all existing pile supported decks between the staging areas and the WORK. CONTRACTOR operations within these areas shall be conducted in a safe manner that does not exceed allowable load limits. Any damage caused by CONTRACTOR operations shall be repaired to the satisfaction of the OWNER at no additional cost.

#### 1.8 OWNER USE OF THE PROJECT SITE

- A. The OWNER may utilize all or part of the existing site during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate and coordinate with the ENGINEER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operations at the same time. In any event, the OWNER shall be allowed access to the Project site during the period of construction.
- B. Areas of the harbor not within the scope of this project shall remain an active harbor occupied by harbor patrons. The Contractor shall conduct operations to minimize interference with the day-to-day operation of the harbor. The CONTRACTOR shall coordinate with the OWNER and the ENGINEER all interruptions of utility service, all required moorage relocations and any other WORK that may affect harbor patrons a minimum of 48 hours in advance or longer as specified elsewhere in the Contract Documents.

## 1.9 **PROJECT MEETINGS**

- A. Pre-Construction Conference
  - 1. Prior to the commencement of WORK at the site, a Pre-Construction Conference will be held in Unalaska within 45 days of NTP and shall be attended by the CONTRACTOR's Project manager, its superintendent, and its Subcontractors as the CONTRACTOR deems appropriate. Other attendants will be:
    - a. ENGINEER and the Inspector.
    - b. Representatives of OWNER.
    - c. Governmental representatives as appropriate.
    - d. Others as requested by CONTRACTOR, OWNER, or ENGINEER.
  - 2. Unless previously submitted to the ENGINEER, the CONTRACTOR shall bring one copy each of the following:
    - a. Plan of Operation.
    - b. Project CPM Schedule in GANTT bar chart format
    - c. Project cash flow assessment.
    - d. Procurement schedule of major equipment and materials and items requiring long lead time.
    - e. Shop Drawing/Sample/Substitute or "Or Equal" submittal schedule.
    - f. Name and telephone number of CONTRACTOR's Project Supervisor.
  - 3. The purpose of the Pre-Construction Conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date.
  - 4. The CONTRACTOR should be prepared to discuss all of the items listed below:
    - a. Status of CONTRACTOR's insurance and bonds.
    - b. CONTRACTOR's tentative schedules.
    - c. Transmittal, review, and distribution of CONTRACTOR's Submittals.
    - d. Proposed submittal form, submittal log, RFI forms, etc.
    - e. Processing applications for payment.
    - f. Maintaining record documents.
    - g. Critical Work sequencing.
    - h. Field decisions and Change Orders.
    - i. Use of Project site, office and storage areas, security, housekeeping, and OWNER's needs.

# SECTION 01010 – SUMMARY OF WORK

- j. Major equipment deliveries and priorities.
- k. CONTRACTOR's assignments for safety and first aid.
- 5. The OWNER will preside at the Pre-Construction Conference and will arrange for keeping and distributing the minutes to all persons in attendance.
- 6. The CONTRACTOR and its Subcontractors should plan on the conference taking no less than 2 hours. The items listed in paragraph 3 will be covered as well as reviewing the Plans and Specifications, in extensive detail, with the ENGINEER and the OWNER.
- B. Progress Meetings
  - 1. The CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as requested by the ENGINEER, or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all Subcontractors active on the site must attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its Suppliers, Manufacturers, and other Subcontractors.
  - 2. The ENGINEER shall preside at the meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems that may develop. During each meeting, the CONTRACTOR is required to present any issues that may impact its WORK, with a view to resolve these issues expeditiously.
- 1.10 DEFINITIONS APPLICABLE TO TECHNICAL SPECIFICATIONS. The following words have the meaning defined in the Technical Portions of the WORK:
  - A. Furnish: means to supply and deliver to the site, to unload and unpack ready for assembly, installation, testing, and start-up.
  - B. Indicated: a word used to direct the CONTRACTOR to information contained on the drawings or in the Specifications. Terms such as "shown," "noted," "scheduled," and "specified" also may be used to assist in locating information but no limitation of location is implied or intended
  - C. Install: defines operations at the site including; assembly, erection, placing, anchoring, applying, shaping to dimension, finishing, curing, protecting, and cleaning, that prepare items in the manner intended by the Contract Documents for the OWNER's use.
  - D. Installer: a person or firm engaged by the CONTRACTOR or its Subcontract or any Subcontractor for the performance of installation, erection, or application work at the site. Installers must be expert in the operations they are engaged to perform.
  - E. Provide: is defined as furnish and install, ready for the intended use.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION (Not Used)

#### **END OF SECTION**

## PART 1 – GENERAL

- A. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of WORK being described, as necessary to complete the various items of the WORK all 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).
- B. No separate payment shall be made for any WORK item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of WORK.
- C. In addition to other incidental items of WORK listed elsewhere in the contract, the following items shall also be considered as incidental to other items of WORK under this contract:
  - 1. Removal and replacement of survey monuments and markers disturbed during construction, whether shown on the Plans or not.
  - 2. Re-vegetating areas disturbed during construction.
  - 3. Trench excavation and bedding as required for all piping, structures, and vault installations.
  - 4. Erosion and pollution control in accordance with local, state and federal standards.
  - 5. Temporary shoring of trenches or bracing of existing facilities as required for constructing any/all improvements.
  - 6. Maintenance of all services through the Project area, including water, storm, garbage pickup, mail delivery, other deliveries and emergency vehicles.
  - 7. All traffic control, including flaggers and preparation of satisfactory Traffic Control Plans.
  - 8. Minor grading of fill materials as required to match existing grades and maintain positive surface drainage.
  - 9. Minor changes in grades to fit field conditions.
  - 10. Miscellaneous connecting and attachment hardware as required installing new equipment.
  - 11. Excavating, bedding, and backfilling for all electrical equipment including transformers, junction boxes, vaults, and conduit.
  - 12. Pile splices required to make up the pile lengths shown in the pile schedule.
  - 13. Accommodating the OWNER's salvage operations as required.
  - 14. Drill discharge/silt containment system to control siltation and turbidity during pile installation operations.

# PART 2 – PAY ITEMS

# **DIVISION 1 – GENERAL REQUIREMENTS**

- 1.1 MOBILIZATION (Pay Item No. 1505.1, and 1505.1A) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Mobilization shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. Payment for Mobilization under the Base Bid shall be made at the amount shown on the Bid Schedule under Pay Item No. 1505.1, which payment shall constitute full compensation for all WORK described in Section 01505 Mobilization, as shown on the Plans and as directed by the ENGINEER.
  - C. Payment for Mobilization under Additive Alternate A shall be made at the amount shown on the Bid Schedule under Pay Item No. 1505.1A, which payment shall constitute full compensation for all WORK described in Section 01505 - Mobilization, as shown on the Plans and as directed by the ENGINEER.
  - D. Partial payments shall be made as the WORK progresses as follows:
    - 1. When 5% of the total original contract amount is earned from other pay items, 50% of the amount bid for Mobilization, or 5% of the original contract amount, whichever is lesser, shall be paid.
    - 2. When 10% of the total original contract amount is earned from other pay items, 95% of the amount bid for Mobilization, or 10% of the original Contract amount, whichever is lesser, shall be paid.
    - 3. Upon completion of all WORK on the Project, payment of any amount bid for Mobilization in excess of 10% of the total original contract amount shall be paid.
- 1.2 CONTAMINATED MATERIALS-EXCAVATION, BAGGING AND STOCKPILING (Pay Item No. 1580.1) PRICE BASED ON QUANTITY, CUBIC YARD
  - A. Measurement for payment for Contaminated Materials-Excavation, Bagging and Stockpiling shall be based on the number of cubic yards of material actually excavated, as determined by the average end area method based on field measurements taken by the ENGINEER at the time of excavation. Where impractical to measure material by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements. Excavation outside of the lines, grades and cross sections indicated on the plans, or directed by the ENGINEER, shall not be measured for payment.
  - B. Contaminated Materials-Excavation, Bagging and Stockpiling is contingent upon the CONTRACTOR encountering contaminated materials during excavation or trenching operations as described in Section 01580-Contaminated Materials.
  - C. Payment for Contaminated Materials-Excavation, Bagging and Stockpiling shall be made at the amount shown on the Bid Schedule under Pay Item No. 1580.1, which payment shall constitute full compensation for all WORK described in Section 01580-Contaminated Materials, as shown on the plans and as directed by the ENGINEER.

## **DIVISION 2– SITE WORK**

- 2.1 DEMOLITION AND DISPOSAL (Pay Item No. 2060.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Demolition and Disposal shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, including all upland and marine related demolition and disposal, all in accordance with the Contract Documents and as shown on the Plans.
  - B. Payment for Demolition and Disposal shall be made at the amount shown on the Bid Schedule under Pay Item No. 2060.1, which payment shall constitute full compensation for all WORK described in Section 02060 Demolition and Disposal, as shown on the Plans, and as directed by the ENGINEER.
- 2.2 UPLAND CONSTRUCTION (Pay Item Nos. 2200.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Upland Construction shall be based on completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Upland Construction shall be made at the amount shown on the Bid Schedule under Pay Item No. 2200.1, which payment shall constitute full compensation for all WORK described in Section 02200 Upland Reconstruction, as shown on the Plans, and as directed by the ENGINEER.
- 2.3 STORM DRAIN SYSTEM (Pay Item No. 2500.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Storm Drain System shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Storm Drain System shall be made at the amount shown on the Bid Schedule under Pay Item No. 2500.1, which payment shall constitute full compensation for all WORK described in Section 02500 Storm Drain System, as shown on the Plans and as directed by the ENGINEER.
- 2.4 DOMESTIC WATER SYSTEM (Pay Item No. 2601.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Domestic Water System shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Domestic Water System shall be made at the amount shown on the Bid Schedule under Pay Item No. 2601.1, which payment shall constitute full compensation for all WORK described in Section 02601 Water System, as shown on the Plans and as directed by the ENGINEER.
- 2.5 BOARD INSULATION (Pay Item No. 2601.2) PRICE BASED ON QUANTITY, BOARD
  - A. Measurement for payment of Board Insulation shall be the actual number of 2" x 2' x 8' boards installed.
  - B. Board insulation shall only be installed as directed by the ENGINEER. Only those boards of insulation actually approved by the ENGINEER to be installed shall be measured for payment.

- C. The bid quantity for Board Insulation is based upon the number of boards required should the CONTRACTOR encounter contaminated materials during excavation or trenching operations as described in Section 01580-Contaminated Materials. The ENGINEER may require installation of Board Insulation in instances not related to contaminated materials as described in Section 02601-Water System.
- D. Payment for Board Insulation shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2601.2, which payment shall constitute full compensation for all WORK described in Section 02601 Water System, as shown on the Drawings and as directed by the ENGINEER.

#### 2.6 FIRE HYDRANT (Pay Item No. 2603.1) PRICE BASED ON LUMP SUM

- A. Measurement for payment for Fire Hydrant shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
- B. Payment for Domestic Water System shall be made at the amount shown on the Bid Schedule under Pay Item No. 2603.1, which payment shall constitute full compensation for all WORK described in Section 02603 Fire Hydrants, as shown on the Plans and as directed by the ENGINEER.
- 2.7 FIRE SUPPRESSION STANDPIPE SYSTEM (Pay Item No. 2611.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Fire Suppression Standpipe System shall be based on the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Fire Suppression Standpipe System shall be made at the amount shown on the Bid Schedule under Pay Item No. 2611.1, which payment shall constitute full compensation for all WORK described in Section 02611 Fire Suppression Standpipe System, as shown on the Plans and as directed by the ENGINEER.
- 2.8 CONSTRUCTION SURVEYING (Pay Item No. 2702.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Construction Survey Measurement shall be based on the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. Payment for Construction Surveying shall be made at the amount shown on the Bid Schedule under Pay Item No. 2702.1, which payment shall constitute full compensation for all WORK described in Section 02702 Construction Surveying, as shown on the Plans, and as directed by the ENGINEER.
- 2.9 SIGNAGE AND ASSEMBLIES (Pay Item No. 2718.1) PRICED BASED ON LUMP SUM
  - A. Measurement for payment for Signage and Assemblies shall be based on the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Signage and Assemblies shall be made at the amount shown on the Bid Schedule under Pay Item No. 2718.1, which payment shall constitute full compensation for all WORK described in Section 02718 Signage and Assemblies, as shown on the Plans, and as directed by the ENGINEER.

- 2.10 7'x80' ALUMINUM GANGWAY (Pay Item No. 2894.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for 7'x80' Aluminum Gangway shall be based on completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for 7'x80' Aluminum Gangway shall be made at the amount shown on the Bid Schedule under Item 2894.1, which payment shall constitute full compensation for all WORK described in Section 02894 Gangways, as shown on the Plans, and as directed by the ENGINEER.
- 2.11 MAINWALK FLOAT, 12'x360' (Pay Item No. 2895.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Mainwalk Float, 12'x360' shall be based on completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Mainwalk Float, 12'x360' shall be made at the amount shown on the Bid Schedule under Pay Item No. 2895.1, which payment shall constitute full payment for all WORK described in Section 02895 – Moorage Floats, as shown on the Plans and as directed by the ENGINEER.
- 2.12 20'x24' GANGWAY LANDING FLOAT (Pay Item No. 2895.2) PRICE BASED ON LUM SUM
  - A. Measurement for payment for 20'x24' Gangway Landing Float shall be based on completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, all accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for 20'x24' Gangway Landing Float shall be made at the amount shown on the Bid Schedule under Pay Item No. 2895.2, which payment shall constitute full payment for all WORK described in Section 02895 Moorage Floats, as shown on the Plans and as directed by the ENGINEER.
- 2.13 FLOAT MOORING PILE, 16" dia. x 0.500" t (Pay Item Nos. 2896.1) PRICE BASED ON QUANTITY, EACH
  - A. Measurement for payment for Float Mooring Pile, 16" dia. x 0.500" t shall be measured per each, furnished and installed complete in place, all in accordance with the requirements of the Contract Documents and as shown on the Plans. Steel pipe piles shall be furnished by the CONTRACTOR in the lengths indicated on the Plans.
  - B. Payment for Float Mooring Pile, 16" dia. x 0.500" t shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2896.1, which payment shall constitute full payment for all WORK described in Section 02896 Steel Pipe Piles, as shown on the Plans and as directed by the ENGINEER.
- 2.14 PREDRILLED PILE SOCKET, 16" Dia. PILES (Pay Item Nos. 2896.2) PRICE BASED ON QUANTITY, EACH
  - A. Measurement for payment for Predrilled Pile Socket, 16" Dia. Piles shall be measured per each, furnished and installed complete in place, all in accordance with the requirements of the Contract Documents and as shown on the Plans. Steel pipe piles shall be furnished by the CONTRACTOR in the lengths indicated on the Plans.

- B. Payment for Predrilled Pile Socket, 16" Dia. Piles shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2896.2, which payment shall constitute full payment for all WORK described in Section 02896 - Steel Pipe Piles, as shown on the Plans and as directed by the ENGINEER
- 2.15 [ ] FLOATATION BILLET (Pay Item Nos. 2897.1 and 2897.2) PRICED BASED ON QUANTITY, EACH
  - A. Measurement for payment for Supply Floatation Billet shall be measured per each, complete, all in accordance with the requirements of the Contract Documents.
  - B. Measurement for payment for Install Floatation Billet shall be measured per each, complete in place and at locations directed in the field by the ENGINEER.
  - C. Payment for Supply Floatation Billet shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2897.1, which payment shall constitute full compensation for all WORK described in Section 02897 Floatation Billets, as shown on the Plans and as directed by the ENGINEER.
  - D. Payment for Install Floatation Billet shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2897.2, which payment shall constitute full compensation for all WORK described in Section 02897 Floatation Billets, as shown on the Plans and as directed by the ENGINEER.
- 2.16 [ ] CABINET AND BASE (Pay Item Nos. 2899.1 and 2899.2) PRICE BASED QUANTITY EACH
  - A. Measurement for payment [] Cabinet and Base shall be measured per each, furnished and installed complete in place, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Life Ring Cabinet and Base shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2899.1, which payment shall constitute full payment for all WORK described in Section 02899 – Float Appurtenances, as shown on the Plans and as directed by the ENGINEER.
  - C. Payment for Fire Extinguisher Cabinet and Base shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2899.2, which payment shall constitute full payment for all WORK described in Section 02899 Float Appurtenances, as shown on the Plans and as directed by the ENGINEER.
- 2.17 SAFETY LADDERS (Pay Item Nos. 2899.4) PRICE BASED QUANTITY EACH
  - A. Measurement for payment Safety Ladders shall be measured per each, furnished and installed complete in place, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Safety Ladders shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2899.1, which payment shall constitute full payment for all WORK described in Section 02899 Float Appurtenances, as shown on the Plans and as directed by the ENGINEER.

## 2.18 MARINE MAMMAL OBSERVANCE CONTINGENCY (Pay Item No. 2900.1) PRICE BASED ON QUANTITY, EACH

- A. Measurement for payment for Marine Mammal Observance Contingency shall be per each, based upon the actual number of hours WORK is suspended, in accordance with the permit requirements of the Contract Documents.
- B. Payment for Marine Mammal Observance Contingency shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2900.1, which payment shall constitute full compensation for all WORK described in Section 02900 Contingency Items, and as directed by the ENGINEER.

#### 2.19 SUPPLY ANODE (Pay Item No. 2996.1B) PRICE BASED ON QUANTITY, EACH

- A. Measurement for payment for Supply Anode shall be per each, based upon the actual number of anodes supplied and delivered to the site, complete, including mounting tabs and aluminum anode, all in accordance with the requirements of the Contract Documents and as shown on the Plans.
- B. Payment for Supply Anode under Additive Alternate A shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2996.1A, which payment shall constitute full compensation for all WORK described in Section 02996 Pile Anodes, as shown on the Plans and as directed by the ENGINEER.

#### 2.20 INSTALL ANODE (Pay Item No. 2996.2A) PRICE BASED ON QUANTITY, EACH

- A. Measurement for payment for Install Anode shall be per each, complete in place, all in accordance with the requirements of the Contract Documents, and as shown on the Plans.
- B. Payment for Install Anode All Types under Additive Alternate A shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2996.2A, which payment shall constitute full compensation for all WORK described in Section 02996 Pile Anodes, as shown on the Plans and as directed by the ENGINEER.

# 2.21 FIELD PHOTOS, CONTINUITY, POTENTIAL READINGS AND REPORT (Pay Item No. 2996.3A) PRICE BASED ON LUMP SUM

- A. Measurement for payment for Field Photos, Continuity, Potential Readings and Report shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
- B. Payment for Field Photos, Continuity, Potential Readings and Report under Additive Alternate A shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2996.3A, which payment shall constitute full compensation for all WORK described in Section 2996 – Pile Anodes, as shown on the plans and as directed by the ENGINEER.

#### **DIVISION 3 - CONCRETE**

- 3.1 CONCRETE ABUTMENT (Pay Item Nos. 3305.1) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Concrete Abutment shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.

B. Payment for Concrete Abutment shall be made at the amount shown on the Bid Schedule under Pay Item No. 3305.1, which payment shall constitute full compensation for all WORK described in Section 03305 – Concrete Abutment, as shown on the Plans and as directed by the ENGINEER.

# **DIVISION 16 – ELECTRICAL**

# 16.1 ELECTRICAL AND LIGHTING SYSTEMS (Pay Item No. 16000.1) PRICE BASED ON LUMP SUM

- A. Measurement for Electrical and Lighting Systems shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, including all electrical and lighting components and other miscellaneous appurtenances all in accordance with the requirements of the Contract Documents and as shown on the Plans. This includes new uplands lighting, water vault electrical, main switchboard, feeders, gangway lighting, panels and contactors, on floats, pedestals including power heads, float lighting, heat trace, and all other work shown on the electrical drawings. This also includes paying the City of Unalaska Electrical Utility for their work. The Electrical Utility work includes but is not limited to removing the existing transformer and re-routing the underground primary feeder, new transformer, and work to connect meters, conductors, etc.
- B. Payment for Electrical System shall be made at the amount shown on the Bid Schedule under Item No. 16000.1, which payment shall constitute full payment for all WORK described in Division 16 Electrical, as shown on the Plans and as directed by the ENGINEER.
- 16.2 ELECTRICAL SUPPORT ASSEMBLIES (Pay Item No. 16000.2) PRICE BASED ON LUMP SUM
  - A. Measurement for payment for Electrical Support Assemblies shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, including all above deck steel and UHMW electrical support items such as light poles with pedestal bases, pedestal bases, electrical support posts, heat trace junction boxes, UHMW spacer plates, UHMW base plates, UHMW cable guards, and all associated hardware and other associated miscellaneous appurtenances all in accordance with the requirements of the Contract Documents and as shown on the Plans.
  - B. Payment for Electrical Support Assemblies shall be made at the amount shown on the Bid Schedule under Pay Item No. 16000.2, which payment shall constitute full compensation for all WORK described in Section 05120 – Metal Fabrication for steel, and Section 02895 Moorage Floats for UHMW, as shown on the Plans and as directed by the ENGINEER.

# **END OF SECTION**

## **SECTION 01045 - CUTTING AND PATCHING**

## PART 1 - GENERAL

#### 1.1 DEFINITION

A. "Cutting and Patching" is defined to include the cutting and patching of nominally completed and previously existing concrete, steel, wood and miscellaneous metal structures; piping and pavement, in order to accommodate the coordination of WORK, or the installation of other facilities or structures or to uncover other facilities and structures for access or inspection, or to obtain samples for testing, or for similar purposes.

#### 1.2 REQUIREMENTS OF STRUCTURAL WORK

- A. Structural WORK shall not be cut and patched in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.
- B. Prior to cutting and patching the following categories of WORK, the CONTRACTOR shall obtain the ENGINEER's approval to proceed with:
  - 1. Structural steel
  - 2. Miscellaneous structural metals, including equipment supports, stair systems and similar categories of work
  - 3. Structural concrete
  - 4. Foundation construction including piles
  - 5. Timber and primary wood framing and bullrails
  - 6. Bearing and retaining walls
  - 7. Structural decking
  - 8. Pressurized piping, vessels and equipment
  - 9. Asphalt pavement, concrete or asphalt curb/gutter, and concrete sidewalk
  - 10. Concrete or timber floats

## 1.3 OPERATIONAL AND SAFETY LIMITATIONS

- A. The CONTRACTOR shall not cut and patch operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.
- B. Prior to cutting and patching the following categories of WORK, the CONTRACTOR shall obtain the ENGINEER's approval to proceed with:
  - 1. Sheeting, shoring and cross bracing
  - 2. Operating systems and equipment
  - 3. Water, moisture, vapor, air, smoke barriers, membranes and flashing
  - 4. Noise and vibration control elements and systems
  - 5. Control, communication, conveying and electrical wiring systems

#### 1.4 VISUAL REQUIREMENTS

A. The CONTRACTOR shall not cut and patch WORK which is exposed on the exterior or exposed in occupied spaces, in a manner resulting in a reduction of visual qualities or

## SECTION 01045 - CUTTING AND PATCHING

resulting in substantial evidence of the cut and patch work, both as judged solely by the ENGINEER. The CONTRACTOR shall remove and replace WORK judged by the ENGINEER to have been cut and patched in a visually unsatisfactory manner.

# 1.5 APPROVALS

A. Where prior approval of cutting and patching is required, the CONTRACTOR shall submit the request and obtain approval prior to performing the WORK. The request should include a description of why cutting and patching cannot reasonably be avoided; how it will be performed; how structural elements (if any) will be reinforced; products to be used; firms and tradespeople who will perform the WORK; approximate dates of the WORK; and anticipated results in terms of structural, operational, and visual variations from the original WORK.

## PART 2 - PRODUCTS

## 2.1 MATERIALS USED IN CUTTING AND PATCHING

- A. Except as otherwise indicated, the CONTRACTOR shall provide materials for cutting and patching which will result in equal-or-better WORK than the WORK being cut and patched, in terms of performance characteristics and including visual effects where applicable. The CONTRACTOR shall use material identical with the original materials where feasible.
- B. Materials shall comply with the requirements of the Technical Specifications wherever applicable.

## **PART 3 - EXECUTION**

# 3.1 PREPARATION

- A. The CONTRACTOR shall provide adequate temporary support for WORK to be cut to prevent failure.
- B. The CONTRACTOR shall provide adequate protection of other WORK during cutting and patching.

#### 3.2 INSTALLATION

- A. The CONTRACTOR shall employ skilled tradespeople to perform cutting and patching. Except as otherwise indicated, the CONTRACTOR shall proceed with cutting and patching at the earliest feasible time and perform the WORK promptly.
- B. The CONTRACTOR shall use methods least likely to damage WORK to be retained and WORK adjoining.
  - 1. In general, where physical cutting action is required, the CONTRACTOR shall cut WORK with sawing and grinding tools, not with hammering and chopping tools. Openings through concrete work shall be core-drilled and all final edges shall be ground smooth to prevent wear.
# **SECTION 01045 - CUTTING AND PATCHING**

- 2. Comply with the requirements of Technical Specifications wherever applicable.
- 3. Comply with the requirements of applicable sections of Division 2 where cutting and patching requires excavation and backfill.
- C. The CONTRACTOR shall patch with seams which are as invisible as possible and comply with specified tolerances for the WORK.
- D. The CONTRACTOR shall restore exposed seams of patched area; and, where necessary, extend finish restoration onto retained WORK adjoining, in a manner which will eliminate evidence of patching.

## SECTION 01070 - ACRONYMS OF INSTITUTIONS

#### PART 1 - GENERAL

#### 1.1 GENERAL

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms which may appear in these Specifications shall have the meanings indicated herein.

## 1.2 ACRONYMS

AAMA	Architectural Aluminum Manufacturer's Association				
AAR	Association of American Railroads				
AASHTO	American Association of State Highway and Transportation Officials				
AATCC	American Association of Textile Chemists and Colorists				
ABS	American Bureau of Shipping				
ACI	American Concrete Institute				
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.				
AGA	American Gas Association				
AGMA	American Gear Manufacturer's Association				
AHAM	Association of Home Appliance Manufacturers				
AI	The Asphalt Institute				
AIA	American Institute of Architects				
AISC	American Institute of Steel Construction				
AISI	American Iron and Steel Institute				
AITC	American Institute of Timber Construction				
AMCA	Air Moving and Conditioning Association				
ANS	American Nuclear Society				
ANSI	American National Standards Institute, Inc.				
APA	American Plywood Association				
API	American Petroleum Institute				
APWA	American Public Works Association				
ASA	Acoustical Society of America				
ASAE	American Society of Agricultural Engineers				
ASCE	American Society of Civil Engineers				
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning				
	Engineers				
ASLE	American Society of Lubricating Engineers				
ASME	American Society of Mechanical Engineers				
ASQC	American Society for Quality Control				
ASSE	American Society of Sanitary Engineers				
ASTM	American Society for Testing and Materials				
ATM	Alaska Test Methods				
AWPA	American Wood Preservers Association				
AWPI	American Wood Preservers Institute				
AWS	American Welding Society				
AWWA	American Water Works Association				

# SECTION 01070 - ACRONYMS OF INSTITUTIONS

BBC	Basic Building Code, Building Officials and Code Administrators				
	International				
BHMA	Builders Hardware Manufacturer's Association				
CBM	Certified Ballast Manufacturers				
CEMA	Conveyors Equipment Manufacturer's Association				
CGA	Compressed Gas Association				
CLFMI	Chain Link Fence Manufacturer's Institute				
CMA	Concrete Masonry Association				
CRSI	Concrete Reinforcing Steel Institute				
DCDMA	Diamond Core Drill Manufacturer's Association				
EIA	Electronic Industries Association				
ETL	Electrical Test Laboratories				
FPL	Forest Products Laboratory				
HI	Hydronics Institute				
ICBO	International Conference of Building Officials				
IEEE	Institute of Electrical and Electronics Engineers				
IES	Illuminating Engineering Society				
IME	Institute of Makers of Explosives				
IOS	International Organization for Standardization				
IP	Institute of Petroleum (London)				
IPC	Institute of Printed Circuits				
IPCEA	Insulated Power Cable Engineers Association				
ISA	Instrument Society of America				
ITE	Institute of Traffic Engineers				
MBMA	Metal Building Manufacturer's Association				
MPTA	Mechanical Power Transmission Association				
MTI	Marine Testing Institute				
NAAMM	National Association of Architectural Metal Manufacturer's				
NACE	National Association of Corrosion Engineers				
NBS	National Bureau of Standards				
NCCLS	National Committee for Clinical Laboratory Standards				
NEC	National Electrical Code				
NEMA	National Electrical Manufacturer's Association				
NFPA	National Fire Protection Association				
NFPA	National Forest Products Association				
NLGI	National Lubricating Grease Institute				
NMA	National Microfilm Association				
NWMA	National Woodwork Manufacturers Association				
OSHA	Occupational Safety and Health Administration				
PCA	Portland Cement Association				
RIS	Redwood Inspection Service				
RVIA	Recreational Vehicle Industry Association				
RWMA	Resistance Welder Manufacturer's Association				
SAE	Society of Automotive Engineers				
SAMA	Scientific Apparatus Makers Association				
SMA	Screen Manufacturers Association				
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association				
SPIB	Southern Pine Inspection Bureau				
SPR	Simplified Practice Recommendation				
SSA	Swedish Standards Association				

# SECTION 01070 - ACRONYMS OF INSTITUTIONS

SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

# PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

#### **SECTION 01090 - REFERENCE STANDARDS**

### PART 1 - GENERAL

#### 1.1 GENERAL

- A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.
- B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for Bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable Laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

## 1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all WORK specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.
  - 1. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO).
  - 2. Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for Bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.
  - 3. In case of conflict between codes, reference standards, Drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts

## SECTION 01090 - REFERENCE STANDARDS

shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall Bid for the most stringent requirements.

- B. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.
- C. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- D. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

## PART 1 – GENERAL

### 1.1 GENERAL

- A. Wherever submittals are required hereunder, all such submittals shall be submitted to the ENGINEER by the CONTRACTOR.
- B. Within 14 Days after the date of commencement as stated in the Notice To Proceed (NTP), the CONTRACTOR shall submit the following items to the ENGINEER for review:
  - 1. A preliminary schedule of Shop Drawings, sample, and proposed substitutes or "or-equal" submittals.
  - 2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.
  - 3. A complete progress schedule for all phases of the Project.
  - 4. Material Safety Data Sheets on products used on the Project.
  - 5. A traffic maintenance plan, as required.
  - 6. A plan for temporary erosion control and pollution control, as required.
  - 7. A letter designating the CONTRACTOR's Superintendent, defining that person's responsibility and authority.
  - 8. A letter designating the CONTRACTOR's safety representative and the Equal Employment Opportunity (EEO) Officer and that person's responsibility and authority.
- C. No payments shall be made to the CONTRACTOR until all of these items are submitted in their entirety, as determined by the ENGINEER.

## 1.2 SHOP DRAWING SUBMITTAL

- A. Wherever called for in the Contract Documents, or where required by the ENGINEER, the CONTRACTOR shall furnish electronic copies of each Shop Drawing submittal to the ENGINEER for review. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, Shop Drawings, fabrication drawings, installation drawings, erection drawings, lists, graphs, operating instructions, catalog sheets, data sheets, and similar items.
- B. All Shop Drawing submittals shall be accompanied by the CONTRACTOR's standard submittal transmittal form. Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for re-submittal.
- C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set bookmarked, as appropriate, prior to transmittal to the ENGINEER.

- D. Except as may otherwise be provided herein, the ENGINEER will return each submittal to the CONTRACTOR with comments noted thereon, within 30 calendar days following receipt of them by the ENGINEER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER by the second submission of a submittal item. The OWNER reserves the right to withhold monies due to the CONTRACTOR to cover additional costs of the ENGINEER's review beyond the second submittal. The ENGINEER's maximum review period for each submittal including all re-submittals will be 30 days per submission. In other works, for a submittal that requires two re-submittals before it is complete, the maximum review period for that submittal could be 90 days.
- E. If a submittal is returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.
- F. If a submittal is returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED," formal revision and resubmission of said submittal is not required.
- G. If a submittal is returned to the CONTRACTOR marked "AMEND-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the said revised submittal to the ENGINEER.
- H. If a submittal is returned to the CONTRACTOR marked "REJECTED-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the said revised submittal to the ENGINEER.
- I. Fabrication of an item may be commenced only after the ENGINEER has reviewed the pertinent submittal and returned copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the Contract Time, or Specifications.
- J. All CONTRACTOR Shop Drawing submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR, prior to submission to the ENGINEER. Each submittal shall be dated, signed, and certified by the CONTRACTOR, as being correct and in strict conformance with the Contract Documents. In the case of Shop Drawings, each sheet shall be dated, signed, and certified. No consideration for review by the ENGINEER of any CONTRACTOR submittal will be made for any items which have not been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused by thereby shall be the total responsibility of the CONTRACTOR.
- K. The ENGINEER's review of CONTRACTOR Shop Drawing submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

## 1.3 SAMPLES SUBMITTAL

- A. Whenever in the Specifications samples are required, the CONTRACTOR shall submit not less than three (3) samples of each item or material to the ENGINEER for acceptance at not additional cost to the OWNER.
- B. Samples, as required herein, shall be submitted for acceptance a minimum of 21 days prior to ordering such material for delivery to the job site, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the WORK.
- C. All samples shall be individually and indelibly labeled or tagged indicating thereon all specified physical characteristics and supplier's names for identification and submitted to the ENGINEER for acceptance. Upon receiving acceptance of the ENGINEER, one (1) set of the samples will be stamped and dated by the ENGINEER and returned to the CONTRACTOR, and one (1) set of samples will be retained by the ENGINEER, and one (1) set of samples shall remain at the job site until completion of the WORK.
- D. Unless clearly stated otherwise, it is assumed that all colors and textures of specified items presented in sample submittal are from the manufacturer's standard colors and standard materials, products, or equipment lines. If the samples represent non-standard colors, materials, products or equipment lines, and their selection will require an increase in Contract Time or Contract Price, the CONTRACTOR will clearly indicate this on the transmittal page of the submittal.

## 1.4 OPERATIONS AND MAINTENANCE MANUAL SUBMITTAL

- A. The CONTRACTOR shall include in the Operations and Maintenance Manuals for each item of mechanical, electrical, and instrumentation equipment, the following:
  - 1. Complete operating instructions, including location of controls, special tools or other equipment required, related instrumentation, and other equipment needed for operation.
  - 2. Lubrication schedules, including the lubricant SAE grade and type, temperature range of lubricants, and including frequency of required lubrication.
  - 3. Preventive maintenance procedures and schedules.
  - 4. Parts lists, by generic title and identification number, complete, with exploded views of each assembly.
  - 5. Disassembly and reassembly instructions.
  - 6. Name and location of nearest supplier and spare parts warehouse.
  - 7. Recommended troubleshooting and startup procedures.
  - 8. Reproducible prints of the record Drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of these Specifications.
  - 9. Tabulation of proper settings for all pressure relief valves, (low/high) pressure switches and other related equipment protection devices.
  - 10. Detailed test procedures to determine performance efficiency of equipment.
  - 11. List of all electrical relay settings including alarm and contract settings.

- B. The CONTRACTOR shall furnish to the ENGINEER two identical sets of Operations and Maintenance manuals. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A table of contents shall be provided which indicates all equipment in the manuals. As an alternative, bookmarked PDF files of the Operations and Maintenance manuals may be furnished.
- C. All Operations and Maintenance manuals and any other required technical manuals shall be submitted complete and in final form to the ENGINEER prior to the requests for final payment.
- D. Incomplete or unacceptable Operations and Maintenance Manuals shall constitute sufficient justification to withhold payment for WORK completed.

### 1.5 SPARE PARTS LIST SUBMITTAL

A. The CONTRACTOR shall furnish to the ENGINEER two (2) identical sets of spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which each manufacturer recommends be maintained by the OWNER in the inventory at the plant site. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to facilitate the OWNER in ordering. The CONTRACTOR shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. The spare parts lists shall be bound in standard size, 3-ring, loose leaf, vinyl plastic hard cover binders suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. As an alternative, bookmarked PDF files of the spare parts information may be furnished.

## 1.6 RECORD DRAWINGS SUBMITTALS

- A. The CONTRACTOR shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record Drawings, of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by Addenda, Change Orders, and the like shall be maintained up-to-date during the progress of the WORK.
- B. In the case of those Drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by Change Order Drawings or final Shop Drawings, and by including appropriate reference information describing the Change Orders by number and the Shop Drawings by manufacturer, Drawing, and revision numbers.

- C. Record drawings shall be accessible to the ENGINEER at all times during the construction period and shall be delivered to the ENGINEER on the 20<sup>th</sup> working day of every third month after the month in which the Notice to Proceed is given as well as upon completion of the WORK.
- D. Final payment will not be acted upon until the CONTRACTOR-prepared Record Drawings have been delivered to the ENGINEER.

### 1.7 PROGRESS SCHEDULES

- A. The progress schedule shall be in Bar Chart or Critical Path Method (CPM) form as required by the ENGINEER.
- B. The progress schedule shall show the order in which the CONTRACTOR proposes to carry out the WORK and the contemplated date on which the CONTRACTOR and their Subcontractors will start and finish each of the salient features of the WORK, including any scheduled periods of shutdown. The schedule shall also indicate any anticipated periods of multiple-shift WORK.
- C. Upon substantial changes to the CONTRACTOR's progress schedule of work or upon request of the ENGINEER, the CONTRACT shall submit a revised progress schedule(s) in the form required. Such revised schedule(s) shall conform with the contract time and take into account delays which may have been encountered in the performance of the WORK. In submitting a revised schedule, the CONTRACTOR shall state specifically the reason for the revision and the adjustments made in his schedule or methods of operation to ensure the completion of all the WORK within the contract time.

### 1.8 PROPOSED SUBSTITUTES OR "OR-EQUAL" ITEM SUBMITTAL

- A. 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 equality required. If the name is followed by the words "or-equal" indicating that a substitution is permitted, materials or equipment of other suppliers may be accepted by the ENGINEER if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:
  - 1. The burden of proof as to the type, function, and quality of any such substitute material or equipment shall be upon the CONTRACTOR.
  - 2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute material or equipment and the ENGINEER's decision shall be final.
  - 3. The ENGINEER may require the CONTRACTOR, to furnish at the CONTRACTOR's expense, additional data about the proposed substitute.

- 4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
- 5. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute item.
- 6. The CONTRACTOR shall be responsible for resultant changes and all additional costs which the accepted substitution requires in the CONTRACTOR's WORK, the WORK of its Subcontractors and of other contractors, and shall effect such changes without cost to the OWNER. This shall include the cost for redesign and claims of other Contractor affected by the resulting change.
- B. The procedure for review by the ENGINEER will include the following:
  - 1. If the CONTRACTOR proposes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the ENGINEER on the "Substitution Request Form" for acceptance thereof.
  - 2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the "Substitution Request Form(s)" shall be submitted within the 21-day period after Notice To Proceed.
  - 3. Wherever a proposed substitute material or equipment has not been submitted within said 21-day period, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide material or equipment named in the Contract Documents.
  - 4. The CONTRACTOR shall certify 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.
  - 5. The ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. In no case will this reasonable time period be less than 30 days.
  - 6. As applicable, no Shop Drawing submittals will be made for a substitute item nor will any substitute item be ordered, installed, or utilized without the ENGINEER's prior written acceptance of the CONTRACTOR's "Substitution Request Form" which will be evidenced by a Change Order.
  - 7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the ENGINEER accepts a proposed substitute, the CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitute.
- C. The CONTRACTOR's application using the "Substitution Request Form" shall contain the following statements and/or information which shall be considered by the ENGINEER in evaluating the proposed substitution:

- 1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of Substantial Completion on time.
- 2. Whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitute.
- 3. Whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty.
- 4. All variations of the proposed substitute for that specified will be identified.
- 5. Available maintenance, repair, and replacement service and its estimated cost will be indicated.
- 6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

## 1.9 MATERIAL CERTIFICATION SUBMITTAL

- A. The ENGINEER may permit the use, prior to sampling, inspection and testing, of certain materials or assemblies when accompanied by manufacturer's material certifications stating that such materials or assemblies fully comply with the requirements of the Contract. The certification shall be signed by the manufacturer, and will specifically reference the material's compliance with the AASHTO, ASTM and/or other standards specified in the applicable Contract Documents.
- B. Material certifications shall be submitted to the ENGINEER prior to incorporating the item into the WORK.
- C. Materials or assemblies used on the basis of material certifications may be sampled, inspected and/or tested at any time, and if found not in conformity with these specifications, will be subject to rejection whether in place or not.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

### (SUBSTITUTION REQUEST FORM - next page)

# **SUBSTITUTION REQUEST FORM**

TO:			Project:				
Conti	ract No.:						
OWN	VER:						
SPEC	CIFIED ITEM:						
Section	on Page		Paragraph	Description			
The u	indersigned requests consider	ation of the followin	ng:				
Attac data a The u 1. 2.	thed data includes product de adequate for evaluation of the undersigned states that the foll The proposed substitution change in any of the Contr The undersigned will pay	scription, specificat request. Applicable owing paragraphs, u does not affect dim act Documents. for changes to the c	tions, drawings, photo e portions of the data a unless modified on atta tensions shown on Dr design, including engin	achments are correct: awings and will not require a neering design, detailing, and			
3.	Construction costs caused by the requested substitution which is estimated to be \$ The proposed substitution will have no adverse affect on other contractors, the construction schedule (specifically the date of substantial completion), or specified warranty requirements.						
4.	Maintenance and service p	Maintenance and service parts will be locally available for the proposed substitution.					
5.	The incorporation or use o of any license fee or royalt	f the substitute in co y.	onnection with the WC	ORK is not subject to payment			
The u equiv	undersigned further states that valent or superior to the Specif	the function, appeared item.	arance, and quality of	the Proposed Substitution are			
Submitted by CONTRACTOR:			Reviewed by ENGINEER				
Signature			□ Accepted	□ Accepted as Noted			
Firm: By: Title:			□ Not Accepted Date: Telephone:	Received Too Late			
Date:	hmonto.		· -				
Attac	enments:						
		END OF SI	ECTION				

## SECTION 01400 - QUALITY CONTROL

## PART 1 - GENERAL

#### 1.1 DEFINITION

A. Specific quality control requirements for the WORK are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

#### 1.2 INSPECTION AT PLACE OF MANUFACTURE

- A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the ENGINEER at the place of manufacture.
- B. The presence of the ENGINEER at the place of manufacturer, however, shall not relieve the CONTRACTOR of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the ENGINEER.

## 1.3 SAMPLING AND TESTING

- A. Unless otherwise indicated, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, ATM, and AASHTO as applicable to the class and nature of the article or materials considered; however, the OWNER reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the ENGINEER will insure the OWNER that the quality of the workmanship is in full accord with the Contract Documents.
- B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial WORK, shall not be construed as a waiver of any requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the ENGINEER reserves the right to make independent investigations and tests, and failure of any portion of the WORK to meet any of the requirements of the Contract Documents, shall be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such work in accordance with the General Conditions.

### 1.4 INSPECTION AND TESTING LABORATORY SERVICE

- A. Inspection and testing laboratory service shall comply with the following:
  - 1. OWNER will appoint, employ, and pay for services of an independent firm to perform inspection and testing or will perform inspection and testing itself unless specific quality control testing is required by the CONTRACTOR under these specifications.

# SECTION 01400 - QUALITY CONTROL

- 2. The ENGINEER will perform inspections as specified in individual specification sections, unless specified otherwise.
- 3. Reports will be submitted by the independent firm to the ENGINEER in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- 4. The CONTRACTOR shall cooperate with the ENGINEER or independent firm and furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
- 5. The CONTRACTOR shall notify ENGINEER 24 hours prior to the expected time for operations requiring inspection and laboratory testing services.
- 6. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The CONTRACTOR shall bear all costs from such retesting at no additional cost to the OWNER.
- 7. For samples and tests required for CONTRACTOR'S use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR'S use shall be included in the Contract Price.

# PART 2 - PRODUCTS (Not Used)

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Inspection: The CONTRACTOR shall inspect materials or equipment upon the arrival on the job site and immediately prior to installation, and reject damaged and defective items.
- B. Measurements: The CONTRACTOR shall verify measurements and dimensions of the WORK, as an integral step of starting each installation.
- C. Manufacturer's Instructions: Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

# PART 1 - GENERAL

### 1.1 GENERAL

- A. Mobilization shall include the obtaining of all PERMITS; moving onto the site of all plant and equipment; furnishing and erecting plants, temporary buildings, and other construction facilities; and implementing security requirements; all as required for the proper performance and completion of the WORK. Mobilization shall include the following principal items:
  - 1. Moving on to the site of all CONTRACTOR's plant and equipment required for operations.
  - 2. Providing all on-site communication facilities, including radios and cellular phones.
  - 3. Providing on-site sanitary facilities.
  - 4. Obtaining all required PERMITS.
  - 5. Having all OSHA required notices and establishment of safety programs.
  - 6. Having the CONTRACTOR's superintendent at the job site full time.
  - 7. Submitting initial submittals.

## 1.2 PAYMENT FOR MOBILIZATION

- A. The CONTRACTOR's attention is directed to the condition that no payment for Mobilization, or any part thereof will be approved for payment under the contract until all Mobilization items listed above have been completed as specified.
- B. As soon as practicable after receipt of the Notice to Proceed, the CONTRACTOR shall submit a breakdown to the ENGINEER for approval, which shall show the estimated value of each major component of Mobilization. When approved by the ENGINEER, the breakdown will be the basis for initial progress payments in which Mobilization is included.

## PART 2 – PRODUCTS (Not Used)

### PART 3 – EXECUTION (Not Used)

# PART 1 - GENERAL

## 1.1 SECURITY PROGRAM

- A. The CONTRACTOR shall:
  - 1. Protect WORK, existing premises and OWNER's operations from theft, vandalism, and unauthorized entry.
  - 2. Coordinate security with OWNER's operations at job mobilization.
  - 3. Maintain program throughout construction period until OWNER's occupancy.

### 1.2 ENTRY CONTROL

- A. The CONTRACTOR shall:
  - 1. Control entry of persons and vehicles onto Project construction site and existing facilities. Utilize fencing and gates as required to control entry.
  - 2. Allow entry on the construction site only to authorized persons with proper identification.
  - 3. Coordinate access of OWNER's personnel to site in coordination with CONTRACTOR's security forces.
- B. OWNER will control entrance of persons and vehicles related to OWNER's operations.

#### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION (Not Used)

# PART 1 - GENERAL

## 1.1 GENERAL

- A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. All utility locates shall be the responsibility of the CONTRACTOR. CONTRACTOR shall comply with Alaska State Law and coordinate for locates of all underground utilities within the WORK limits prior to any WORK.
- C. The CONTRACTOR shall verify the exact locations and depths of all utilities and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the WORK. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's WORK. Any utility or service in conflict with the WORK will be reburied by the CONTRACTOR prior beginning the WORK to avoid damage.
- D. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.
- E. The ENGINEER shall be notified of the CONTRACTOR's field-locate schedule.

### 1.2 RIGHTS-OF-WAY

- A. The CONTRACTOR shall not do any work that would affect any oil, gas, sewer, or water pipeline; any telephone, cable television, telegraph, or electric transmission line; any fence; or any other structure, nor shall the CONTRACTOR enter upon the rights-of-way involved until notified by the ENGINEER that the OWNER has secured authority therefore from the proper party. After authority has been obtained, the CONTRACTOR shall give said party due notice of its intention to begin work, if required by said party, and shall remove, shore, support or otherwise protect such pipeline, transmission line, ditch, fence, or structure or replace the same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the OWNER shall determine the sequence and order of the WORK. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the OWNER to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted.
- B. No such decision as to the method or time of conducting the WORK or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the WORK in Article 15 of the General Conditions of the contract.

## 1.3 PROTECTION OF SURVEY MONUMENTS, STREET AND/OR ROADWAY MARKERS

A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey monuments, markers or points disturbed by the CONTRACTOR

## SECTION 01530 - PROTECTION AND RESTORATION OF EXISTING FACILITIES

shall be accurately re-established, at the CONTRACTOR's expense unless provided for elsewhere in the contract, after all street or roadway resurfacing has been completed. Re-establishment of all survey monuments shall be by a Registered Alaskan Land Surveyor.

#### 1.4 RESTORATION OF PAVEMENT

- A. General: All paved areas, including asphalt concrete berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement OWNER. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.
- C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.
- D. Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private roads have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

#### 1.5 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The CONTRACTOR shall protect all above ground, underground and offshore utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the OWNER to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- C. Where the proper completion of the WORK requires the temporary or permanent removal

### SECTION 01530 - PROTECTION AND RESTORATION OF EXISTING FACILITIES

and/or relocation of an existing utility or other improvement which is indicated, the CONTRACTOR shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

- D. OWNER's Right of Access: The right is reserved to the OWNER and to the OWNERS of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this contract.
- E. Underground Utilities Indicated: Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.
- F. Underground Utilities Not Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the ENGINEER. If directed by the ENGINEER, repairs shall be made by the CONTRACTOR under the provisions for changes and extra WORK contained in the General Conditions.
- G. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the WORK which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such WORK will be paid for as extra WORK in accordance with the corresponding provisions of the General Conditions.
- H. Approval of Repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement OWNER before being concealed by backfill or other WORK.
- I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone, cable television or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the ENGINEER are made with the OWNER of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

#### 1.6 TREES WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing

## SECTION 01530 - PROTECTION AND RESTORATION OF EXISTING FACILITIES

trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.

- 1. <u>Trimming</u>: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.
- 2. <u>Replacement</u>: The CONTRACTOR shall immediately notify the jurisdictional agency and/or the OWNER if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the OWNER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, the CONTRACTOR shall pay to the OWNER of said tree a compensatory payment acceptable to the tree OWNER, subject to the approval of the jurisdictional agency or OWNER.

### 1.7 PROTECTION OF EXISTING STRUCTURES

- A. Compaction Equipment and Operations: The CONTRACTOR shall restrict its compaction operations as necessary to assure no damage occurs to adjacent buildings. This may require the use of smaller compaction equipment than is usually employed for trench backfill and roadway embankment compaction operations when in the vicinity of buildings sensitive to vibrating or other impact-type activities. It shall be the CONTRACTOR's responsibility to determine in which areas of the project the compaction operations must be restricted, to avoid damage to existing buildings. The CONTRACTOR is advised that some structures on the project, especially those founded on steep or unstable ground, and are especially sensitive to vibrations caused by heavy construction equipment. The foregoing restrictions on the size of, and magnitude of impact energy exerted by, compaction equipment will in no way relieve the CONTRACTOR from the compaction requirements as specified in other Sections of the Contract.
- B. The CONTRACTOR shall notify all affected businesses and other residents in advance of any operations that will cause vibrations that may damage belongings within the buildings. All property damage caused by the CONTRACTOR's operations shall be repaired or replaced at CONTRACTOR's expense.

### PART 2 PRODUCTS – (Not Used)

### PART 3 EXECUTION - (Not Used)

## PART 1 - GENERAL

1.1 HIGHWAY LIMITATIONS. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge and dock load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

## 1.2 TEMPORARY CROSSINGS

- A. General: Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, private residences, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 200 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to private driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time, as approved by the ENGINEER.
- B. Temporary Bridges: Wherever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the ENGINEER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

### 1.3 MAINTENANCE OF TRAFFIC

- A. General: Unless otherwise provided, the roadway undergoing improvements shall be kept open to all traffic by the CONTRACTOR. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. The CONTRACTOR shall provide unimpeded access through the Project limits for emergency vehicles and make every effort to provide minimum delay to United States Postal Service vehicles and garbage collection vehicles.
- B. The CONTRACTOR shall submit an approved traffic control plan to the ENGINEER for approval a minimum of two (2) weeks prior to construction. The ENGINEER reserves the right to observe these traffic control Plans in use and to make any changes as field conditions warrant. Any changes shall supersede these Plans and be done solely at the CONTRACTOR's expense.
- C. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where so provided on the Plans or otherwise approved by the ENGINEER, the CONTRACTOR may by-pass traffic over a detour route. When no longer required, the detour shall be removed and the approached obliterated.

- D. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the WORK shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.
- E. The CONTRACTOR's equipment shall stop at all points of intersection with the traveling public unless satisfactory traffic control measures, approved in writing by the ENGINEER, are installed and maintained at CONTRACTOR's expense.
- F. When the CONTRACTOR is required to maintain traffic through grading, roadway excavation and embankment areas, the construction shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times. The surface of the roadbed shall be properly crowned for drainage. In advance of other grading operations, sufficient fill shall be placed at culverts and bridges to permit traffic to cross unimpeded. Part width construction techniques shall be employed when the traffic is routed through roadway cuts or over embankments under construction. The material shall be excavated or placed in layers and the construction activities shall be alternated from one side to the other, with traffic routed over the side opposite the one under construction.
- G. During the removal and laying of culvert pipe, a maximum time of one hour of road closure may be permitted, providing the removal and laying of the culvert pipe cannot be completed for one-half width of the roadway and provided that a detour cannot be constructed around the culvert being laid. Closure shall be scheduled so as not to delay traffic. The CONTRACTOR shall post, at the site of the closure within view of the waiting public traffic, the time the closure started and the time the road will again be open to traffic. The CONTRACTOR shall notify the Fire and Police Departments of such closures prior to commencement of WORK.
- H. At intervals of 48 hours and 24 hours prior to start up of construction operations, and at weekly intervals during the construction period, the CONTRACTOR shall advertise in the local newspaper and have broadcast on all local radio stations the precise location, time of commencement, and proposed completion date of the WORK scheduled for the following week which will require detouring or otherwise effect public traffic. Detours shall be described in sufficient detail to efficiently inform the traveling public of the modified traffic pattern. The cost of these advertisements shall be considered incidental to other contract Bid items. The CONTRACTOR will notify the property owners 24 hours prior to commencement of WORK.
- I. When, in the opinion of the ENGINEER, conditions are such that the safety and/or convenience of the traveling public is adversely affected, the CONTRACTOR will be immediately notified in writing. The notice will state the defect(s) and the corrective action(s) required. In the event that the CONTRACTOR neglects to take immediate corrective action, the ENGINEER may suspend all WORK on the project until satisfactory corrective action is performed. In the event the CONTRACTOR does not take corrective action within 24 hours, the ENGINEER may order such WORK as deemed necessary for public convince and safety accomplished by outside forces. The cost of this WORK shall be deducted from any monies due or that may become due under the terms or the Contract.

- J. The CONTRACTOR shall bear all expense of maintaining the traffic over the section of road undergoing improvement, including dust control and snow plowing, and of constructing and maintaining such approaches, crossings, intersections, and other features as may be necessary, without direct compensation, except as provided below:
  - 1. Special Detours. When the proposal contains a Bid item for detours, the payment for such item shall cover all cost of constructing and maintaining such detour or detours, including the construction of any and all temporary bridges and accessory features and the removal of the same, and obliteration of the detour road. Right-of-way for temporary highways or bridges will be furnished by the OWNER.
  - 2. Maintenance of Traffic during Suspension of WORK. The CONTRACTOR shall make passable and shall open to traffic such portions of the Project and temporary roadways as may be agreed upon between the CONTRACTOR and the ENGINEER for the temporary accommodation of necessary traffic during the anticipated period of suspension. If the suspension is seasonal (winter shutdown), thereafter, and until an issuance of an order for the resumption of construction operations, the maintenance of the temporary route of line of travel agreed upon will be the responsibility of the OWNER. Prior to the OWNER accepting the Project for winter shutdown, the CONTRACTOR shall do all WORK necessary to provide a roadway surface and subgrade that will not require the OWNER to perform additional maintenance WORK during the shutdown period, except for purpose of snow removal. If the WORK is suspended due to unfavorable weather, failure of the CONTRACTOR to correct conditions unsafe for the workers or the general public, failure to carry out provisions of the contract, or for failure to carry out orders of the ENGINEER, all costs for maintenance of traffic during the suspended period shall be borne by the CONTRACTOR. When WORK is resumed, the CONTRACTOR shall replace or renew any WORK or materials lost or damaged because of temporary use of the project; shall remove, to the extent directed by the ENGINEER, any WORK or materials used in the temporary maintenance; and shall complete the Project as though its prosecution had been continuous and without interference.
- K. Traffic Control: All locations requiring redirection or stopping of the traveling public shall be properly signed and/or flagged by the CONTRACTOR. For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, flaggers and provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," (MUTCD) published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1) with the current State of Alaska supplements.
- L. The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety Regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.
- M. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

- N. Temporary Street Closure: If closure of any street is required during construction, the CONTRACTOR shall obtain all required permits and approvals at least 30 days in advance of the required closure and again at 48 hours. A Detour and Traffic Control Plan shall accompany the application.
- O. The CONTRACTOR shall notify the Police and Fire Departments and any other affected agency of all planned street closures. Notification shall consist of giving the time of commencement and proposed date of completion of WORK and names of street, schedule of operations, and routes of detours. Such notification shall be given at least 48 hours before such closure is to take effect.
- P. Temporary Driveway Closure: The CONTRACTOR shall maintain access to all residential, commercial and street approaches. Any temporary closures shall require prior approval by the ENGINEER. The CONTRACTOR shall notify the OWNER or occupant (if not owner-occupied) of the closure of the driveways to be closed more than one (1) eight-hour work day at least three (3) working days prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the owner/occupant how long the WORK will take and when closure is to start.
- Q. On-Site Cellular Phones: The CONTRACTOR shall maintain one active cellular phone at the project site at all times with the phone number provided to the Fire, Police and Engineering Departments. The cellular phone shall be carried by the person in charge of the field operations. The CONTRACTOR shall provide and allow the use of the CONTRACTOR's radio frequency to facilitate communication between the CONTRACTOR and the ENGINEER.
- R. Street Closure Requirements. The following street closure allowances and limitations shall apply to this contract, and shall take precedence over any conflicting public access requirements and limitations given elsewhere in the Contract Documents.
  - 1. The CONTRACTOR will not be permitted to obstruct vehicular traffic between the hours of 4:30pm and 8:00am, seven (7) days per week.
  - 2. Emergency vehicle, pedestrian, garbage, and mail delivery access is required at all times. The CONTRACTOR shall contact local waste disposal company regarding any work affecting scheduled garbage pickup.
  - 3. Street closure to vehicular traffic will not be permitted until all Project site residents or other users of Project site parking lots affected by the closure have been notified. This notification shall be given at least eight (8) hours prior to the closure.
  - 4. At the time of each road closure, the CONTRACTOR shall contact the Fire and Police Departments and inform them of the planned period of closure. Further contact shall be made when the planned closure period is changed.

### 1.4 CONTRACTOR'S WORK AND STORAGE AREA

- A. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK.
- B. Should the CONTRACTOR find it necessary to use any additional land for its camp or for other purposes during the construction of the WORK, it shall provide for the use of such lands at its own expense.

- C. The CONTRACTOR shall provide and use a separate storage area(s) for hazardous materials used in constructing the WORK.
  - 1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: **Warning, Caution, Poisonous, Toxic, Flammable, Corrosive, Reactive, or Explosive**. In addition, whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.
  - 2. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.
  - 3. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.

### 1.5 PARKING

A. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION (Not Used)

## SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

## PART 1 - GENERAL

- 1.1 DUST ABATEMENT. The CONTRACTOR shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The CONTRACTOR shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER.
- 1.2 RUBBISH CONTROL. During the progress of the WORK, the CONTRACTOR shall keep the site of the WORK and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the WORK site, and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

## 1.3 SANITATION

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.
- B. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.
- 1.4 CHEMICALS. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer. In addition, see the requirements set forth in paragraph 6.11 of the General Conditions.

### 1.5 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").
- B. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

## SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, stop work immediately and notify the ENGINEER.

## 1.6 SILTATION AND TURBIDITY DURING PILE INSTALLATIONS

- A. The CONTRACTOR shall install a discharge containment system for implementation during all pile installation operations when slurry within the pile is removed. The containment system shall capture all drilled materials and water discharged from the pile as further specified in Section 02896.
- B. Maintain containment system as required to control turbidity.

## PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

## SECTION 01570 – EROSION AND SEDIMENT CONTROL

## PART 1 - GENERAL

#### 1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide for erosion control during construction in accordance with the requirements of the Alaska Department of Environmental Conservation (ADEC). All discharge of pollutants and sedimentation from onsite drainage shall be caught on-site.
- B. Erosion Control includes preparation and maintenance of a Storm Water Pollution Prevention Plan (SWPPP), control of erosion, sedimentation and discharge of pollutants, in accordance with the ADEC Construction General Permit (CGP).
- C. The WORK under this section includes providing all labor, materials, tools and equipment necessary to construct and maintain temporary erosion control works; including but not limited to, wattles, silt fences, silt containment booms, settling ponds, check dams, ditches, etc.

## **PART 2 - PRODUCTS**

## 2.1 MATERIALS

A. Materials shall be suitable for the intended use and perform effectively to control silt and surface erosion. All materials shall remain the property of the CONTRACTOR.

### PART 3 - EXECUTION

### 3.1 GENERAL

- A. The CONTRACTOR is responsible to prepare, submit and maintain a SWPPP, as required by the CGP, that is in accordance with their construction methodologies and sequences.
  - 1. For projects disturbing greater than 1 Acre, this requirement shall include submission of a Notice of Intent (NOI) to ADEC prior to beginning of WORK. Copies of the NOI and SWPPP shall also be submitted to the ENGINEER within 5 days of submittal to ADEC.
  - 2. For projects disturbing less than 1 acre, the SWPPP shall be submitted to the ENGINEER prior to the beginning of WORK; submittal to ADEC or an NOI are not required.
- B. WORK at the Project site will not be permitted until the above documents are submitted to the ENGINEER and acceptance of this plan has been obtained from the governing agency or agencies (if required by the CGP).
- C. The CONTRACTOR shall install temporary erosion control structures and devices as required by their SWPPP, prepared in accordance with the ADEC CGP. They shall be maintained in effective operating condition at all times. Prior to completion of work, the CONTRACTOR shall clean and remove all silt and debris from the settling pond and check dams.

## SECTION 01570 – EROSION AND SEDIMENT CONTROL

- D. Temporary erosion control structures shall remain in place until the project is completed and replaced by permanent erosion control WORK, protected by final stabilization or until the ENGINEER approves their removal.
- E. The CONTRACTOR shall be responsible for meeting the requirements of all permits (including permits naming the OWNER, or other parties); therefore, shall be responsible for the quality of the run-off water from the Project site and for any fines and/or penalties resulting from the construction operation.
- F. The CONTRACTOR shall submit NOT (Notice of Termination) at completion of the WORK and removal of all SWPPP items.
# SECTION 01580 - CONTAMINATED MATERIALS

# PART 1 - GENERAL

- 1.1 DESCRIPTION. The WORK under this Section requires providing all labor, materials, tools and equipment necessary for the removal of contaminated soils from excavations encountered throughout the WORK. WORK includes excavation, bagging, and stockpiling of contaminated soils on site, and coordination with an OWNER designated consultant to complete all necessary reporting and coordination with the Alaska Department of Environmental Conservation (ADEC) as required by law.
  - A. ADEC Division of Contaminated Sites does not list this site as a contaminated site. There have not been any contaminated materials specifically identified; however, reportedly a fuel spill occurred in the region designated on the Plans. According to UniSea Incorporated, the initiator of the spill, this spill was reported to ADEC and subsequently cleanup was coordinated with ADEC and fully accomplished to their satisfaction.
  - B. This WORK is contingent upon the CONTRACTOR encountering contaminated soils.
  - C. All work related to the excavation, handling, stockpile and storage of contaminated materials shall be performed in accordance with Alaska Administrative Code (AAC); 18 AAC 75. Nothing in this specification shall be construed as relieving the CONTRACTOR of the responsibility to comply with local, state or federal regulations related to the WORK.

# PART 2 - PRODUCTS

- 2.1 CONTAMINATED MATERIAL BAGS
  - A. Contaminated material bags shall be provided by the OWNER.

# PART 3 - EXECUTION

## 3.1 GENERAL

- A. In the event the CONTRACTOR encounters contaminated materials, WORK shall be immediately stopped and the CONTRACTOR shall contact the ENGINEER to verify the contamination.
  - 1. Contamination will initially be identified by olfactory and visual methods but identification may progress to Owner provided photoionization detection (PID) if determined necessary by the ENGINEER.
- B. The CONTRACTOR shall not proceed with other work within the area until notified in writing by the ENGINEER to proceed.

# 3.2 CONTAMINATED MATERIALS

- A. CONTRACTOR shall excavate, bag and stockpile on site all materials contaminated with hydrocarbons as determined by the ENGINEER to the extent necessary to complete the WORK.
- B. Stockpile and temporary on site storage of the contaminated material shall be the responsibility of the CONTRACTOR and shall be performed in accordance with 18 AAC 75.370.

# ROBERT STORRS HARBOR-C FLOAT REPLACEMENTCONTAMINATED MATERIALSDPW Project No. 12601Page 01580-1

# SECTION 01580 – CONTAMINATED MATERIALS

C. The OWNER shall complete removal of the contaminated materials once ADEC has provided appropriate authorizations.

## SECTION 01600 - MATERIALS AND EQUIPMENT

# PART 1 - GENERAL

## 1.1 GENERAL

- A. The word "Products," as used herein, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the WORK.

# 1.2 QUALITY ASSURANCE

- A. <u>Source Limitations</u>: To the greatest extent possible for each unit of WORK, the CONTRACTOR shall provide products, materials, or equipment of a singular generic kind from a single source.
- B. <u>Compatibility of Options</u>: Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment already selected. Compatibility is a basic general requirement of product/material selections.
- 1.3 PRODUCT DELIVERY/STORAGE/HANDLING. The CONTRACTOR shall deliver, handle, and store products in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

## 1.4 TRANSPORTATION AND HANDLING

- A. Products shall be transported by methods to avoid product damage and shall be delivered in undamaged condition in manufacturer's unopened containers or packaging.
- B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment by methods to prevent soiling and damage.
- C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

## SECTION 01600 - MATERIALS AND EQUIPMENT

## 1.5 STORAGE AND PROTECTION

- A. Products shall be stored in accordance with manufacturer's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's written instructions.
- B. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.
- C. Loose granular materials shall be stored on solid surfaces in a well-drained area and shall be prevented from mixing with foreign matter.
- D. Storage shall be arranged in a manner to provide access for maintenance and inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions.

#### 1.6 MAINTENANCE OF STORAGE

- A. Stored products shall be periodically inspected on a scheduled basis. The CONTRACTOR shall maintain a log of inspections and shall make said log available to the ENGINEER on request.
- B. The CONTRACTOR shall verify that storage facilities comply with manufacturer's product storage requirements.
- C. The CONTRACTOR shall verify that manufacturer-required environmental conditions are maintained continually.
- D. The CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes does not occur.
- E. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.
- F. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the OWNER in accordance with the Contract Documents.

## PART 2 - PRODUCTS (Not Used)

# PART 3 - EXECUTION (Not Used)

# PART 1 - GENERAL

#### 1.1 FINAL CLEAN UP

A. The CONTRACTOR shall promptly remove from the vicinity of the completed WORK, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily compiled with the foregoing requirements for final cleanup of the Project site.

## 1.2 CLOSEOUT TIMETABLE

A. The CONTRACTOR shall establish dates for equipment testing, acceptance periods, and on-site instructional periods as required under the contract. Such dates shall be established not less than one (1) week prior to beginning any of the foregoing items, to allow the OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

# 1.3 FINAL SUBMITTALS

- A. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the ENGINEER for transmittal to the OWNER:
  - 1. Written guarantees, where required
  - 2. Maintenance stock items; spare parts; special tools, where required
  - 3. Completed record Drawings
  - 4. Certificates of inspection and acceptance by local governing agencies having jurisdiction
  - 5. Releases from all parties who are entitled to claims against the subject Project, property, or improvement pursuant to the provisions of law
  - 6. Compliance Certificate and Release form signed by the CONTRACTOR shall be submitted to the Port Director (blank attached to this Section).
- B. Before final payment can be made, the CONTRACTOR shall supply a copy of the "Notice of Completion of Public Works" form approved by Wage and Hour Administration of the Labor Standards and Safety Division of the Alaska Department of Labor and Workforce Development.
- C. Before final payment, the CONTRACTOR shall provide the OWNER with clearance from the Alaska Department of Labor and Workforce Development for the CONTRACTOR and all Subcontractors that have worked on the Project. This clearance shall indicate that all Employment Security Taxes have been paid. A sample form for this purpose is at the end of Section 00800 Supplementary General Conditions.

## 1.4 WARRANTY AND GUARANTEE

A. The CONTRACTOR shall comply with the warranty and guarantee requirements contained in Article 13 of the General Conditions.

# SECTION 01700 - PROJECT CLOSE-OUT

- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as part of such required repair WORK, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as part of such required repair WORK unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.
- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and the CONTRACTOR's surety shall be liable to the OWNER for the cost thereof.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

## SECTION 01700 - PROJECT CLOSE-OUT

## COMPLIANCE CERTIFICATE AND RELEASE FORM

#### PROJECT: <u>ROBERT STORRS HARBOR – C FLOAT REPLACEMENT</u> CONTRACT NO:

The **CONTRACTOR** must complete and submit this to the Port Director with respect to the entire contract.

Completed forms may be submitted upon completion of the Project. All requirements and submittals must be met before final payment will be made to the CONTRACTOR.

#### *I certify that the following and any referenced attachments are true:*

- All WORK has been performed, materials supplied, and requirements met in accordance with the applicable Drawings, Specifications, and Contract Documents.
- All Suppliers and Subcontractors have been paid in full with no claims for labor, materials or other services outstanding. If all Subcontractors and suppliers are not paid in full, please explain on a separate sheet.
- All employees have been paid not less that the current prevailing wage rates set by the State of Alaska (or U.S. Department of Labor, as applicable).
- All equal employment opportunity, certified payroll and other reports have been filed in accordance with the prime contract.
- The attached list of Subcontractors is complete (required from CONTRACTOR). The City Engineer was advised and approved of all Subcontractors before WORK was performed and has approved any substitutions of Subcontractors.
- All DBE firms listed as a precondition of the prime contract award must have performed a commercially useful function in order for the WORK to count to a DBE goal. All DBE firms performed the WORK stated and have received at least the amount claimed for credit in the Contract Documents.
- All DBE Subcontractors must attach a signed statement of the payment amount received, the nature of WORK performed, whether any balance is outstanding, and indicate that no rebates are involved.
- If the amount paid is less than the amount originally claimed for DBE credit, the CONTRACTOR has attached approval from the City Engineer for underutilization.

I understand it is unlawful to misrepresent information in order to receive a payment which would otherwise be withheld if these conditions were not met. I am an authorized agent of this firm and sign this freely and voluntarily. The foregoing statements are true and apply to the following project contractor.

Firm Name

Capacity: CONTRACTOR

Signed

Printed Name and Title

Date

Return completed form to: Peggy McLaughlin, Port Director, City of Unalaska, P.O. Box 610, Unalaska, AK 99685. Call (907) 581-1254 if we can be of further assistance or if you have any questions.

# SECTION 01704 - FINAL CLEAN-UP AND SITE RESTORATION

# PART 1 - GENERAL

1.1 DESCRIPTION. The WORK under this Section includes providing all supervision, labor, materials, tools and equipment necessary for final clean-up and restoration of all areas disturbed by construction activities, to a condition equal to, or better than, before construction started. This does not include clean-up or restoration incidental to, or directly provided for by, other construction items.

# PART 2 - PRODUCTS

2.1 MATERIALS. Any materials required shall conform to the appropriate Section of these Specifications.

# PART 3 - EXECUTION

## 3.1 CONSTRUCTION

A. The CONTRACTOR shall clean up all sites disturbed during construction of the project. This includes removal of all construction equipment, disposal of all excess materials, disposal of all rubbish and debris, removal of all temporary structures, and grading of the sites so that no standing water is evident.

# SECTION 02060 - DEMOLITION AND DISPOSAL

## PART 1 - GENERAL

## 1.1 DESCRIPTION

A. WORK under this Section shall include all labor, materials, tools and equipment necessary for the demolition, salvage and proper offsite disposal or storage of all items as designated herein and as shown on the Plans or as otherwise required to complete the WORK. The CONTRACTOR shall provide an appropriate disposal site for all items designated to be disposed. Demolition and disposal methods shall meet all local, state and federal regulations.

#### 1.2 SUBMITTALS

A. Provide public notification in local newspaper, on local radio and to USCG to notify public of anticipated interruption to traffic, interruption of access and parking services within the general dock and harbor areas, or interruptions to moorage. Provide copy of all public notices to the ENGINEER for review prior to placing notices.

## PART 2 - PRODUCTS (Not Used).

## PART 3 - EXECUTION

#### 3.1 EXAMINATION AND PREPARATION

- A. Prior to commencement of WORK, the CONTRACTOR shall visit the site with ENGINEER and OWNER to ascertain existing conditions and to determine the complete scope of demolition and disposal WORK.
- B. Conduct demolition to minimize interference with adjacent structures and interruption to public services.
- C. Cease operations immediately if adjacent structures appear to be in danger and notify the ENGINEER. Do not resume operations until directed by the ENGINEER.

#### 3.2 DEMOLITION SALVAGE AND DISPOSAL

- A. Areas of Robert Storrs Harbor not being demolished will remain an active harbor and as such, utilities shall remain available to these areas throughout the duration of the WORK. The CONTRACTOR is required to perform WORK to reconfigure and repair utility systems in these areas to ensure their continued operation prior to commencing demolition salvage and disposal WORK as shown in the Plans and directed by the ENGINEER.
- B. Demolition salvage and disposal shall be performed in accordance with all applicable City of Unalaska codes and standards and shall be completed as shown on the Plans.
- C. Demolition salvage and disposal shall be conducted in accordance with the schedule specified in Section 01010 Summary of Work, Article 1.4.
- D. Prior to commencement of demolition activities, the CONTRACTOR shall salvage and provide to the OWNER those items designated in the Plans. The CONTRACTOR shall coordinate with the OWNER for delivery and storage of these items. CONTRACTOR is responsible for delivery and off-loading of salvaged items within 5 miles of the project.

# SECTION 02060 – DEMOLITION AND DISPOSAL

- E. The CONTRACTOR shall coordinate with OWNER on the schedule and sequencing of float and gangway removal at least five working days prior to commencement of any demolition activities.
- F. Conduct demolition activities in an organized manner ensuring demolished materials are promptly removed from the site.
- G. The CONTRACTOR is responsible to secure waste disposal sites, including obtaining written permission of the land owner and any required permits, if none are indicated on the Plans. The cost of securing such sites shall be borne by the CONTRACTOR. If requested by the ENGINEER, the CONTRACTOR shall furnish copies of all required permits for the disposal sites.
- H. Stockpile salvaged materials to be incorporated into the WORK and take measures to ensure stockpiled materials are safe, secure an undamaged.
- I. Repair any damaged structures or materials designated to remain or to be salvaged.
- J. Demolish and dispose all other incidental and miscellaneous items as required to complete the project.
- K. Place construction signs and barricades, as required, to prevent public entry into Work area.
- L. Repair any damage to existing facilities designated to remain.
- M. Excavation required to complete demolition work shall be considered incidental.

# SECTION 02200- UPLAND CONSTRUCTION

# PART 1 - GENERAL

- 1.1 DESCRIPTION. The WORK under this Section requires providing all labor, materials, tools and equipment necessary for the upland reconstruction at the C Float Approach Dock in its entirety to the lines, grades details and cross sections indicated on the Plans or as directed by the ENGINEER. WORK under this Section shall include, but may not be limited to providing; traffic control, temporary and permanent environmental, sediment and erosion control mechanisms, completing; excavations, embankments, armor rock slopes, geotextile fabrics, base course and subgrades for roadways and parking areas, adjusting or relocating; portable restroom, jersey barriers, guardrail, installing; paint, guardrail, bollards, concrete slabs and other associated items complete, to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.
- 1.2 Unless specifically stated otherwise all work performed in the upland areas shall be provided as a requirement of this Section. Upland Work in these areas not listed here or elsewhere in these documents shall be considered incidental to this Section.

# PART 2 - PRODUCTS

- 2.1 ENVIRONMENTAL, EROSION AND SEDIMENT CONTROLS. Environmental, erosion and sediment control mechanisms shall be provided in accordance with the provisions of Sections 01560 Temporary Environmental Controls and 01570 Erosion Control.
- 2.2 EXCAVATION. All excavation shall be unclassified excavation, and shall consist of excavation and disposal or use of all materials, of whatever character, encountered in the WORK as directed by the Engineer in accordance with Section 02202 Excavation and Embankment.
- 2.3 EMBANKMENT. Embankments shall be of the material type specified in the Plans and shall be provided in accordance with Section 02202 Excavation and Embankment.
- 2.4 BASE COURSE. Base Course shall be the material type specified in the Plans and shall be provided in accordance with Section 02204 Base Course.
- 2.5 ARMOR ROCK. Armor Rock shall be Class II unless otherwise specified in the Plans and shall be provided in accordance with Section 02205 Armor Rock.
- 2.6 GEOTEXTILE FABRIC. Geotextile fabric shall be the type specified in the plans and shall be provided in accordance with Section 02714 Filter Fabric.
- 2.7 PAINTED MARKINGS. Painted markings for the concrete hydrant pad shall be red, paint shall be of a type suitable for marking concrete as approved by the ENGINEER.
- 2.8 BOLLARDS. Steel pipe for bollards shall be provided in accordance with Section 05120-Metal Fabrication. All other materials shall be as specified in the Plans.
- 2.9 CONCRETE SLABS. Concrete and Rebar shall be provided in accordance with Section 03301-Structural Concrete.
  - A. Concrete slabs shall be sealed *Sure Klean Weather Seal SL40<600* as manufactured by *Prosoco* in accordance with the manufacturer's explicit instructions.

# **PART 3 - EXECUTION**

# 3.1 UPLAND WORK COVERED BY OTHER SECTIONS

- A. Execution of WORK in this Section shall conform to the applicable Sections of the Contract Documents except as explicitly stated in the Plans, or elsewhere in the Contract Documents, or as directed by the Engineer within the limits of Section 00700 General Conditions. WORK shall include but may not be limited to:
  - 1. Application of environmental erosion and sediment control mechanisms in accordance with Sections 01560 Temporary Environmental Controls and 01570 Erosion Control.
  - 2. Excavation and embankment construction in accordance with Section 02202 Excavation and Embankment.
  - 3. Installation of base course in accordance with Section 02204 Base Course.
  - 4. Installation of armor rock in accordance with Section 02205 Armor Rock.
  - 5. Installation of geotextile fabric fabric and gate as shown in the Plans and in accordance with Section 02714 Geotextile Fabric.
  - 6. Installation of Concrete slabs as shown in the Plans and in accordance with Section 03301-Structural Concrete.
    - a. Seals slabs in accordance with the manufacturer's explicit written instructions.

# 3.2 RELOCATE PORTABLE RESTROOM

A. Portable restroom shall be removed and temporarily stored nearby and reinstalled on the new concrete slab as shown in the Plans.

# SECTION 02202-EXCAVATION AND EMBANKMENT

# PART 1 - GENERAL

1.1 DESCRIPTION. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for excavation and embankment construction to the lines, grades and cross sections indicated in the Plans or as directed by the ENGINEER.

# PART 2 - PRODUCTS

- 2.1 EXCAVATION. All excavation shall be unclassified and shall consist of disposal of all materials, of whatever character, encountered in the WORK.
  - A. Disposal of excavation to an off-site location provided by the CONTRACTOR shall be incidental to Upland Construction.

## 2.2 EMBANKMENT.

- A. Material for embankment construction shall consist of non-frost susceptible earth, sand, gravel, fractured rock or combination thereof containing no muck, peat, frozen materials, roots, sod or other deleterious materials and shall be compactible to the density required by the Specifications.
- B. Embankments for this project shall consist of subbase materials of the type indicated on the Plans.
- 2.3 SUBBASE. Subbase shall be of the type indicated in the Plans conforming to the Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction Section 703.

# PART 3 - EXECUTION

- 3.1 EXCAVATION
  - A. Clearing and grubbing in excavation areas must be completed prior to beginning excavation operations.
  - B. Excavations shall be reasonably smooth and uniform to the lines, grades and crosssections shown in the Plans or as directed by the ENGINEER. Excavations shall be conducted to ensure that material outside of excavation limits remains undisturbed.
  - C. Excavations shall be protected from erosion and maintained to drain freely at all times.
  - D. The CONTRACTOR shall remove all excavated materials and backfill with approved material.
  - E. Excavated materials shall be disposed of by the CONTRACTOR at a location provided by the CONTRACTOR.
  - F. The CONTRACTOR is responsible for securing excavation disposal sites. The CONTRACTOR shall obtain the written permission of the Landowner for use of all disposal sites, and shall either obtain any required permits or assure that others have obtained them. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for the disposal sites. The cost of securing such sites shall be borne by the CONTRACTOR.

# SECTION 02202-EXCAVATION AND EMBANKMENT

- 1. If the CONTRACTOR fails to comply with the provisions of any city ordinance or permit pertaining to disposal sites the City shall have the right, after giving 30 days written notice, to bring the disposal sites into compliance and collect the cost of the work from the CONTRACTOR, either directly or by withholding monies otherwise due under the Contract.
- G. Disposal areas shall be uniformly graded to drain, with the outer limits feathered to blend with the existing ground. Disposal areas shall be seeded, capped with suitable material, or otherwise protected from long-term erosion.
- H. The CONTRACTOR shall conduct all operations to prevent contaminating backfill or subbase materials with excavated materials.
- I. The CONTRACTOR shall provide added care including bracing and shoring as required when excavating adjacent to existing retaining walls, fences and buildings. Damage caused to existing walls, fences and buildings by the CONTRACTOR shall be repaired at the CONTRACTOR's expense.
- J. Where excavations occur adjacent to existing roadways or other paved surfaces designated to remain undisturbed the CONTRACTOR shall record existing surface elevations prior to excavating and take necessary measures to ensure pavement is not damaged and existing elevations and grades are maintained throughout the WORK and upon completion. Damage caused to existing pavements by the CONTRACTOR shall be repaired at the CONTRACTOR's expense.
- K. After excavation to the sub-cut limit is complete and prior to placing geotextile fabric and backfilling, the bottom of the sub-cut shall be adequately compacted until a firm base for the backfill material is obtained.

# 3.2 EMBANKMENT

- A. Embankments shall be constructed to a reasonably smooth and uniform shape conforming to the lines, grades and cross sections indicated on the Plans or as directed by the ENGINEER.
- B. The underlying ground shall be properly prepared, graded, and compacted prior to placing embankment material. Clearing and grubbing in embankment areas must be completed prior to embankment operations. Debris shall be removed and surface depressions or holes shall be filled with suitable material to a level uniform surface and compacted before the embankment is constructed.
- C. When embankment is to be placed on hillsides steeper than a 4:1 slope, new embankment is to be placed alongside existing embankments, or embankments are to be built half width at a time the foundation shall first be prepared by constructing benches of sufficient width to accommodate placing and compacting equipment. Each bench shall begin at the intersection of the original ground and the vertical side of the previous cut. Material so excavated and suitable for embankment construction shall be incorporated into the new embankment. Benching is incidental to other items in the contract and no direct payment will be made therefore.
- D. Wherever an existing compacted roadway surface containing granular material lies within three feet of the new embankment surface, such existing roadway shall be scarified to a depth of six inches and incorporated into the first layer of embankment.

# SECTION 02202-EXCAVATION AND EMBANKMENT

- E. Embankments over swampy ground may be constructed by end dumping an initial lift of depth approved by the ENGINEER to support hauling and spreading equipment.
- F. If continued hauling over a completed or partially completed embankment causes loss of stability as evidenced by pumping or rutting, or other damage, the CONTRACTOR shall repair the damaged embankment at its own expense and adjust its hauling equipment and procedures to avoid further damage.
- G. The finish subgrade surface shall not vary more than 0.1-foot when tested using a 10-foot straightedge, or more than 0.1-foot from established grade. Additionally, the algebraic average of all deviations from established finished subgrade elevations taken at 100-foot intervals shall be less than 0.05-foot.

# 3.3 EMBANKMENTS CONSTRUCTED WITH MOISTURE DENSITY CONTROL.

A. Except for embankments constructed predominantly of rock fragments or boulders, all embankments shall be constructed with moisture density control. Embankments shall be placed in horizontal layers not to exceed eight inches in depth, loose measurement, for the full width of the embankment, except as required for traffic, and shall be compacted before the next layer is placed. Embankments shall be compacted at the approximate optimum moisture content to not less than 95% of the maximum density as determined by AASHTO T 180-D unless otherwise noted. Embankment materials may require drying or moistening to bring the moisture content near to optimum. In place field densities will be determined by ATM-213 or ATM-309 as required by the ENGINEER. Sufficient time shall be allowed between layers to allow for field density tests.

# 3.4 EMBANKMENTS CONSTRUCTED WITH SUBBASE

- A. When embankment material consists predominantly of rock fragments or boulders too large to be contained in the lift thickness specified without crushing or further fracturing, such material may be placed in lifts not exceeding in thickness the approximate average size of the larger rocks, or 18-inches, whichever is less.
- B. Shot Rock Borrow shall not be dumped in final position but shall be deposited on the fill and distributed by blading or dozing so that voids, packets and bridging will be reduced to a minimum. Intervening spaces and interstices shall be filled with smaller stones and earth to form a dense, well-compacted embankment. Hauling equipment shall be uniformly routed over the entire width of the embankment.

# 3.5 EMBANKMENTS CONSTRUCTED WITH SUBBASE GRADING A.

- A. Subgrades shall be constructed to the embankment tolerances described in paragraph 3.2 prior to placement of Subbase Grading A. The CONTRACTOR shall place grade stakes at all changes in grade and at maximum 50-foot intervals prior to placing Subbase Grading A.
- B. Embankments shall be placed in horizontal layers not to exceed six inches in depth, loose measurement, for the full width of the embankment, except as required for traffic, and shall be compacted before the next layer is placed. Compaction of embankments constructed with Subbase Grading A shall be achieved by performing a minimum level of compactive effort consisting of six complete coverage passes with a 15-ton vibratory steel drum roller over the complete coverage area of any given lift with equipment suitably equipped by the manufacturer for compacting shot rock material.

# **END OF SECTION**

**ROBERT STORRS HARBOR – C FLOAT REPLACEMENT DPW Project No. 12601**  EXCAVATION AND EMBANKMENT Page 02202-3

# PART 1 - GENERAL

### 1.1 DESCRIPTION

- A. WORK under this section includes providing all labor, materials, tools and equipment necessary for the excavation and backfill required for installation of pipelines, manholes vaults, diversion structures and other appurtenances; and for ground surface restoration, including pavement.
- B. The Work under this section shall be incidental to other items of work within the Contract and shall not be measured directly for payment.

#### 1.2 SUBMITTALS

A. Compaction Plan-CONTRACTOR shall provide a bedding materials compaction plan a minimum of 30 Days in advance of WORK.

## **PART 2 - PRODUCTS**

- 2.1 TRENCH EXCAVATION
  - A. Trench excavation shall consist of all material, of whatever nature, excavated from trenches or below structures within the limits indicated in the Plans.
  - B. All trench excavation shall be disposed of in accordance with Section 02202-Excavation and Embankment

#### 2.2 BEDDING

A. Bedding shall be crushed rock material aggregate, free of muck, frozen material, lumps, organic material, trash, lumber or other debris, conforming to the requirements for Base Course Grading D-1 or F-1 as designated in the Plans in accordance with Section 02204-Base Course.

### 2.3 BACKFILL

A.

- A. Backfill is defined as material placed above the level of bedding material. All backfill material shall be imported material and shall conform to the requirements of Subbase Grading A in accordance with Section 02202-Excavation and Embankment
- 2.4 Crushed Aggregate Drain Rock shall be crushed stone or crushed gravel, consisting of sound, angular, tough, durable rock fragments of uniform quality, free from clay balls, vegetable matter, or other deleterious matters, and with no adherent films or coatings of dirt, clay, dust or other deleterious matter that could impede drainage. Wash the aggregate if necessary.

Crushed Aggregate Drain Rock shall meet the following req	uirements:
L.A. Wear,% AASHTO T 96	45, max.
Degradation Value ATM 313	50, min.
Sodium Sulfate loss,% AASHTO T 104	9, max. (5 cycles)
Fracture,% WAQTC FOP for AASHTO TP 61	90, min. (single face)

# SECTION 02203 - TRENCHING

SIEVE SIZE	% PASSING BY WEIGHT
1-Inch	100
3/4-Inch	90-100
1/2-Inch	20-55
3/8-Inch	0-15
No. 200	0-1

Crushed Aggregate Drain Rock shall conform to the following gradation:

# **PART 3 - EXECUTION**

# 3.1 EXCAVATION

- A. Prior to excavating trenches, all necessary clearing and grubbing shall be completed as required.
- B. Excavation for trenches shall conform to the lines and grades shown on the Plans. The CONTRACTOR shall also do any grading or other measures necessary to prevent surface water from entering the trench.
- C. Excavation of any and all material more than two feet below the invert of a pipe or structure or as shown on the Plans shall be done only when ordered in writing by the ENGINEER. The material so excavated will be handled in the manner described below.
- D. All excavated material shall be disposed of offsite as described in Section 02202-Excavation and Embankment.
- E. No more than 150 feet of trench shall be open in advance of laying of pipe, and not more than ten feet of trench shall remain open at the end of each working period. When the trench is in a traveled roadway, it shall be completely backfilled, in accordance with the Specifications, and opened to traffic at the end of each working period.
- F. If explosives are used, the CONTRACTOR shall obtain all necessary permits and comply with all pertinent regulations. All utility companies shall be informed a minimum of 48 hours prior to the use of explosives in the vicinity of their facilities.
- G. The CONTRACTOR shall protect and preserve all existing pavement throughout the entire construction period. No tracked equipment may be operated on any pavement without first protecting the pavement with pavement pads approved by the ENGINEER. All pavement which is damaged in any manner by the CONTRACTOR's operations shall be restored to original or better condition at the CONTRACTOR's expense.
- H. Where required to prevent caving of the trench, or by any safety law or regulation, the CONTRACTOR shall furnish and install bracing and/or sheeting to protect the excavation. This bracing and/or sheeting shall be removed as trench backfill progresses.
- I. The CONTRACTOR shall remove and dispose of all water entering the excavation. Disposal of water shall be done in a manner to prevent damage or nuisance to adjacent property, and in accordance with all applicable laws and regulations. Pumps shall be adequate to maintain a dry trench during the bedding, pipe installation, and initial backfill

# SECTION 02203 - TRENCHING

to an elevation at least one foot above the top of pipe. No backfill may be placed in standing water under any circumstance, except when the plans and/or Specifications specifically permit installation of pipe in a wet trench.

- J. Excavations for manholes and similar structures shall be per OSHA standards and large enough to provide proper working room. Any over depth excavation shall be backfilled with concrete or other approved material at the CONTRACTOR's expense.
- K. The CONTRACTOR shall provide temporary support of existing structures, as necessary to protect the structures from settlement or other disturbances caused by construction activities. All structures disturbed by the CONTRACTOR's activities shall be returned to original condition, or better.
- L. Trench excavation shall be completed above the tideline to the extent possible. In areas where the pipe vertical alignment calls for trench excavation below the high tide line the Contractor shall coordinate Work according to tidal schedules such that Work is not conducted within the water.

# 3.2 BEDDING

- A. Bedding shall be placed in conformance with the lines and grades shown on the Plans and to the limits depicted in the Standard Details. Before placing any bedding material, the bottom of the trench shall be hand-raked ahead of the pipe laying operation to remove stones and lumps which will interfere with smooth and complete bedding of the pipe. The specified bedding material shall then be placed in layer(s) the full width of the trench, each layer not exceeding eight inches in thickness loose measure, and compacted to 95% of maximum density or as specified in the Plans, as determined by AASHTO T 180 D, until the elevation of the plan grade for the pipe invert is attained. The pipe bed shall then be fine-graded by hand and compacted as above. Bell holes shall be hand dug at the location of the joints and shall be of sufficient size to allow proper making of the joint and to prevent the collar or bell of the pipe from bearing on the bottom of the trench.
- B. After the pipe has been laid and approved for covering, the specified bedding material shall be placed evenly on both sides of the pipe for the full width of the trench. Approval for covering does not imply final acceptance of the pipe, or relieve the CONTRACTOR in any way of responsibility to complete the project in conformance with the plans and Specifications. Bedding material shall be placed in layers. The thickness, loose measure, of the first layer shall be either one-half the outside diameter of the pipe plus two inches or eight inches, whichever is least. This layer shall be compacted as specified above to provide solid support to the underside of the pipe.
  - 1. For pipe ten inches and smaller nominal diameter, the next layer shall be of the thickness required to complete placement of the bedding to a plane six inches above the pipe, after compaction as specified above.
  - 2. For pipe twelve inches and larger, the bedding material shall be placed and compacted in layers not more than eight inches in thickness, loose measure, up to a plane six inches above the top of the pipe.
- C. Bedding material compaction shall be achieved by performing a minimum level of compactive effort over the complete coverage area with equipment suitably equipped by the manufacturer for compacting bedding materials.
  - 1. For each type of bedding material the minimum level of compactive effort shall be established by performing in place density tests in accordance with ATM 213-WAQTC FOP for AASHTO 310.

# SECTION 02203 - TRENCHING

- D. In place density tests shall be conducted by the OWNER as he sees fit. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER. The material shall be retested until the tests show that the compaction meets the specification requirements.
  - 1. If, in the opinion of the ENGINEER, an area appears to have sub-standard compaction or the minimum level of compactive effort requires re-evaluation due to changing site or material conditions additional density tests may be called for by the ENGINEER. The results of such tests shall reestablish the minimum level of compactive effort as determined by the ENGINEER.
- E. Bedding shall be considered incidental to all pipe, structures and utilities and shall be installed as shown in the Plans as part of other work.

# 3.3 BACKFILL

- A. The trench shall be backfilled above the bedding material, as shown on the Plans with imported backfill. The backfill shall be compacted to 95% of maximum density or as specified in the Plans or Specifications, as determined by AASHTO T 180-D. Lifts shall not exceed six inches in thickness in loose measure unless otherwise directed by the Engineer.
- B. Where trenches cross roadways, streets or driveways, backfilling shall be done immediately following excavation and laying of the pipe. All crossings shall be backfilled, compacted, and open to traffic at the end of each day's WORK. Major road crossings shall be excavated and backfilled in half widths of the traveled way so that at least one-half of the roadway is open to controlled traffic at all times during the WORK. All WORK performed within a right-of-way shall be done in conformance with the appropriate permits issued by the respective agency having jurisdiction over the right-of-way.
- C. At least 24 hours prior to commencing backfilling operations, the CONTRACTOR shall notify the ENGINEER of the proposed method of compaction. No method will be approved until the CONTRACTOR has demonstrated, under actual field conditions, that such method will produce the degree of compaction required.

# PART 1 - GENERAL

## 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing one or more layers of aggregate base course on a prepared surface to the lines and grades shown on the Plans.

# PART 2 - PRODUCTS

## 2.1 MATERIAL

- A. Aggregate base and surface course shall consist of crushed gravel or crushed stone, conforming to the quality requirements of AASHTO M 147. The aggregate shall be free from lumps, balls of clay, or other objectionable matter, and shall be durable and sound.
  - 1. Base and surface course shall be sampled according to "WAQTC FOP for AASHTO T2 Sampling Aggregates" as described in the *Alaska Test Methods Manual*, ATM 301 published by the Alaska Department of Transportation and Public Facilities.
  - 2. Coarse aggregate (that material retained on the No. 4 sieve) shall be crushed stone and shall consist of sound, tough, durable rock of uniform quality. Rock shall be free of schist that cleaves along preferred foliation planes. Rock shall be free of platy mineral grains. Metamorphosed rock shall be free of slaty cleavage. All material shall be free from clay balls, vegetable matter or other deleterious matters. Coarse aggregate shall not be coated with dirt or other finely divided mineral matter. All aggregates shall be free of roots and wood. In addition, coarse aggregate shall meet the following requirements:

Property	Value	Test Method
L.A. Wear, %	25 max.	AASHTO T 96
Degradation Value	45 min.	ATM 313
Fracture, %	70 min.	WAQTC FOP for
		AASHTO TP 61
Plastic Index	6 max.	WAQTC FOP for
		AASHTO T 90
Sodium Sulfate Loss, %	9 max.	AASHTO T 104

- 3. Aggregate shall not exceed eight (8) percent thin -elongated pieces as determined by ATM 306.
- 4. Fine Aggregate: Fine aggregate (passing the No. 4 sieve) shall meet the quality requirements of AASHTO M 29.
- B. Base and surface course material shall conform to one of the following gradations as specified:

# SECTION 02204 - BASE COURSE

Sieve Designation	<u>A</u>	<u>B</u>	<u>C</u>	<u>C-1</u>	<u>D</u>	<u>D-1</u>	<u>E</u>	<u>F-1</u>
4	100							
2	85-100	100						
1 1/2				100				
1			100	70-100		100		100
3/4				60-90	100	70-100	100	85-100
3/8				45-75		50-80		60-100
No. 4	30-70	30-70	40-75	30-60	45-80	35-65		50-85
No. 8				22-52		20-50		40-70
No. 10			25-55		30-65			
No. 50				8-30		8-30		25-45
No. 200	10Max.	3-10	4-10	0-6	4-12	0-6	0-6	8-20

# BASE AND SURFACE COURSE GRADATIONS

(Percent passing by weight)

- C. For gradings C, D, & E at least 50% by weight of the particles retained on the No. 4 sieve shall have at least one fractured face as determined by WAQTC FOP for AASHTO TP 61 as described in ATM 305.
- For gradings A, C-1, D-1 & F-1, at least 70% by weight of the particles retained on a No.
  4 sieve shall have at least one fractured face as determined by WAQTC FOP for
  AASHTO TP 61 as described in ATM 305.

# PART 3 - EXECUTION

- 3.1 GENERAL
  - A. All references herein to base course shall also apply to surface course.

# 3.2 CONSTRUCTION

- Prior to placement of the base course, the underlying surface shall be prepared by dressing, shaping, wetting or drying, and compacting of the underlying material to a minimum of 95% maximum density or as specified in the Plans as determined by AASHTO T 180-D or as specified under Section 02202 Excavation and Embankment. Surfaces shall be cleaned of all foreign substances and debris.
- B. Any ruts or soft yielding spots that may appear shall be corrected by loosening and removing unsatisfactory material and adding approved material as required, reshaping, and recompacting the affected areas to the lines and grades indicated on the Plans. If required by the ENGINEER, the CONTRACTOR shall proof load questionable areas with a loaded truck or other piece of equipment approved by the ENGINEER.
- C. Blue tops shall be set to the top of base course. They shall be set by the CONTRACTOR at breaks in grade and on even grade at intervals not to exceed 50 feet.

# SECTION 02204 - BASE COURSE

- D. Base course material shall be deposited and spread in a uniform layer to the required grades, and to such loose depth that when compacted to the density required, the thickness will be as indicated on the plans. Portions of the layer which become segregated shall be removed and replaced with a satisfactory mixture, or shall be remixed to the required gradation.
- E. Base course material compaction shall be achieved by performing a minimum level of compactive effort over the complete coverage area with equipment provided by the CONTRACTOR suitably equipped by the manufacturer for compacting base course materials.
  - 1. For each type of material the minimum level of compactive effort shall be established by performing in place density tests in accordance with ATM 213-WAQTC FOP for AASHTO 310.
- F. In place density tests shall be conducted by the OWNER as he sees fit. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER. The material shall be retested until the tests show that the compaction meets the specification requirements.
  - 1. If, in the opinion of the ENGINEER, an area appears to have sub-standard compaction or the minimum level of compactive effort requires re-evaluation due to changing site or material conditions additional density tests may be called for by the ENGINEER. The results of such tests shall reestablish the minimum level of compactive effort as determined by the ENGINEER.
- G. The maximum compacted thickness of any one layer shall not exceed six (6) inches. If the required compacted depth exceeds six (6) inches, the base shall be constructed in two (2) or more layers of approximately equal thickness. Each layer shall be shaped and compacted before the succeeding layer is placed.
- H. Base course shall be compacted to at least 95% of its maximum density or as specified in the Plans, as determined by AASHTO T 180-D.
- I. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and irregularities. If at any time the mixture is excessively moistened, it shall be aerated by means of blade graders, harrows, or other approved equipment, until the moisture content is such that the surface can be recompacted and finished as above.
- J. The finished surface of the base course, when tested using a 10-foot straightedge, shall not show any deviation in excess of 3/8-inch between two contact points. The finish surface shall not vary more than 1/2-inch from established grade. Additionally, the algebraic average of all deviations from established grade of the finish base course surface elevations taken at 50-foot intervals shall be less than 0.02-foot.

# PART 1 - GENERAL

## 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing a protective covering of armor rock as shown on the Drawings, or as directed by the ENGINEER.

# PART 2 - PRODUCTS

# 2.1 GENERAL

- A. Stone for this WORK shall be hard angular quarry stones, having a percentage of wear of not more than 50 at 500 revolutions as determined by ASTM C535. The least dimension of any piece of stone shall be not less than 1/3 of its greatest dimension. Stones shall meet the following gradation based on the number of stones method of grading as described below.
- B. Class I Armor Rock
  - 1. No more than 10% of the stones by total number shall weigh more than 50 pounds per piece and no more than 50% by total number of the stones shall weigh less than 25 pounds per piece. The stones shall be evenly graded.
- C. Class II Armor Rock
  - 1. No more than 10% of the stones by total number shall weigh more than 400 pounds per piece and no more than 15% by total number of the stones shall weigh less than 25 pounds per piece. The stones shall be evenly graded and a minimum of 50% by total number of the stones shall weigh 200 pounds or more per piece.
- D. Class III Armor Rock
  - 1. No more than 10% of the stones by total number shall weigh more than 1,400 pounds per piece and no more than 15% of the stones by total number shall weigh less than 25 pounds per piece. The stones shall be evenly graded and a minimum of 50% of the stones by total number shall weigh 700 pounds or more per piece.
- E. Class IV Armor Rock
  - 1. No more than 10% of the stones by total number shall weigh more than 5,400 pounds per piece and no more than 15% of the stones by total number shall weigh less than 400 pounds per piece. The stones shall be evenly graded and a minimum of 50% of the stones by total number shall weigh 2,000 pounds or more per piece.

# 2.2 GEOTEXTILE FABRIC

A. Geotextile Fabric shall conform to the requirements of Section 02714 – Geotextile Fabric.

# PART 3 - EXECUTION

## 3.1 CONSTRUCTION

- A. Foundation or toe trenches and other necessary excavations shall be completed and approved by the ENGINEER prior to placing armor rock. Slopes to be protected with armor rock shall be free of brush, trees, stumps and other objectionable material and shall be dressed to a reasonably smooth surface.
- B. Unless otherwise noted or authorized by the ENGINEER, the armor rock protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the armor rock protection as may be necessary to place geotextile fabric and to prevent mixture of embankment and armor rock material.
  - 1. Unprotected embankment and slopes are subject to erosion from wave and tidal action. Placement of armor rock shall be scheduled to provide protection against erosion of the underlying embankment and excavated slopes at all times.
- C. The CONTRACTOR shall provide a level, compact area of sufficient size to dump and sort typical loads of armor rock material for routine inspection and approval prior to placement. The CONTRACTOR shall provide assistance, including mechanical equipment, at no additional cost to the OWNER or ENGINEER, as required to sort, measure, and inspect individual stones intended for final placement and for the purpose of determining if the armor rock is within specifications.
- D. Geotextile Fabric shall be placed as provided for in Section 02714 Geotextile Fabric.
- E. Armor rock shall be placed and distributed by mechanical means to provide a uniform mass of stones. All armor rock shall be so placed and distributed such that there are no large accumulation or area composed mainly of either the larger or smaller sizes of stones. Segregated areas consisting predominantly of smaller or larger stones shall be adjusted and redistributed by mechanical means.
  - 1. The stones shall be handled or placed with an excavator as to secure a stone mass of the thickness, height and length shown on the Drawings, or as staked, with a minimum of voids.
  - 2. Undesirable voids shall be filled with small stones or spalls. The rock shall be manipulated sufficiently by means of an excavator, rock tongs, or other suitable equipment to secure a reasonably regular surface and mass stability.
- F. Armor rock shall be uniformly placed to its full course thickness in one operation on prepared slopes and in such a manner to avoid damaging geotextile fabric or displacing underlying material. Placement shall proceed up the slope from the toe. Placement by end dumping methods from the top of the slope will not be allowed.
- G. Final acceptance of armor rock materials shall be in final location following field sorting, mechanical manipulation and placement.

## SECTION 02500 – STORM DRAIN SYSTEM

## PART 1 - GENERAL

## 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing the complete storm drain system including the oil water separator, and associated HDPE piping and the abutment perforated drain pipe as shown on the Plans or directed by the ENGINEER.

## 1.2 SUBMITTALS

- A. Storm Drain Oil Water Separator
- B. Frames and Grates: Catalogue cuts and material certifications.
- C. Storm Drain Pipe material certifications and cut sheets.

# PART 2 - PRODUCTS

# 2.1 JOINT MORTAR

A. Joint mortar shall be non-shrink-type, and shall consist of one part Portland cement and two parts approved sand with water as necessary to obtain the required consistency. Mortar shall be used within 30 minutes after its preparation. If mortar is submerged and cannot be kept dry until cured, a substitute approved by the ENGINEER shall be used.

# 2.2 FRAMES, GRATES, COVERS, AND LADDER RUNGS

- A. Frames, grates, covers and ladder rungs shall conform to the plan dimensions and to the following Specification requirements for the designated materials:
  - 1. All frames, grates, and covers shall be ductile iron, conforming to ASTM A 48, Class 30.
  - 2. Carbon-steel castings shall conform to the requirements of AASHTO M 103. Grade shall be optional unless otherwise designated.
  - 3. Malleable iron castings shall conform to the requirements of ASTM A 47. Grade shall be optional unless otherwise designated.
  - 4. All manhole covers shall have the words "STORM DRAIN" cast into the top in approximately three-inch text.
  - 5. Structural steel shall conform to the requirements of AASHTO M 183.
  - 6. Manhole steps shall be constructed of polypropylene conforming to ASTM D 4101 and shall meet current state and federal safety standards.
  - 7. Galvanizing, where specified for these units, shall conform to the requirements of AASHTO M 111.
  - 8. Frames covers and grates shall be load rated per AASHTO M-306.

## 2.3 REINFORCING STEEL

A. Reinforcing steel shall conform to the following applicable requirements:

# SECTION 02500 - STORM DRAIN SYSTEM

Deformed Billet-Steel Bar
 AASHTO M 31 (ASTM A 615, grade 60)
 Welded Steel Wire Fabric
 AASHTO M 55 (ASTM A 185)
 Cold-Drawn Steel Wire
 AASHTO M 32 (ASTM A 82)
 Fabricated Steel Bar or Rod Mats
 AASHTO M 54 (ASTM A 184)

# 2.4 PRECAST CONCRETE UNITS

- A. Precast concrete units shall be as shown in the drawings and conform to the requirements of AASHTO M 199, except that the absorption test will not be required.
- B. Cracks in units will be cause for rejection. Honeycombed or patched areas in excess of 30 cumulative square inches will be cause for rejection.
- C. Concrete shall conform to Section 03301 Structural Concrete.
- D. Manhole steps shall meet current state and federal safety standards.

# 2.5 HDPE STORM DRAIN PIPE

A. HDPE storm drain pipe shall be SDR 17 butt fusion type unless otherwise noted and shall be provided in accordance with Section 02601-Water System.

# 2.6 CORRUGATED POLYETHYLENE PIPE

- A. Corrugated polyethylene pipe (CPP) shall be high density corrugated polyethylene, smooth interior pipe, and shall be manufactured in conformity with the latest AASHTO M-252 or AASHTO M-294, Type S Specification, and shall meet the requirements of ASTM D3350 Cell Classification 324420C, or ASTM D1248 type III, Class C, Category 4, Grade P33.
- B. Pipe shall be joined with Hancor, Inc. Hi-Q Sure-Lok (bell-and-spigot) joint, or approved equal, meeting the requirements of AASHTO M294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 lbs.
- C. The bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell by the pipe manufacturer.
- D. Fittings shall conform to AASHTO M252 or AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.
- E. Pipe for the abutment drain shall be perforated in accordance with AASHTO M252 Class II.
  - 1. Geotextile Fabric shall be of the type designated in the plans provided in accordance with Section 02714-Geotextile Fabric
  - 2. Crushed aggregate Drain Rock shall be provided in accordance with Section 02203-Trenching.

# 2.7 STORM DRAIN OUTFALL.

A. Storm Drain Outfall shall be as shown in the plans.

# SECTION 02500 – STORM DRAIN SYSTEM

- B. Outfall outlet guard shall be HDPE StormRax Round as manufactured by Contech Construction Products Inc. or approved equal. All steel hardware shall be constructed of 316 SS.
  - 1. Additional installation hardware shall be provided for the outfall guard as shown in the Plans.

# **PART 3 - EXECUTION**

# 3.1 GENERAL CONSTRUCTION

- A. Existing storm flow shall not be impeded during construction.
- B. Excavation, bedding, crushed aggregate drain rock and backfilling shall conform to the requirements of Section 02203 Trenching.
- C. Manhole pipe connections shall be made as shown on the Drawings and as required by the manufacturer's recommendations. A snug, watertight seal shall be provided for each pipe connection.
- D. All manholes shall be bedded in as shown in the Plans.
- E. Welding shall be done in accordance with the best modern practice and the applicable requirements of AWS D1.1 except as modified by AASHTO "Standard Specifications for Welding of Structural Steel Highway Bridges."
- F. Metal frames shall be set over the cast-in-place concrete support structure with a maximum <sup>1</sup>/<sub>4</sub>-inch thick mortar bed.
- G. Oil Water Separator shall be furnished and installed as shown in the Plans.
- H. Outfall shall be installed with HDPE outfall guard as described herein and show in the Plans.
- I. When a pipe enters the manhole through a wall of a precast unit, the CONTRACTOR shall perform the cutting of the concrete and steel reinforcement in a manner that will not loosen the reinforcement in the wall. The steel reinforcement shall be cut flush with the wall face. All joints and openings cut in the walls shall be grouted.

# PART 1 - GENERAL

## 1.1 DESCRIPTION

A. The WORK under this Section requires providing all labor, materials, tools and equipment necessary for the construction of the water system in its entirety, including furnishing and installing; all pipe, both buried and suspended, valves with boxes, flexible hose assemblies with connections, fittings, clamps, hanger assemblies, water service pedestals, transitions, flanges, steel stands, hardware, miscellaneous steel shapes and weldments, meter vault, meters with reading systems, backflow prevention devices, automatic control valves, dismantling joints, spare parts, thrust blocks, anchor blocks, sash weights, tie rods, bedding, backfill, as well as performing all trenching, flushing, testing, disinfection and other associated items, complete as shown in the Plans to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.

## 1.2 GENERAL REQUIREMENTS

- A. The CONTRACTOR shall install the water pipe and fittings to the horizontal and vertical alignment shown on the Plans and shall complete all associated WORK described in this Section.
- B. The CONTRACTOR is responsible for knowledge of all permits as well as local, state, and federal codes, standards, or statutes related to the WORK he performs. The CONTRACTOR shall install the system in compliance with such regulations and shall notify the ENGINEER immediately of any discrepancies.
- C. All water system components shall have NSF 61 certification unless otherwise approved by the Engineer.
  - 1. NSF 61 Annex G certified lead free products shall be provided where available.
- D. All water system components shall have a minimum pressure rating of 150 p.s.i. unless otherwise specified.

## 1.3 REFERENCES

- A. ASME American Society of Mechanical Engineers
- B. ASSE American Society of Sanitary Engineering
- C. ASTM American Society for Testing and Materials
- D. AWWA American Water Works Association
- E. DIPRA Ductile Iron Pipe Research Association
- F. NSF National Sanitation Foundation
- G. PPI Plastic Pipe Institute

# 1.4 SUBMITTALS

- A. The Contractor shall review the Specification in its entirety and provide all required submittals to the ENGINEER prior to performing the associated WORK.
- B. Submittals shall be compiled by the CONTRACTOR and submitted in accordance with Section 01300 Submittals.

# 02601 - WATER SYSTEM

- C. On catalogue sheets with more than one item, clearly indicate which item shall be utilized.
- D. Submittals for this Section shall include, but may not be limited to the following.

1.	Water pipe and fittings:	Material certifications and catalogue cut sheets.
2.	Flexible Hose and fittings:	Material certifications and catalogue cut sheets.
3.	Waterline appurtenances:	Catalogue cut sheets.
4.	HDPE fusion technician:	Certificate of fitness issued in accordance with 49 CFR 192.285 by an appropriate agency.
5.	Mooring Float Water pedestals	Shop drawings and all material cut sheets.
6.	Flanges and backup rings:	Material certifications and shop drawings
7.	Water Equipment Vault:	Material certifications, shop drawings, warranty information and all components cut sheets.
8.	Steel Component:	Shop drawings per Section 05120-Metal Fabrication

- 9. Flushing, testing and disinfection plan.
- 10. Testing and Certification sheets for backflow prevention devices in accordance with City of Unalaska municipal code.

## 1.5 SPARE PARTS

- A. The CONTRACTOR shall provide the OWNER with spare parts listed herein prior to completion of the WORK.
  - 1. (2) Each repair kits for backflow preventer.
  - 2. (2) Water pedestals completely assembled with hoses.

# PART 2 - PRODUCTS

#### 2.1 DUCTILE IRON PIPE (DIP)

A. Ductile iron water pipe (DIP) shall conform to the requirements of AWWA C151, with cement mortar lining conforming to the requirements of AWWA C104. Standard Thickness Class 52 pipe shall be used unless otherwise shown on the Plans. Water pipe shall have an exterior bituminous coating conforming to the requirements of AWWA C110. All water pipe shall be clearly marked with the manufacturer's name, type, class and/or thickness as applicable. Lettering shall be legible and permanent under normal conditions of handling and storage.

# 2.2 DIP JOINTS

- A. Unless otherwise shown on the Plans, or as specified below, pipe joints shall be push-on rubber gasket type conforming to the requirements of AWWA C111.
- B. DIP placed within pipe casings shall have restrained joint connections.
- C. Restrained joint water pipe shall be U.S. Pipe TR FLEX, U.S. Pipe field Loc Gasket, EBBA IRON "Mega-lug System," Griffin Snap Lock, Pacific State Lock Mechanical type, or approved equal. Restrained push-on joints for pipe shall be designed for a water working pressure of 250 psi and shall be capable of being deflected a minimum of 3 per joint, for pipe sizes through 18 inches, after assembly.

# 2.3 DIP FITTINGS

- A. Fittings for all ductile iron water pipe and restrained joint water pipe shall be mechanical joint fittings with EBBA IRON "Mega-lug System" or approved equal.
- B. For connecting to existing water mains, the CONTRACTOR shall use a mechanical joint tee and a mechanical joint cut-in-sleeve similar to Clow F-1220 or Mueller H-843, or a cast iron coupling similar to Rockwell 431, or approved equal. The length of all sleeves and couplings shall equal or exceed the diameter of the pipe.
- C. All valve clusters consisting of a tee and one or more valves, including fire hydrant legs, shall be monolithically restrained with EBBA Iron "Mega-lug System," or approved equal.

# 2.4 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

- A. High Density Polyethylene Pipe (HDPE) and fittings shall be manufactured in accordance with AWWA C906. HDPE shall be manufactured from PE4710 polyethylene compounds that meet or exceed ASTM D3350 Cell Classification 445574. All HDPE pipe and fittings shall be certified by the NSF for potable water service. HDPE pipe and fitting material compound shall contain color and ultraviolet (UV) stabilizer meeting or exceeding the requirements of Code C per ASTM D3350.
- B. HDPE waterline shall be SDR 11 unless otherwise noted.
- C. HDPE fittings shall be PE4710 with the cell classification noted above. Fittings shall be molded unless otherwise approved by the engineer with pressure ratings at a minimum equal to that of the pipe. Fittings shall be butt fusion type unless otherwise noted on the plans or approved by the Engineer. Electro-fusion connections are allowed where shown on the Plans and elsewhere on a limited basis upon Engineer approval. Fittings and connections shall conform to the following:
  - 1. Butt fusion fittings shall meet ASTM D3261
  - 2. Electro-fusion fittings shall meet ASTM F1055
  - 3. Socket fittings are not permitted.
- D. Flanged pipe connections are allowed where shown on the Plans and elsewhere on a limited basis upon Engineer approval. Flanges shall be PE 4710, with a minimum Cell Classification as noted above. Flanges shall conform to ASTM D 3261 or ASTM F 2206 as applicable. Flanges shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flanges shall be per ASTM D 3261. Fabricated flange adapters shall be per ASTM F 2206.

# 02601 - WATER SYSTEM

- Back-up rings, shall be 316 stainless steel or polypropylene encapsulated where submerged and hot dip galvanized elsewhere unless otherwise noted in the Plans. Bolt-holes and bolt-circles shall conform to one of these standards: ASME B-16.5 Class 150, ASME B-16.47 Series A Class 150, ASME B-16.1 Class 125, or AWWA C207 Class 150 Series B, D, or E. The back-up ring shall provide a long-term pressure rating equal to the pressure class of the pipe or 250 psi, whichever is greater. The pressure rating shall be clearly marked on the back-up ring.
- 2. Bolts and associated hardware shall be 316 stainless steel where submerged and hot dip galvanized elsewhere unless otherwise noted in the Plans and provided in accordance with Section 05120 Metal Fabrication.
- E. Service connections shall be electro-fusion saddles, sidewall fusion branch saddles, or manufactured tapping tees made from materials specified herein unless otherwise noted on the Plans or approved by the ENGINEER. When service connections require a change in pipe material, transitions shall be made with a 316 stainless steel threaded outlet unless otherwise noted in the Plans. Mechanical strap-on saddles shall only be permitted upon ENGINEER approval, and must be approved by the manufacturer for use on HDPE pipe. Mechanical strap-on saddles shall be entirely constructed of 316 S.S. unless otherwise noted or approved by the engineer. All service connections shall be installed per manufacturer's recommendations.
  - 1. Service connection outlet shall be threaded IPS of the size noted in the Plans.
  - 2. The size of a sidewall fusion saddle shall be as indicated on the plans. The saddle shall be made in accordance with ASTM D 3261 or ASTM F 2206. After installation, approximately <sup>1</sup>/<sub>4</sub>" of the PE pipe shall be visible beyond the saddle to confirm that proper surface preparation occurred. Saddle faces that do not provided <sup>1</sup>/<sub>4</sub> inch of area beyond the saddle are not acceptable.
  - 3. Tapping tees shall conform to ASTM D3261.
- F. Transition fittings shall be full bore, butt fusion type IPS transitions of the size and material noted on the Plans.
  - 1. Where transitioning to steel pipe transition shall be 316 stainless steel unless otherwise noted.
  - 2. Where transitioning to copper, brass or bronze pipe transitions shall be red brass or silicon bronze.
- G. HDPE ball valves shall be PE 4710 full bore type with a minimum pressure rating greater than or equal to that of the pipe and a 2" operation nut.
  - 1. HDPE ball valves shall be butt fusion type unless otherwise noted in the Plans.
  - 2. CONTRACTOR to confirm compatibility with valve operation riser assembly prior to material order.
- H. HDPE lateral motion restraints shall be *GF Piping Systems Electrofusion Flex Restraints*, or HDPE wall anchors conforming to the same pressure material and integrity standards as the HDPE pipe.
## 2.5 HOT DIP GALVANIZED STEEL PIPE AND FITTINGS

- A. Steel pipe and fittings shall be provided in accordance with Section 05120-Metal Fabrication and shall be NSF-61 listed. Steel fittings shall conform to AWWA C208 and shall be NSF 61 listed.
- B. Steel flanges shall conform to AWWA C228 and C207 as applicable and shall be factory welded or onto pipe as noted in the plans per AWS recommendations. Flanges shall be provided in accordance with Section 05120-Metal Fabrication.
- C. Bolts, nuts, and other miscellaneous hardware shall be hot dip galvanized unless otherwise noted in the Plans and shall be provided according to section 05120-Metal Fabrication.

### 2.6 STAINLESS STEEL PIPE AND FITTINGS

- A. Stainless steel pipe and fittings shall be 316 stainless steel welded seamless pipe and shall be factory welded unless otherwise approved by the engineer. Pipe and Fittings shall conform to AWWA C220, C226 and Section 05120-Metal Fabrication. Stainless steel pipe and fittings shall be NSF 61 listed.
- B. Stainless steel flanges shall be class 150 or greater, 316 stainless steel, conform to AWWA C228 and C207 as applicable and shall be factory welded onto pipe with 316 stainless steel rod as noted in the plans per AWS recommendations. Flanges shall be provided in accordance with Section 05120-Metal Fabrication.
  - 1. CF8M will not be accepted as a suitable substitute for 316 ss. welded flanges
- C. Where stainless steel pipe and flanges are submerged the pipe and flanges shall be factory welded to a complete assembly. Field welding of stainless steel pipe and fittings shall not be permitted.
- D. Bolts, nuts, and other miscellaneous hardware shall be 316 S.S. unless otherwise noted in the Plans and shall be provided according to section 05120-Metal Fabrication.

## 2.7 BRASS AND BRONZE PIPE AND FITTINGS

- A. All brass pipe and fittings shall be rated for 150 psi min.
- B. The terms brass and bronze pipe are used interchangeably and shall be taken to mean threaded schedule 40 "red brass," or bronze of any industry standard type unless otherwise noted.
- C. Fittings shall be threaded or flanged where noted.
- D. Flanges shall be of similar construction and performance standards as the flanged components to which they are connecting.
- E. Pipe and fittings shall be NSF 61 listed.

### 2.8 INSULATED PIPE AND FITTINGS

- A. The contractor shall supply insulated pipe and fittings as shown in the Plans. The minimum service temperature range of all individual components and final products shall be -30° to 90°F. The pipe and fittings shall consist of an HDPE carrier pipe insulated with polyurethane insulation and protected with an HDPE outer jacket.
- B. Carrier pipe shall be HDPE as specified in the drawings and conform to the requirements of High Density Polyethylene Pipe and Fittings herein.

C. Insulation between the carrier pipe and outer jacket of all pipe and fittings shall be lowdensity rigid closed-cell urethane foam. Foam shall be either spray applied or monolithically injected into the annular space between the carrier pipe and jacket such that the resulting insulation completely fills the annular space and is free of defects affecting its intended purpose. Urethane foam shall be bonded to the carrier pipe and conform to the specifications as follows:

Maximum Thermal Conductivity	$0.17 \frac{btu \times in}{hr \times ft^2 \times {}^{\circ}F}$	ASTM C518
Core Density Range	2.0 to 4.0 pcf	ASTM D1622
Minimum Compressive Strength	35 psi	ASTM D1621
(Parallel and perpendicular to pipe axis)		
Maximum Water Absorption	0.05 pcf	ASTM D2842
Dimensional Stability	1% at -20°F	ASTM D2126
(Maximum Linear Change)	3% at +100°F	

- D. The outer jacket shall have a nominal outer diameter of 6" maximum greater than the nominal outer diameter of the carrier pipe, be a minimum of 150 mils thick and be constructed of HDPE with a minimum cell classification 335460C per ASTM D3350.
- E. The carrier pipe shall be centered in the HDPE jacket. Centerline offsets shall be no more than  $\frac{3}{8}$ " throughout the length of the pipe and  $\frac{1}{4}$ " at the ends. Heat trace channel offset shall be no more than  $\frac{3}{8}$ ". Jacket/insulation cutbacks shall be determined by the manufacturer to optimize ease of installation and joint connections.
- F. Heat trace channels shall be required where shown in the Plans. Channels shall be fully enclosed and in direct contact with the carrier pipe for its entire length. The inner surface shall be smooth and free of burrs or protrusions. Channel shall extend past the insulation a min. of 2" or as required to adequately make joints with no gaps in channel. Transition pieces shall be provided as required to connect heat trace channel through joints and fittings to maintain channel continuity.
- G. Heat trace cable shall be provided and installed as shown in the drawings in accordance with Division 16000 Electrical.
- H. Insulated pipe joints, fittings and valves shall be capable of field installation and meet the same thermal insulation and integrity requirements as the pipe. Pipe joints shall be waterproof and shall be installed per the manufacturer's printed instructions.
- I. *Canusa Superstop* heat shrink end caps as manufactured by Canusa CPS shall be provided for all insulated pipe ends in appropriate sizes.

## 2.9 FLEXIBLE HOSE AND FITTINGS

- A. Flexible hose and fittings shall meet the same pressure and integrity standards as the rigid pipe and shall be manufactured to endure conditions involved with the intended use.
- B. Hose materials are known to have extraordinary lead times, coordinate as required.
- C. Hoses shall be equipped with threaded or flanged connections compatible with the pipe connections as designated herein and shown in the Plans. Hose end connections shall be one of the following types:
  - 1. *PT Coupling Pro Grip C50* External Crimp System with *PT C50HD Heavy Duty Ferrules* or approved equal.

- 2. 316 stainless steel pull mandrel internal expansion body with 316 ss pull mandrel ferrule.
- 3. 316 stainless steel build-in nipples.
- D. Nipples, ferrules, and all other associated steel hardware shall be constructed entirely of 316 SS.
- E. 4-inch flexible water hose shall be *Good Year White Flexwing* equipped with an FDA compliant tube or approved equal with fixed flanges compatible with pipe flanges to which they shall be connected as shown in the Plans and as specified herein.
- F. 2-Inch and 1-inch flexible water hoses shall be *Good Year Vintner* equipped with an FDA compliant white chlorobutyl tube or approved equal.
  - 1. 1-inch hose shall be equipped with 316 ss threaded connections.
  - 2. 2-inch hose shall be equipped with fixed or floating flanges compatible with pipe flanges to which they shall be connected as shown in the plans and as specified herein.
- G. Flanges for hose assemblies both fixed and floating with all associated steel fittings and hardware shall be 150 lb. and shall be constructed entirely of 316 SS.
  - 1. All welds shall be completed with 316 SS rod.
  - 2. No more than one floating flange assembly shall be allowed per hose.
  - 3. Threaded on flange assemblies shall not be permitted.
  - 4. All flange connection hardware shall be 316 SS provided in accordance with Section 05120 Steel Fabrication.
  - 5. Flange gasket material shall be NSF-61 listed or FDA compliant and shall be compatible with both potable and salt water as stated by the manufacturer.
- H. On hoses with internal steel wire reinforcement the CONTRACTOR shall apply *3M 5200 Marine Grade Sealant* to the cut ends of the hose as required to completely seal the exposed cut section.
  - 1. Sealant shall be field applied in the presence of the ENGINEER unless otherwise approved in writing by the ENGINEER.
  - 2. Sealant shall be applied in a manner that ensures sealant does not intrude into carrier tube of hose or connected pipe.
- I. Hose construction, fittings installation and hose assembly installation shall be completed per manufacturer's recommendations to meet pressure and integrity standards as specified herein.

J. The ENGINEER may perform, on a randomly selected hose assembly, metallurgical testing of steel fittings, flanges, ferrules or miscellaneous steel hardware to verify compliance with this specification. The first test shall be paid for by the OWNER. Should the test reveal non-compliance with this specification, **all** of the hose assemblies shall be tested at the CONTRACTOR's expense. Non-compliant hose assemblies shall be replaced, in their entirety, at no cost to the OWNER. Replacement hoses shall also be tested at the CONTRACTOR's expense. Any metallurgical testing required after the first test shall be paid for by the CONTRACTOR and shall be at the sole discretion of the ENGINEER.

## 2.10 PIPE LUBRICANT

A. The lubricant shall be suitable, and acceptable by the manufacturer and the City of Unalaska Water Utility for lubricating the parts of the joint for assembly. The lubricant shall be non-toxic, "industrial food grade", shall not support the growth of bacteria, and shall have no deteriorating effects on the gasket material. It shall not impart taste or odor to the water in a pipe that has been flushed in accordance with AWWA C601, "Standard for Disinfecting Water Mains". The lubricant containers shall be labeled with the trade name or trademark and the pipe manufacturer's name where applicable."

# 2.11 THAW WIRE AND CONTINUITY STRAPS

- A. Thaw wire and continuity straps shall be No. 2 copper wire, stranded, with HMWPE insulation and suitable for direct bury applications. Exothermic welding to attach continuity straps on DIP and fittings shall be "Cadweld" or approved equal and coated with bituminous coating.
- B. Bronze wedges shall be allowed as a substitute for continuity straps.

# 2.12 UNDERGROUND MARKING TAPE

- A. Underground marking tape for ductile iron, copper, or steel water pipe shall be blue, six inch wide, four mil thick, polyethylene tape with black lettering with the following wording: "Caution: Waterline Buried Below." Marking tape shall be installed 12 inches above the top of all water pipe.
- B. For HDPE water pipe the Contractor shall provide and install a detectable locator tape with black lettering with the following wording: "Caution: Waterline Buried Below." The locator tape shall not be less than five (5) mil, foil backed, and six inch (6") wide vinyl tape. The Contractor shall install the locator tape above and parallel to the axis of the utility with no breaks in continuity. The Contractor shall install the locator tape three feet (3') below finish grade or two feet (2') deep in the street structural section. Installation of the locator tape is considered incidental to Water System.

# 2.13 INSULATION BOARD

- A. A maximum of 8 inches of insulation board shall be required around buried water pipe on three sides per Engineer direction where the depth of cover to top of pipe is less than five (4) feet, at storm drain crossings, in the proximity of manholes, vaults, or similar structures and elsewhere as shown on the plans or per Engineer direction.
- B. Insulation board shall be *Dow Chemical Company, Styrofoam Highload 40*, or approved equal.

## 2.14 TIE RODS

A. Tie rods shall be threaded black iron or mild steel with a 12-mil minimum asphaltic coating and shall be located symmetrically around the perimeter of the pipe using anchorage lugs of standard manufacture for attachment where required. Unless otherwise shown on the Plans, the number and size of the rods shall be as shown on the table below:

PIPE SIZE	TIE ROD SIZE	NO. OF RODS
4" – 10"	3⁄4"	2
12''-16''	3⁄4"	4
18" – 20"	3⁄4"	6
22"	1"	4
24"	1"	6

### 2.15 CONCRETE

A. Concrete shall conform to Section 03301 – Structural Concrete unless otherwise indicated.

## 2.16 STEEL COMPONENTS

- A. All steel components, hangers, supports, steel stands, mounting brackets, plates, other miscellaneous steel shapes and all hardware shall be 316 stainless steel or hot dip galvanized unless otherwise noted and provided in accordance with the provisions of Section 05120-Metal Fabrication.
- B. Strut shall be required where shown in the plans and shall be HDG or 316 SS unless noted otherwise.
- C. Pipe clamps and straps shall be shall be *Cooper B2400 or Cooper B318FL* as applicable or approved equal manufactured in 316 stainless steel or hot dip galvanized.
- D. Channel Nuts shall be Cooper model N225SS6 with springs and <sup>1</sup>/<sub>2</sub>" attachment bolts or approved equal provided in 316 SS.

### 2.17 UHMW PE

A. Ultra High Molecular Weight (UHMW) Polyethylene components shall be manufactured from virgin polyethylene material, be U.V. stabilized and shall be partially cross-linked. UHMW components shall be black in color, unless otherwise noted, and edges chamfered as shown on Plans.

### 2.18 EPOXY ANCHORS

A. Epoxy anchors shall be 316 stainless steel threaded rod of the size specified in the drawings anchored with *Hilti HIT-RE500-SD Epoxy Adhesive* unless otherwise noted.

## 2.19 UPLAND WATER SYSTEM COMPONENTS

- A. Gate valves and boxes provided in accordance with the Plans.
- B. Vault shall be *Granite precast 5x7.5 MV* or approved equal or approved equal enclosure.
- C. The water meter shall be *Sensus Omni C-2* with built in strainer, no substitutions.
  - 1. Meter part number shall be exactly C21XXXXG1GA0X

- 2. Meter shall be equipped with remote reading system, *Radio Read* no substitutions, part number shall be exactly, Part # C21XXXXG1GA0X.
- D. The backflow prevention assembly shall be *Wilkins Model 375 Lead Free Reduced Pressure Zone Assembly* or approved equal certified by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research Manual of Cross Connection Control 10<sup>th</sup> Edition.
- E. Pressure reducing valve shall be *Wilkins Model XLFCBP* equipped with low flow bypass.
  - 1. Valves shall be set to 60 psi downstream pressure.
- F. Pipe supports shall be *Cooper* of the model specified in the Plans and hot dip galvanized per Section 05120 Metal Fabrication.

### 2.20 FLOAT WATER SYSTEM COMPONENTS

- A. Water Pedestals shell shall be constructed of SDR 17 HDPE fittings and pipe provided in accordance with section 2.4 herein except pedestal shell does not require pressure rating.
- B. Hose bibs shall be quarter-turn anti-siphon frost free sill cock with extension valve and vacuum breaker. Bibs shall be rated for 150 psi min and be NSF-61 listed. Extension valve length shall be as required to fit pedestal housing.
  - 1. Extension valve shall be the maximum length practicable to ensure valve is well heated and insulated.
  - 2. Hose Bib shall be oriented to drain.
- C. 1" ball valves shall be constructed entirely of 316 stainless steel as designated in the plans with FPT outlets.
  - 1. Handles and operating nuts shall be 316 SS or shall be removed prior to putting pedestals into service.
- D. Exterior shrink wrap located at the pedestal bases shall be Canusa SuperStop CSS-60.
  - 1. Canusa ECS-B 30-15 additional end cap sealant shall be utilized on the 1" HDPE transition fitting end as required per manufacturer's recommendations.
  - 2. Install heat shrink sealants and caps per manufacturer's written instructions to fully waterproof the pedestals.
- E. Pedestal insulating materials shall be of sufficient thermal resistance to maintain water temperatures above freezing under all local weather conditions. Install per manufacturer's recommendations.
  - 1. Lower pedestal insulation between the carrier pipe and shell shall be low-density rigid closed-cell urethane foam. Foam shall be either spray applied or monolithically injected into the annular space between the carrier pipe and shell such that the resulting insulation completely fills the annular space and is free of defects affecting its intended purpose. Urethane foam shall conform to the specifications as follows:

Maximum Thermal Conductivity	$0.17 \frac{btu \times in}{hr \times ft^2 \times {}^\circ F}$	ASTM C518
Core Density Range	1.75 to 4.0 pcf	ASTM D1622
Minimum Compressive Strength	20 psi	ASTM D1621
(Parallel and perpendicular to pipe axis)		

Maximum Water Absorption	2.5% by volume	ASTM D2842
Dimensional Stability	1% at -20°F	ASTM D2126
(Maximum Linear Change)	3% at +100°F	

- 2. A physical barrier or non-hydrocarbon based releasing agent shall be applied to the carrier pipe and the heat trace sleeve prior to installing the foam insulation to ensure pipe does not bond to insulation.
  - a. Barrier or agent shall not negatively affect the insulation's chemical or structural properties and shall not diminish the thermal resistance of the unit.
- 3. Upper pedestal insulation shall be *Thermafiber Granulated Wool, Packing Wool* or approved equal water resistant fibrous insulation.
- F. Heat trace shall be per Electrical Plans and Specifications.

# **PART 3 - EXECUTION**

## 3.1 GENERAL

- A. The CONTRACTOR shall preserve and protect all existing utilities and other facilities including but not limited to: telephone, television, electrical, water and sewer utilities, surface or storm drainage, highway or street signs, mail boxes, and survey monuments.
- B. The CONTRACTOR shall immediately notify the City of Unalaska of utilities or other facilities damaged during construction and shall immediately repair or replace that which was damaged. The CONTRACTOR shall support and protect any underground utility conduits, pipes, or service lines where they cross the trench.
- C. Where COU waterlines are specified to be "Hot Tapped" taps shall be performed by the COU Water Utility with their tools unless otherwise indicated in the Plans or directed by the ENGINEER. The CONTRACTOR shall coordinate his work as required to provide 48 hours minimum notice to the Utility.
  - 1. The Contractor shall have tapping sleeve and valve installed per design prior to the arrival of the COU Water Utility.
  - 2. The Utility shall have the authority to reject the installation of the tapping sleeve and valve should it deem the CONTRACTOR's work unsatisfactory. Should the Utility reject the installation the CONTRACTOR shall immediately take corrective action to the satisfaction of the Utility and the ENGINEER. The CONTRACTOR shall reschedule the WORK as required.
- D. The CONTRACTOR shall give at least 48 hours notice to the City of Unalaska Water and Wastewater Utility Divisions and the City of Unalaska Harbors Department prior to:
  - 1. Needing water or sewer main line locates;
  - 2. Interruption of water service in any area; or
  - 3. Use of water from any fire hydrant.

- E. Any water service disruption shall be restored as soon as possible. The CONTRACTOR shall comply with the current policy on "Water and Sewer Line Locates" of the City of Unalaska Public Works Department, Water and Wastewater Utilities Divisions. The CONTRACTOR shall notify all local radio stations and any major customers who will be affected of a planned water service disruption.
- F. The CONTRACTOR is responsible for maintaining continuous water service at existing volume and pressure to all structures, with; existing, temporary or new piping, except as provided in this Section.
- G. The CONTRACTOR shall review product cut sheets and installation instructions for all products and shall handle, install, test and operate all products per the manufacturer's recommendations to the extent required to perform the WORK. Unless otherwise approved in writing by the ENGINEER the CONTRACTOR shall not deviate from manufacturer's instructions or recommendations.

## 3.2 PIPE INSTALLATION

- A. All water pipe and fittings shall be inspected for defects. Damaged pipe will be rejected and the CONTRACTOR shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.
- B. Whenever it becomes necessary to cut a length of water pipe, the cut shall be made by abrasive saw or by special pipe cutter.
- C. The water pipe shall be laid to the horizontal and vertical alignment shown on the Plans. When buried a minimum five foot cover shall be maintained from finish grade to top of water pipe, unless otherwise shown on the Plans. Fittings shall be installed at the location shown on the Plans and elsewhere upon ENGINEER approval.
- D. Trench excavation, bedding, and backfill shall conform to the requirements of Section 02203 Trenching.
- E. To prevent dirt, fluids, or other foreign material from entering the pipe and fittings during handling and installation, the open end of the pipe shall be protected by a water-tight plug at all times except when joining the next section of pipe.
- F. Under no circumstances shall pipe deflections, either horizontal or vertical, exceed the manufacturer's printed recommendations. Where deflections would exceed the manufacturer's recommendations, fittings shall be used.
- G. Existing water pipe and appurtenances to be removed or abandoned shall be as designated on the Plans or directed by the ENGINEER. Abandoned water services shall be plugged at the cut ends. Abandoned water pipes shall be removed as shown on the Plans, or mechanically plugged if not required to be removed.
- H. All excavation, bedding and backfill shall be performed in accordance with the provisions of Section 02203-Trenching.
- I. Suspended pipe shall be installed in a manner that adequately supports the pipe at all times per manufacturer's recommendations.

### 3.3 DUCTILE IRON PIPE INSTALLATION

A. Ductile iron water pipe shall be installed in accordance with the manufacturer's printed specifications and instructions, and in conformance with AWWA C151.

- B. Water pipe shall be handled carefully to prevent damage to the pipe, pipe lining, or coating. Water pipe and fittings shall be loaded and unloaded using hoists and slings to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled. If any part of the coating or lining is damaged, repair thereof shall be made in a manner satisfactory to the ENGINEER at the CONTRACTOR's expense.
- C. All pipe ends shall be square with the longitudinal axis of the water pipe and shall be reamed and smoothed to assure a good connection.
- D. Vertical deflections to avoid obstructions that exceed allowable water pipe joint deflections shall be accomplished by the use of fittings and joint restraints. Additional fittings to those indicated on the Plans will be required to accomplish these vertical deflections.
- E. Concrete thrust blocks shall be furnished and installed in accordance with the Plans.
- F. Pressurized water pipe ends shall be plugged and thrust blocks installed. Volume and bearing area of thrust blocks for end plugs shall be per DIPRA's "A Guide for the Installation of Ductile Iron Pipe"
- G. All pipe fittings shall be restrained with EBBA Iron "Megalug System," or approved equal.
- H. All joints within 50 feet of tees or bends equal to or greater than 45 shall be restrained joints.
- I. Polyethylene encasement shall be required in areas as shown on the plans.
  - 1. Polyethylene encasement shall be installed at locations shown in the Plans and in conformance to the methods described in the most current edition of AWWAC105/ANSI A21.5 and DIPRA's "A Guide for the Installation of Ductile Iron Pipe" and "Polyethylene Encasement".
- J. All ductile iron pipe joints shall be bonded with continuity straps or bronze wedges.
- 3.4 HDPE PIPE INSTALLATION
  - A. HDPE water pipe and fittings shall be joined using butt fusion unless otherwise specified in the Plans or approved by the ENGINEER. The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations by certified technicians. The CONTRACTOR shall submit a certificate of fitness issued by the pipe manufacturer for each technician prior to beginning fusion operations.
  - B. Saddle fusion shall be done in accordance with the manufacturer's recommendations and ASTM F 2620. Saddle fusion joints shall be made by qualified fusion technicians. If the CONTRACTOR intends to use saddle fusion joints testing of sample joints may be required per the direction of the ENGINEER in accordance with ASTM F905.
  - C. Electro-fusion joining shall be done in accordance with the manufacturer's recommended procedure and ASTM F 1290. The electro-fusion transformer unit shall be the type capable of reading the electronic barcode associated each fitting and storing the fuse input and result information electronically. The CONTRACTOR shall maintain the data recorded by the electro-fusion unit throughout the warranty period of the WORK. This information shall be provided to the ENGINEER upon request. Electro-fusion joints shall be made by a qualified technician.

- D. Flange installation shall follow the guidelines of Plastic Pipe Institute Technical Note # 38.
- E. Socket fusion joints are not permitted.
- F. HDPE pipe sleeves shall be installed over ends of the pipe segments prior to fusing.

### 3.5 EPOXY ANCHORS

A. Epoxy anchors shall be installed per the manufacturers explicit instructions to the depths specified in the drawings or to the manufacturer's recommended minimum anchor effective embedment if no depth is specified.

## 3.6 FLUSHING, TESTING AND DISINFECTION

- A. Prior to; flushing, testing, disinfection or placement of any section of the water system into service, the procedures outlined by the manufacturers of the various system components shall be reviewed and followed as they apply unless otherwise approved in writing by the ENGINEER. Should any of the Items in **Part 3-Execution** herein jeopardize the integrity or warranty of the various components according to the manufacturers printed literature the CONTRACTOR shall consult with the ENGINEER prior to proceeding. Any damage incurred due to the failure to comply with this provision shall be repaired in a manner satisfactory to the ENGINEER at the CONTRACTOR's expense.
- B. Prior to acceptance, the CONTRACTOR shall "Open-Bore" flush the water pipe then perform hydrostatic tests, electrical continuity tests, and disinfection and coliform tests. Testing may be done in any sequence. However, in the event the disinfection, coliform and continuity tests have been performed and repairs are made to the water pipe system in order to pass the hydrostatic test, all previous tests and the "Open-Bore" flushing shall be repeated to the satisfaction of the ENGINEER.
- C. The CONTRACTOR shall review the Plans and specifications prior to flushing and develop a testing and disinfection plan to review with the ENGINEER. Any saddles, connections or fittings the CONTRACTOR intends to permanently install on the system for the purpose of testing shall be identified and approved by the ENGINEER. The CONTRACTOR shall be responsible for supplying such appurtenances which shall conform to the applicable sections herein. The CONTRACTOR is responsible for performing all flushing testing and disinfection of the system in its entirety and shall plan his WORK accordingly.

## 3.7 OPEN-BORE FLUSHING

Open bore flushing is required of all installed water pipes to remove any foreign A. matter. The CONTRACTOR shall furnish, install and remove all pumps, fittings and pipes necessary to perform the flushing; shall provide all additional excavation and backfill; and shall dispose of all water and debris flushed from the water pipe. Flushing through fire hydrants, meters, backflow preventers, automatic control valves, reduced outlets or fittings shall not be permitted unless specifically authorized in writing by the ENGINEER. The CONTRACTOR shall notify the ENGINEER and the City of Unalaska Water Utility, in writing, 48 hours in advance of any flushing operation. A flushing scheme and schedule shall be submitted by the CONTRACTOR for review and approval by the ENGINEER prior to flushing. The schedule for flushing must be approved by the City of Unalaska Water Utility and all flushing operations shall be done in the presence of a City of Unalaska Water Utility representative unless otherwise approved in writing. The CONTRACTOR shall be responsible for obtaining any permits necessary for flushing operations.

## 3.8 HYDROSTATIC TESTING

- A. The CONTRACTOR shall hydrostatically test all newly installed water pipe as well any as affected existing pipe as determined by the ENGINEER.
- B. The ENGINEER shall be present for all hydrostatic and leakage tests. The CONTRACTOR shall notify the ENGINEER at least 24 hours prior to any test and shall notify the ENGINEER at least two hours in advance of the scheduled time if the test is to be cancelled or postponed.
- C. Sections to be tested shall be limited to 1,500 feet, unless otherwise approved in writing by the ENGINEER.
- D. Hydrostatic testing shall be conducted after "Open-Bore" flushing, in accordance with the requirements of AWWA C600 or C901 and as stated hereafter. The CONTRACTOR shall furnish all assistance, equipment, labor, materials, and supplies necessary to complete the test to the satisfaction of the ENGINEER.
- E. The CONTRACTOR shall suitably valve-off or plug the outlet to existing or previously tested water pipe prior to perform the required hydrostatic test.
- F. The CONTRACTOR may install saddles, corporation stops or test ports on a limited basis to perform testing as required herein.
  - 1. Test connections shall be identified in the CONTRACTOR's Flushing and Disinfection Plan.
- G. Prior to testing, all air shall be expelled from the water pipe. If permanent air vents are not available to accommodate testing, the CONTRACTOR shall install corporation stops and blow-off lines so the air can be expelled as the line is filled with water as approved by the ENGINEER.
- H. Systems comprised of multiple pipe materials may be tested together as approved by the ENGINEER.

- I. Defective materials or poor quality of WORK, discovered as a result of the hydrostatic tests, shall be replaced by the CONTRACTOR. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be repeated until a satisfactory test is obtained.
- J. After completion of testing, all test and air pipes fittings, valves and other miscellaneous appurtenances installed for testing shall be removed unless otherwise approved by the ENGINEER. Corporation stops installed for testing shall remain and shall be closed in the presence of the ENGINEER.

## 3.9 DIP HYDROSTATIC TESTING PROCEDURE

- A. The DIP hydrostatic test pressure shall be a minimum of 150 psi or 1<sup>1</sup>/<sub>2</sub> times the operating pressure of the water pipe (measured at the highest elevation of the newlyinstalled water pipe), whichever is greater, unless otherwise directed by the ENGINEER. Acceptance pressure testing shall be done with all service lines installed, corporation stops open, and pressure against the closed curb stops, and outlet valves. The duration of each hydrostatic pressure test shall be one hour. Pumping will cease after the required test pressure has been reached. If the pressure remains constant for one hour without additional pumping, or pressure drop is less than five psi, that section of water pipe is acceptable.
- B. If the pressure drops five (5) psi or more during the initial one hour hydrostatic pressure test, the CONTRACTOR shall conduct a leakage test. Leakage shall be determined by measuring "make-up" water necessary to restore the specified test pressure. The quantity of water lost from the water pipe shall not exceed the number of gallons per hour as determined by the following formula:

$$\frac{ND\sqrt{P}}{L} = 7400$$

L= Allowable leakage in gallons per hour

- N= Summation of mechanical and push-on joints in length of water pipe tested
- D= Diameter of water pipe in inches
- P= Test pressure in pounds per square inch
- C. Should the tested section fail to meet the pressure test as specified, the CONTRACTOR shall locate and repair the defects and then retest the water pipe as specified above. Any specific leakage point detected shall be corrected by the CONTRACTOR to the satisfaction of the ENGINEER regardless of the allowable leakage specified above.
- D. If applicable, tests shall be performed with the auxiliary gate valves open and pressure against the hydrant. After the hydrostatic test has been successfully completed, each valve shall be tested by closing in turn and relieving the pressure beyond. This test of the valves will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The CONTRACTOR shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.
- 3.10 HDPE HYDROSTATIC TESTING PROCEDURE

- A. Testing shall be performed with water only. Compressed gas will not be accepted as a suitable test medium.
- B. The hydrostatic test pressure shall be a minimum of 150 psi or 1½ times the operating pressure of the water pipe (measured at the highest elevation of the newly-installed water pipe), whichever is greater, unless otherwise directed by the ENGINEER. Acceptance pressure testing shall be done with all service lines installed, corporation stops open, and pressure against the closed curb stops and outlet valves. If appurtenances in the system have a maximum pressure rating lower than that specified above they will be isolated from the system by the CONTRACTOR and tested separately per manufacturer's recommendations as approved by the ENGINEER. If isolation cannot reasonably be performed as determined by the ENGINEER the test pressure for the system shall be equal to 95% of the maximum operating pressure of the lowest pressure rated component in the system.
- C. Testing shall be performed with all parts of the system within the test section installed in their design location to the extent possible and reasonable as determined by the ENGINEER. All parts of the section to be tested shall be restrained from movement in case of failure.
- D. HDPE hydrostatic testing shall be performed using the "pressure drop" method. The "make up water" test method will not be accepted. Testing shall be performed in accordance with ASTM F-2164 and the procedure described herein:
  - 1. Fill the test section slowly with water ensuring all air is purged from the system. Filling should be performed from the point in the system lowest in elevation. If this point is inaccessible the CONTRACTOR shall take reasonable measures to ensure the system is purged of air prior to testing.
  - 2. Allow the test section temperature to equalize throughout.
  - 3. Slowly pressurize the test section to the test pressure as indicated in part B.
  - 4. Add make-up water as necessary to maintain the test pressure for a minimum of 4 hours.
  - 5. Reduce the pressure by 10 psi; this will be the test phase pressure.
  - 6. Without increasing the pressure or adding make-up water monitor the system and visually inspect for leakage. A passing test is indicated if no visual leakage is observed and the pressure remains within 5% of the test phase pressure for a minimum of 1 hour.
- E. If DIP fire hydrant assemblies are present in the system perform DIP test item # 3.9-D above.
- F. If the test section fails, depressurize the system and repair defective areas.
- G. The system must be allowed to "relax" for a minimum of 8 hours prior to retesting.

### 3.11 ELECTRICAL CONTINUITY

A. Electrical continuity is required for six inch or smaller D I water pipe and fire hydrant assemblies, and shall be provided by two electrical continuity straps installed on each side of the water pipe joint or fittings. Electrical continuity testing will not be performed.

### 3.12 DISINFECTION

- A. Disinfection by chlorination of all new water pipe shall be completed and a satisfactory bacteriological report obtained prior to placing the pipe in service. "Openbore" flushing shall be completed before chlorination is begun.
- B. Chlorine shall be applied by one of the following methods:
  - 1. Liquid chlorine gas-water mixture;
  - 2. Direct chlorine gas feed; or
  - 3. Hypochlorite commercial products such as HTH, Perchloren, Macho-chlor, or approved equal.
- C. The chlorinating agent shall be applied at the beginning of the section adjacent to the feeder connection, insuring treatment of the entire water pipe. Water shall be fed slowly into the new water pipe with chlorine applied in amounts to produce a dosage of 50 ppm. Application of the chlorine solution shall continue until the required residual of not less than 50 ppm free chlorine is evident at all extremities of the newly constructed line.
- D. The chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with a suitable device for regulating the rate of flow and the effective diffusion of gas within the water pipe. Hypochlorite products shall be placed or injected into the water pipe. During the chlorination process, all intermediate valves and accessories shall be operated. Valves shall be manipulated so that the strong chlorine solution in the water pipe being treated will not flow back into the pipe supplying the water.
- E. The following table is to be used as a guide for chlorinating pipes by the calcium hypochlorite and water mixture method. The given dosage per 100 feet results in a chlorine solution of 40 to 50 ppm. This dosage takes into account that CONTRACTORs most frequently use granular HTH, which is 65% pure. If another chlorinating agent is used, the dosage must be adjusted.

PIPE DIAMETER	DOSAGE PER 100 FEET
4"	.60 oz.
6"	1.35 oz.
8"	2.75 oz.
10"	4.30 oz.
12"	6.19 oz.
16"	11.00 oz.
20"	17.00 oz.

F. A residual of not less than 50 ppm free chlorine shall be produced in all parts of the water pipe. After 24 hours detention there shall be a minimum free chlorine residual of 25 ppm in all parts of the water pipe. This residual shall then be neutralized in the pipe by injecting an approved reducing agent such as sulfur dioxide, sodium bisulfate, sodium sulfite or sodium thiosulfate.

- G. After the water pipe system has been thoroughly flushed, samples will be taken at representative locations in the system by the ENGINEER, placed in sterile bottles, and submitted to an approved laboratory for bacteriological examination. The presence of bacteria in any sample shall be verified with a second sample at the same location. If verified, the pipe disinfection procedure shall be repeated and additional samples taken for bacteriological examination. Pipe disinfection shall be repeated, at the CONTRACTOR's expense, until satisfactory results are obtained. The first testing sequence will be paid for by the OWNER. Any further testing and sampling required due to insufficient disinfection (positive coliform tests) will be paid for by the CONTRACTOR.
- H. The water shall be flushed from the water pipe at its extremities, including all curb stops, until the replacement water chlorine residuals are equal to those of the permanent source of supply. The de-chlorinated water and water used for flushing shall be disposed of in a manner approved by the ENGINEER and in conformance with current requirements of the Alaska Department of Fish and Game, and the Alaska Department of Environmental Conservation.

## 3.13 BACKFLOW PREVENTION DEVICE

A. The contractor shall have all backflow prevention devices tested by a COU approved testing agency in accordance with the COU municipal code. Testing certifications shall be provided to the required COU agencies and the OWNER. Backflow prevention device testing shall be paid for by the CONTRACTOR. A list of approved testing agencies can be obtained from the COU Water Utility.

# PART 4 - ACCEPTANCE

# 4.1 CITY OF UNALASKA

- A. Prior to acceptance the Contractor shall contact the City of Unalaska Water Utility and have the water vault, meter, and meter reading device inspected and tested by a City of Unalaska Official.
- B. Prior to acceptance the Contractor shall contact the City of Unalaska and have all backflow prevention devices and other components inspected by a City of Unalaska building inspector as required per COU municipal code.
- C. Acceptance of the system shall be contingent upon the satisfaction of the City of Unalaska officials with the installation and testing of their respective systems and components to the extent required by the Contract Documents.

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing fire hydrant assemblies, including the hydrant leg, auxiliary gate valve, valve box, and continuity straps, and fire hydrants; for furnishing and installing hydrant bollards to protect fire hydrants.

### 1.2 SUBMITTALS

- A. Fire Hydrants: Catalogue cuts.
- B. Bollards: Material Certifications

# PART 2 - PRODUCTS

## 2.1 FIRE HYDRANTS

- A. Fire hydrants shall conform to the requirements of AWWA C502 for Dry Barrel Fire Hydrants. Fire hydrants shall be of the type specified in the standard drawings.
- B. Fire hydrants shall be supplied as shown in the Plans.
- C. Fire hydrants shall be provided with a weathercap and an epoxy or bituminous-coated shoe.
- D. Connections shall be mechanical joint with "Mega-lug" fittings, unless otherwise indicated on the Drawings.

### 2.2 HYDRANT BOLLARDS

- A. Hydrant bollards shall be provided as shown in the plans with covers.
- B. Concrete shall be provided in accordance with Section 03301-Structural Concrete.

### 2.3 BARREL EXTENSION

- A. Barrel extensions shall conform to the requirements of AWWA C502 for Dry Barrel Fire
- B. Hydrants and shall include barrel extension, steel stem coupling, stainless steel clevis and cotter pins, solid flange, gasket, bolts and nuts, stem extension and lubricant.

# PART 3 - EXECUTION

### 3.1 FIRE HYDRANTS

A. The CONTRACTOR shall install the fire hydrant assemblies in accordance with applicable AWWA Standards, the manufacturer's recommendations and the Plans. The interior components of the fire hydrant shall be cleaned of all foreign matter prior to installation. Fire hydrant legs shall be installed level and the barrel shall be installed plumb. Any adjustments to the traffic flange shall be accomplished with barrel extensions, in accordance with the fire hydrant manufacturer's recommendations. The extensions shall be made between existing barrel and hydrant. Remove the hydrant drain plugs, if any, prior to installation.

# **SECTION 02603 – FIRE HYDRANTS**

- B. Fire hydrants installed, but not available for use, shall be covered with burlap or heavy plastic and security tied.
- C. After installation, all fire hydrant assemblies shall be flushed, field-tested, and disinfected as outlined in Section 02601 Water Pipe. Each hydrant shall then be winterized by removing the water in the hydrant and barrel.
- D. Painting and coating shall be applied in accordance with AWWA specifications. Hydrant shall be painted from the top of the traffic flange to the operating nut either in a color approved by the COU utility dependent on the manufacturer. Wording shall be stenciled in black in accordance with the Plans.

## 3.2 HYDRANT BOLLARDS

A. Hydrant Bollards shall be installed as shown in the Plans.

### SECTION 02611 – FIRE SUPPRESSION STANDPIPE SYSTEM

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK under this Section requires providing all labor, materials, tools and equipment necessary for the installation of the fire suppression standpipe system in its entirety, including furnishing and installing; all pipe, both buried and suspended, fittings, clamps, hangers, standpipes, fire department connections, transitions, flexible hose assemblies with connections, flanges, valves, steel stands, hardware, paint, and miscellaneous steel weldments and shapes, as well as performing all flushing, testing, coordination with the Fire Department and other associated items, complete as shown in the Plans to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.

### 1.2 GENERAL REQUIREMENTS

- A. The CONTRACTOR shall install the fire suppression standpipe system pipe and fittings to the horizontal and vertical alignment shown on the Plans and shall complete all associated WORK described in this Section.
- B. The CONTRACTOR is responsible for knowledge of all permits as well as local, state, and federal codes, standards, or statutes related to the WORK he performs. The CONTRACTOR shall install the system in compliance with such regulations and shall notify the ENGINEER immediately of any discrepancies.
- C. Fire Suppression System shall be a Class I manual dry standpipe as indicated on the drawings and in accordance with NFPA #14. Installer shall possess Class IIB Alaska Fire System Permit. All piping and materials specifically indicated that does not comply with NFPA #14 has been approved by the Authority Having Jurisdiction as acceptable for this standpipe system installation.
- D. All fire system components shall have a minimum pressure rating of 175 psi.

### 1.3 SUBMITTALS

- A. The Contractor shall review the Specification in its entirety and provide all required submittals to the ENGINEER prior to performing the associated WORK.
- B. Submittals shall be compiled by the CONTRACTOR and submitted in accordance with Section 01300-Submittals.
- C. On catalogue sheets with more than one item, clearly indicate which item shall be utilized.
- D. Submittals for this Section shall include, but may not be limited to the following.

1.	Pipe and fittings:	Material certifications and catalogue cut sheets.
2.	Flexible Hose and fittings:	Material certifications and catalogue cut sheets.
3.	Waterline appurtenances:	Catalogue cut sheets.
4.	Pump Assembly:	Catalogue cut sheets, operation and maintenance manuals
5.	Fire suppression system installer:	Class IIB Alaska Fire System Permit

FIRE SUPPRESSION STANDPIPE SYSTEM Page 02611-1

## SECTION 02611 -FIRE SUPPRESSION STANDPIPE SYSTEM

6.	Paint	Product cut sheet.
7.	HDPE fusion technician:	Certificate of fitness issued in accordance with 49 CFR 192.285 by an appropriate agency.
8.	Mooring Float Water pedestals	Shop drawings and all material cut sheets.
9.	Flanges and backup rings:	Material certifications and shop drawings
10.	Steel Component:	Material Certifications and shop drawings per Section 05120- Metal Fabrication

11. Flushing and testing plan coordinated with and approved by the City of Unalaska Fire Department.

# PART 2 - PRODUCTS

## 2.1 PIPE AND FITTINGS

- A. HDPE pipe and fittings shall be PE4710 with a minimum pressure rating of 200 psi provided in accordance with Section 02601-Domestic Water System, Article 2.4-High Density Polyethylene Pipe and Fittings.
- B. HDPE pipe shall be SDR 11 unless otherwise noted.
- C. Hot dip galvanized steel pipe shall be schedule 40 ASTM A53 grade B type E or S.
- D. Stainless steel pipe and fittings shall have a minimum pressure rating of 200 psi and shall be provided in accordance with the following:
  - 1. Stainless steel pipe shall conform to AWWA C220 and Section 05120-Metal Fabrication.
  - 2. Stainless steel flanges shall conform to AWWA C228 and C207 as applicable and shall be factory welded onto pipe per AWS recommendations. Flanges shall be provided in accordance with Section 05120-Metal Fabrication.
  - 3. Bolts, nuts, and other miscellaneous hardware shall be 316 SS unless otherwise noted in the Plans and shall be provided according to section 05120-Metal Fabrication.
- E. Flanged pipe connections are allowed where shown on the Plans and elsewhere on a limited basis upon ENGINEER approval. All flanged connections shall have 316 SS or polypropylene encapsulated backup rings and 316 SS connecting hardware and shall conform to the provisions of Section 02601-Domestic Water System for HDPE flanged connections.

### 2.2 FLEXIBLE HOSE AND FITTINGS

- A. Flexible hose and fittings shall meet the same pressure and integrity standards as the rigid pipe and shall be manufactured to endure conditions involved with the intended use.
- B. Hose materials are known to have extraordinary lead times, coordinate as required.

# SECTION 02611 –FIRE SUPPRESSION STANDPIPE SYSTEM

- C. Hoses shall be equipped with threaded or flanged connections compatible with the pipe connections as designated herein and shown in the Plans. Hose end connections shall be one of the following types:
  - 1. *PT Coupling Pro Grip C50* External Crimp System with *PT C50HD Heavy Duty Ferrules* or approved equal.
  - 2. 316 SS pull mandrel internal expansion body with 316 SS pull mandrel ferrule.
  - 3. 316 SS build-in nipples. Nipples, ferrules, and all other associated steel hardware shall be constructed entirely of 316 SS.
- D. 4-inch flexible hose shall be *Good Year Veyance Technologies Plicord Super Black Flexwing* or approved equal with flanged connections.
- E. Flanged connections for hose assemblies both fixed and floating with all associated steel fittings and hardware shall be 150 lb. and shall be constructed entirely of 316 SS.
  - 1. All welds shall be completed with 316 SS rod.
  - 2. No more than one floating flange assembly shall be allowed per hose assembly.
  - 3. Threaded on flange assemblies shall not be permitted.
  - 4. All flange connection hardware shall be 316 SS provided in accordance with Section 05120-Steel Fabrication.
  - 5. Flange gasket material shall be compatible with both potable and salt water as stated by the manufacturer and shall have a pressure rating equal to the pressure class of the pipe or 250 psi minimum, whichever is greater.
- F. On hoses with internal steel wire reinforcement the CONTRACTOR shall apply *3M 5200 Marine Grade Sealant* to the cut ends of the hose as required to completely seal the exposed cut section.
  - 1. Sealant shall be field applied in the presence of the ENGINEER unless otherwise approved in writing by the ENGINEER.
  - 2. Sealant shall be applied in a manner that ensures sealant does not intrude into carrier tube of the hose or the connected pipe.
- G. Hose construction, fittings installation and hose assembly installation shall be completed per manufacturer's recommendations to meet pressure and integrity standards as specified herein.
- H. The ENGINEER may perform, on a randomly selected hose assembly, metallurgical testing of steel fittings, flanges, ferrules or miscellaneous steel hardware to verify compliance with this specification. The first test shall be paid for by the OWNER. Should the test reveal non-compliance with this specification, **all** of the hose assemblies shall be tested at the CONTRACTOR's expense. Non-compliant hose assemblies shall be replaced, in their entirety, at no cost to the OWNER. Replacement hoses shall also be tested at the CONTRACTOR's expense. Any metallurgical testing required after the first test shall be paid for by the CONTRACTOR and shall be performed at the sole discretion of the ENGINEER.

### 2.3 FIRE SUPPRESSION SYSTEM COMPONENTS

- A. Locking caps as specified herein shall be coordinated with the local fire department as required.
- B. The fire department inlet connection shall be brass 4"x2½"x2½" single clapper FDC inlet rated for a minimum of 175 psi.

# SECTION 02611 -FIRE SUPPRESSION STANDPIPE SYSTEM

- 1. Fire department inlet connection shall be indexed "STANDPIPE". The indexing shall be cast in by the manufacturer.
- 2. The fire department connection shall be complete with interior independent selfclosing clappers, and shall have threads to meet the local fire department requirements.
- 3. Inlet shall have locking plugs that shall protect the threads, as manufactured by *Knox*, no substitutions.
- C. Fire standpipe gate valves shall be *Dixon model WDGV251F* threaded, non-rising stem wedge disc gate valve or approved equal U/L listed and Factory Mutual approved gate valve equipped with a hand wheel.
- D. The fire department standpipe connection shall be 2<sup>1</sup>/<sub>2</sub>" brass as shown in the Plans rated for a minimum of 175 psi and shall have threads to meet the local fire department requirements.
  - 1. Standpipes shall have locking caps that shall protect the threads, as manufactured by *Knox*, no substitutions.

## E. BRACKETS AND MOUNTING HARDWARE

- 1. All galvanized steel brackets and associated mounting hardware shall be as shown in the Plans, shall be hot dip galvanized or 316 SS unless otherwise noted and shall be provided in accordance with Section 05120 Metal Fabrication.
- 2. Strut, pipe straps and associated hardware shall be provided in accordance with Section 02601-Domestic Domestic Water System.

## **PART 3 - EXECUTION**

# 3.1 GENERAL

A. CONTRACTOR and Fabricator to verify all fit-ups prior to order.

### 3.2 INSTALLATION

- A. Fire suppression system installation shall be as shown in the Plans, in accordance with NFPA #14 and Section 02601-Domestic Water System, as applicable.
- 3.3 OPEN-BORE FLUSHING
  - A. Fire suppression system shall be flushed in the presence of the City of Unalaska Fire Department with their pumper truck. Coordinate with the City of Unalaska Fire Department to complete flushing as required.
  - B. Flush fire suppression system in accordance with Section 02601-Domestic Water System; provide appropriate notices and scheduling with the City of Unalaska water utility.

## 3.4 HYDROSTATIC TESTING

- A. Provide fire suppression system hydrostatic testing per Section 02601-Domestic Water System, except the hydrostatic test pressure shall be 200 psi and the test period shall be a minimum of 2 hours.
- B. Hydrostatic testing of the fire suppression system shall be performed in the presence of the ENGINEER and a representative of the City of Unalaska Fire Department. Provide 48 hours notice prior to testing.

## SECTION 02702 - CONSTRUCTION SURVEYING

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- 1.2 The WORK under this Section includes providing all labor, materials, tools and equipment necessary to perform all surveying and staking necessary for the completion of the Project in conformance with the Drawings and Specifications and standard engineering and surveying practices, including all calculations required to accomplish the WORK.
- 1.3 The WORK shall include the staking, referencing and all other actions as may be required to preserve and restore land monuments and property corners which are situated within the Project area, and to establish monuments as shown on the Drawings.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

- 3.1 CONSTRUCTION
  - A. All surveying involving property lines or monuments shall be done by, or under the direction of, a Registered Land Surveyor licensed in the State of Alaska.
  - B. The OWNER will supply information relative to the approximate locations of monuments and corners, but final responsibility for locations, referencing, and restoration shall rest with the CONTRACTOR.
  - C. In the event the CONTRACTOR does not replace the survey monuments and property corners disturbed by the CONTRACTOR's operations, the OWNER may, after first notifying the CONTRACTOR, replace the monuments in question. The cost of such replacements shall be deducted from payments to the CONTRACTOR.
  - D. The CONTRACTOR shall provide the OWNER with a copy of all surveyors' notes, if requested by the ENGINEER, prior to each Pay Request payment for which payment for Pay Item No. 2702.1, Construction Surveying, is increased from the previous Pay Request payment.
  - E. The CONTRACTOR shall provide the OWNER with a copy of all surveyors' notes, prior to the request for final payment, and include the information on the record drawings.
  - F. The CONTRACTOR shall obtain all information necessary for as-built plan production, from actual measurements and observations made by its own personnel, including Subcontractors, and submit this information to the ENGINEER.
  - G. The CONTRACTOR shall use competent, qualified personnel and suitable equipment for the layout work required and shall furnish all stakes, templates, straightedges and other devices necessary for establishing, checking and maintaining the required points, lines and grades.
  - H. The CONTRACTOR shall perform all staking necessary to delineate clearing and/or grubbing limits; all cross sections necessary for determination of excavation and embankment quantities, including intermediate and/or remeasure cross sections as may be required; all slope staking; all staking of culverts and drainage structures, including the necessary checking to establish the proper location and grade to best fit the conditions on site; the setting of such finishing stakes as may be required; the staking of right-of-way; the staking and layout of all structures including foundations, abutments, floats, piles, and

# SECTION 02702 - CONSTRUCTION SURVEYING

gangways; referencing and other actions as may be required to preserve or restore land monuments and property corners; and all other staking necessary to complete the project.

- I. Field notes shall be kept in standard bound notebooks in a clear, orderly and neat manner, consistent with standard engineering and surveying practices. The CONTRACTOR's field books shall be available for inspection by the ENGINEER at any time.
- J. All field survey notes, including those which become source documentations from which quantities for payment are computed, shall be recorded by a notekeeper furnished by the CONTRACTOR. The notekeeper shall be thoroughly familiar with generally accepted standards of good survey notekeeping practice.
- K. The ENGINEER may randomly spot-check the CONTRACTOR's surveys, staking and computations at the ENGINEER's discretion. After the survey or staking has been completed, the CONTRACTOR shall provide the ENGINEER with a minimum of 72 hours notice prior to performing any WORK, and shall furnish the appropriate data as required, to allow for such random spot-checking; however, the OWNER assumes no responsibility for the accuracy of the WORK.
- L. The ENGINEER may make minor adjustments in grades and locations of improvements based on the staking information provided by the CONTRACTOR. The CONTRACTOR shall adjust the grade stakes as required to accommodate minor changes at no additional cost to the OWNER.

## PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, material, tools, and equipment necessary for furnishing and installing geotextile fabric in locations indicated on the Plans and as directed by the ENGINEER.

## PART 2 - PRODUCTS

#### 2.1 MATERIAL

- A. Geotextile fabric shall be composed of plastic yarn fabricated into a pervious sheet with distinct pores or openings.
- B. The plastic yarn shall consist of a long-chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, or vinylidene-chloride and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The cloth shall be calendared or otherwise finished so that the yarns will retain their relative position with respect to each other. The edges of the cloth shall be selvedged or otherwise finished to prevent the outer yarn from pulling away from the cloth.
- C. Type A geotextile fabric, woven or non-woven, shall meet the following requirements:

1.	Grab Tensile Strength (ASTM D 1682)			90	lbs. n	nin.
2.	Bursting Strength (ASTM D 751)			100	) psi r	nin.
3.	Equivalent Opening Size (EOS)			40	min,	100 max
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D. Type B Geotextile Fabric, woven or non-woven, shall meet the following requirements:

1. 2.	Grab tensile strength (ASTM D 4632) Grab tensile elongation (ASTM D 4632)	270 lbs. min. 50% maximum
3.	Burst Strength (ASTM D 3786)	500 psi. min.
4.	Trapezoid Tear Strength (ASTM D 4533)	95 lbs. min.
5.	Puncture Strength (ASTM D 4833)	120 lbs. min.
6.	Flow Rate (ASTM D 4491)	50 gal/min/sf

## 2.2 SEAMS

- A. Seams, when required, shall be sewn with thread of material meeting the chemical requirements given above for plastic yarn. The sheets for geotextile fabric shall be sewn together at the factory or another approved location to form sections not less than two feet wide. Seams shall be tested in accordance with ASTM D 1682, using one-inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90 pounds in any principal direction.
- B. In lieu of seams, geotextile fabric may be joined with adjacent pieces by overlapping. The material shall be overlapped a minimum of 3 feet.

## 2.3 ACCEPTANCE REQUIREMENTS

A. All brands of plastic geotextile fabric and all seams to be used will be accepted based on certification. The CONTRACTOR shall furnish the ENGINEER a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the cloth. The mill certificate or affidavit shall attest that the cloth meets the chemical, physical, and manufacturing requirements stated in this Section.

### 2.4 SHIPMENT AND STORAGE

A. During all periods of shipment and storage, the cloth shall be protected from mud, dirt, dust, debris, direct sunlight, ultraviolet rays, and temperatures greater than 140 ° F. To the extent possible, the cloth shall be wrapped in a heavy-duty protective covering.

# PART 3 - EXECUTION

## 3.1 CONSTRUCTION

- A. Geotextile fabric shall be placed in the manner and at the locations shown on the Drawings or as directed by the ENGINEER. At the time of installation, cloth shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.
- B. The surface upon which the geotextile fabric is to be placed shall be free of projections or depressions, and rocks, roots, and other sharp objects which may cause the geotextile fabric to be punctured. The geotextile fabric shall be placed without stretching and shall lie smoothly in contact with the soil or wall surface. When overlapping of strips is necessary, the joints shall be overlapped a minimum of two feet. End overlaps shall be made in the direction of flow.
- C. The fabric shall be protected at all times during construction from contamination or from damage during its installation or during placement of subsequent covering; contaminated or damaged cloth shall be replaced at the CONTRACTOR's expense, or if the ENGINEER permits, torn fabric may be patched. The aggregate material shall be cleaned from the fabric, and the torn area shall be overlain with fabric with a minimum three-foot overlap around the edges of the torn area. Care shall be taken that the patch remains in place when material is placed over the affected area.
- D. The WORK shall be scheduled so that not more than 30 Days elapse between the placement of the cloth and the time it is covered with specified material.
- E. In instances where bedding prisms for curbs, walls, structure bases, light pole bases, piping, manholes, catch basins or other items are designated to be installed below the elevation at which the geotextile fabric is to be installed as shown in the Plans, the geotextile fabric shall be lain at the limit of excavation and shall maintain continuity with the surrounding geotextile fabric by overlapping the material as shown in the Plans or specified herein. Extra Geotextile Fabric as required shall be considered incidental and shall not be measured directly for payment.
- F. Following placement of the fabric on the prepared surface, material of the type shown on the Drawings shall be back-dumped on the previously spread fabric or ground adjacent to the fabric and carefully pushed or spread onto the fabric by a dozer or other machinery. A minimum depth of one foot, or the depth shown on the Drawings, shall be maintained at all times between the fabric and the wheels or tracks of the construction equipment. At no time shall equipment operate on the unprotected fabric. The material shall be spread in the direction of the fabric overlap. Special care shall be taken to maintain a proper overlap and fabric continuity.

## SECTION 02718 – SIGNAGE AND ASSEMBLIES

### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing signs and support assemblies for the fire suppression system, upland parking area, gangways, and all other miscellaneous appurtenances and hardware, complete as shown in the Plans to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.

### 1.2 SUBMITTALS

A. Fabrication Shop Drawings for all signage and stands.

# **PART 2 - PRODUCTS**

- 2.1 SIGNS
  - A. All sign panels shall be constructed of Engineer Grade sheeting, or better.
  - B. All sign background color shall be white reflective unless otherwise noted.
  - C. All sign material, thickness and reflective paint shall conform to Alaska DOT&PF Standard Specifications for Highway Construction, Section 615 Standard Signs and to be provided in accordance with the Plans.

### 2.2 SUPPORT ASSEMBLIES

- A. Support assemblies for signs to be located on the floats shall be hot dip galvanized steel provided in accordance with Section 05120 Metal Fabrication.
- B. Strut shall be *Cooper B22SH Channel* or approved equal 12 gauge hot dip galvanized strut provided in accordance with Section 05120 Metal Fabrication.
- C. Sign posts for upland signs shall be provided as shown in the Plans
- D. All Hardware shall be type 316 SS or hot dip galvanized unless otherwise noted in the plans and shall be provided in accordance with Section 05120 Metal Fabrication

### **PART 3 - EXECUTION**

- 3.1 SIGNS
  - A. Sign assemblies shall be installed at locations shown on the Drawings. The exact location will be marked in the field by the ENGINEER. The CONTRACTOR shall notify the ENGINEER a minimum of seven days prior to installation of the signs.
  - B. Upland Signs shall be salvaged and reinstalled on new posts as shown in the Plans and per ENGINEER direction.

### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary for fabrication, transport, delivery, and installation of the complete aluminum gangway consisting of the gangway structure, fiberglass grating, LED lighting, transition plate assemblies, nosings, hinge assemblies, gangway abutment connection weldment, link plates, guide angles, skid plates, keeper angles and all other miscellaneous appurtenances and hardware in accordance with the requirements of the Contract Documents and as indicated on the Plans.

#### 1.2 REFERENCES

A. ASTM (American Society of Testing Materials) Specifications

### 1.3 SUBMITTALS

- A. Fabrication Shop Drawings for all fabricated aluminum and steel items, prior to fabrication, per Section 05120 Metal Fabrication.
- B. Aluminum Submittals per Section 05120 Metal Fabrication.
- C. Structural Steel Submittals per Section 05120 Metal Fabrication.
- D. Welding Procedures and Welder Certifications per Section 05120 Metal Fabrication.
- E. Gangway Handling Plan: CONTRACTOR shall coordinate with the fabricator(s) and all transport companies to submit a handling and installation plan for review and approval, by the ENGINEER, prior to beginning fabrication work. Plan shall describe all lifting, transport and installation equipment and devices as well as proposed transport configuration.
- F. Traction Plate Submit (2) product samples along with manufacturer's published literature for specific product and accessories, as applicable, including manufacturer's specifications, physical characteristics, fabrication and dimensional tolerances, product warranty, and options for coarseness of anti-slip surface. Submittal shall include dimensional specifications for rivets used to attach traction plate as indicated on the Plans.
- G. Fiberglass Grating Submit (2) product samples along with manufacturer's published literature for specific product and accessories, as applicable, including manufacturer's specifications, physical characteristics, fabrication and dimensional tolerance data, and product warranty. Submittal shall include proposed method of attachment per manufacturer's recommendations.
- H. UHMW (Ultra High Molecular Weight) Polyethylene Submit material specifications and Fabrication Shop Drawings for each type of fabricated UHMW piece.

- I. Rubber Pads Submit manufacturer's published literature for specific product, including manufacturer's specifications, physical characteristics, performance and dimensional tolerance data.
- J. LED Lighting Submit manufacturer's published literature for specific product, including manufacturer's specifications, physical characteristics. Also include location/placement on gangway as well as connection details.

# 1.4 QUALITY ASSURANCE

A. Quality Assurance requirements shall be per Section 05120 – Metal Fabrication.

# PART 2 - PRODUCTS

- 2.1 MATERIALS All materials shall conform to the Design Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to verify that materials purchased comply with the fore mentioned documents. The Fabricator shall inspect all materials, upon arrival, for conformance with the purchase orders, and confirm that mill certificates and test reports are provided, and that they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to purchasing and/or commencing any WORK involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified on the design documents if the proposal for a substitution is not approved by the ENGINEER. All materials shall conform to good workmanship, acceptable industry standards and manufacturer's recommendations.
  - A. Miscellaneous steel plates and shapes shall be ASTM A36, galvanized per ASTM A123 or A153, and comply with Section 05120 Metal Fabrication.
  - B. All aluminum plate and shapes shall comply with Section 05120 Metal Fabrication.
  - C. All bolts, piano hinge connection rods, and miscellaneous hardware shall comply with Section 05120 Metal Fabrication
  - D. All Ultra High Molecular Weight (UHMW) Polyethylene components shall be manufactured from virgin polyethylene material, be U.V. stabilized and shall be partially cross-linked. UHMW components shall be black in color, unless otherwise noted. Transition plate nosings shall be yellow in color.
  - E. Fiberglass grating shall be high-strength, Pultruded bar type with anti-skid, extra coarse and durable grit surface such as "*Safe-T-Span*" type "I-4010", ADA Compliant grating with 1" I-type bearing bars or approved equal. Color of grating shall be dark gray. Attachment of grating bars shall use Type 316 Stainless Steel fasteners per manufacturer's recommendations. All cuts, holes or otherwise exposed fiberglass grating shall be sealed with resin seal kit per manufacturer's recommendations. "*Safe-T-Span*" is produced by *Fibergrate / Composite Structures International, Inc.*
  - F. Traction Plate shall be fiberglass reinforced plate with extra-coarse, non-slip grit surface. Acceptable product shall be "*Safplate*" or approved equal. Color of plate shall be dark

### **SECTION 02894 - GANGWAY**

gray. Plate shall be installed only after coordination with the manufacturer's representative to verify fabrication and fit-up dimensional tolerances. Variance in adjacent plate thickness shall not exceed 1/16". Placement of plate and repairs of cuts or holes shall be per manufacturer's recommendations. "*Safplate*" Fiberglass Gritted Plate is produced by *Strongwell Corporation*. Installed plate that does not match the same grit surface texture as approved by the submittal process shall be removed and replaced by the CONTRACTOR at no additional cost.

G. LED Lighting shall be provided as noted on the electrical drawings.

## 2.2 DELIVERY, STORAGE, AND PROTECTION

A. Delivery, Storage, and Protection shall be per Section 05120 – Metal Fabrication.

## PART 3 – EXECUTION

### 3.1 FABRICATION

- A. The complete aluminum gangway assembly shall be fabricated and constructed in conformance with the Contract Documents and as shown on the Plans. Any gangway materials damaged during transport and delivery and/or during handling and fabrication operations shall be repaired or replaced by the Fabricator, at the discretion of the ENGINEER, and at no additional cost to the OWNER.
- B. Fabricator shall coordinate with all material suppliers to ensure that fit-up and fabrication of all gangway components comply with the Plans and Specifications.
- C. All gangway tube and pipe elements shall be completely sealed by welding or other ENGINEER approved methods. Fabricator shall provide weep holes as indicated on the Plans.

### 3.2 TRANSPORT AND DELIVERY

- A. The CONTRACTOR shall assume full responsibility for any damage or losses resulting from the handling or transporting of the gangway and all associated components during loading, shipping, transport and delivery to the project site as well as the subsequent handling required on site for installation.
- B. Damage that occurs during transport and delivery and/or during other handling operations prior to final acceptance shall be repaired or replaced by the CONTRACTOR at the discretion of the ENGINEER, and at no additional cost to the OWNER.

## 3.3 INSTALLATION

- A. The complete gangway shall be installed as indicated on the Plans and/or to the highest industry standards if not fully shown on the Plans.
- B. Verify final location for guide assemblies at bottom of gangway through several extreme tide cycles before final anchoring to float. Confirm final location of guide assembly with

ENGINEER. Following complete installation of gangway and all other associated WORK. CONTRACTOR shall lubricate gangway skids, as directed by the ENGINEER, with an ENGINEER approved, graphite-based lubricant.

C. Construction methods and products not specifically mentioned in these Contract Documents shall be utilized using reasonable care and the highest quality construction practices. Final inspection and acceptance of all WORK and products not specifically mentioned in these Contract Documents shall be made by the ENGINEER. Approval shall be based upon conformance to the Contract Documents, quality of workmanship, applicable industry standards, and pertinent manufacturer's recommendations.

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary for fabrication, handling, transport, and installation of the complete mooring float system, consisting of multiple mainwalk float units, gangway landing float units, all miscellaneous appurtenances and hardware, and all other related Work in accordance with the requirements of the Contract Documents and as shown on the Plans.

#### 1.2 REFERENCES

- A. AISC (American Institute of Steel Construction) Code of Standard Practice Manual of Steel Construction (ASD).
- B. ASTM (American Society of Testing Materials) Specifications

#### 1.3 SUBMITTALS

- A. Fabrication Shop Drawings for all float units and float unit components.
- B. Submittals for all fabricated steel items shall be per Section 05120-Metal Fabrication, Section 02896-Steel Pipe Piles, and Section 09900-Coatings, as appropriate.
- C. Mooring Float Assembly and Handling Plan: CONTRACTOR shall coordinate with the fabricator(s) and all transport companies to submit an assembly, handling and installation plan for review and approval, by the ENGINEER, prior to beginning fabrication work. Plan shall address fabrication sequence and schedule, means and methods for assembly and alignment of individual float units; fabrication, installation and assembly of all bolted float connections, steel coating application procedures; describe all lifting, transport and installation equipment and devices as well as proposed transport configuration of multiple float units.
- D. UHMW (Ultra High Molecular Weight) Polyethylene: Submit manufacturer's published literature for specific product along with Fabrication Shop Drawings for each type of UHMW piece.
- E. Rubber Shear Blocks and Compression Bushings: Submit rubber material specifications, drawings indicating overall dimensions, and fabrication and dimensional tolerances.
- F. Metal Grating: Submit manufacturer's published literature for specific product along with Fabrication Shop Drawings for each type of grating panel.
- G. Anodes: Submit manufacturer's published literature for specific product including material specifications, drawings indicating overall dimensions, and fabrication and dimensional tolerances.
- H. Fiberglass Cable Tray: Submit manufacturer's published literature for specific product, accessories and associated attachment hardware along with shop fabrication drawings illustrating cable tray layout and segment lengths used for each type of float module.

### **SECTION 02895 – MOORING FLOATS**

- I. Coated Polystyrene Flotation Billet Shop Drawings: Submit complete shop drawings illustrating geometry, chamfers, and any required notches for each billet type.
- J. Fiberglass Rods, Nuts and Shapes: Submit manufacturer's published literature for specific product(s).
- K. Float Fabricator's Quality Assurance Program Submit copy of quality assurance program fabricator(s) propose to use during the fabrication process.

## PART 2 - PRODUCTS

2.1 GENERAL - All materials shall conform to the Design Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to verify that materials purchased will comply with the fore mentioned documents. The Fabricator shall inspect all materials, upon arrival, for conformance with the purchase orders, and confirm that mill certificates and test reports are provided and that they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to purchasing and/or commencing any WORK involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified on the design documents if the proposal for a substitution is not approved by the ENGINEER. All materials shall conform to good workmanship, acceptable industry standards and manufacturer's recommendations.

## 2.2 METAL MATERIALS

- A. Unless otherwise noted, all steel pipe pontoons shall be straight seam pipe conforming to ASTM A-252, Grade 3. Carbon Equivalency shall not exceed 0.45.
- B. Pipe less than 12-inch diameter shall be ASTM A53, Grade B, Type E or S.
- C. Square and rectangular HSS shall be ASTM A500, Grade B.
- D. Miscellaneous steel plate and shapes shall be ASTM A36, unless otherwise noted.
- E. Fabricated metal weldments and assemblies shall comply with Section 05120-Metal Fabrication.
- F. Float-to-float connection bolts shall be ASTM F1554 GR105 with ASTM A563 DH Heavy Hex nuts and ASTM F844 plate washers. All float-to-float connection hardware shall be hot-dip galvanized.
- G. Bolts and miscellaneous hardware shall comply with Section 05120-Metal Fabrication.
- H. Stainless Steel shall be Type 316, conforming to ASTM A276.
- I. Steel coatings shall be as specified in Section 09900-Coatings.
- J. Non-Skid Coating shall conform to Section 09900-Coatings.

#### 2.4 MISCELLANEOUS MATERIALS

- A. All Ultra High Molecular Weight (UHMW) Polyethylene components shall be manufactured from virgin polyethylene material, be U.V. stabilized, and shall be partially cross-linked. UHMW float rubstrips shall be yellow in color, all other UHMW components shall be black in color, unless otherwise noted, and edges chamfered as shown on Plans.
- B. Anodes shall be MA-3 Alloy, as manufactured by *M&M Industries, Inc.*, or approved equal. Anodes shall be of the specified weight and dimensions as indicated on the Plans. Bare ASTM A36 steel bar shall be used for offset mounting tabs. Submit Anode specifications and details for ENGINEER approval.
- C. Fiberglass Cable Tray shall be as manufactured by *MPHUSKY Corporation*, or approved equal. Cable tray shall be "ladder-type" with width, height and rung spacing as shown on the Plans. Submit cable tray and mounting hardware specifications, along with any necessary drawings to illustrate cable tray segment lengths and proposed mounting method, for ENGINEER approval.
- D. Fiberglass Rod, Nuts and Channel Shapes (billet hanger assembly components) shall be as manufactured by "*StrutTech*", and supplied by *Axium Composites Inc.*, of Redmond, Washington (1-425-885-2805), or approved equal.
- E. Metal Grating shall be type W19-4 with serrated 1 <sup>1</sup>/<sub>4</sub>" x 3/16"t bearing bars as manufactured by *Grating Pacific*, *LLC*, or approved equal. All grating shall be edge banded at all panel edges and grating openings. All grating shall be hot-dip galvanized after fabrication. Attach grating as shown on the Plans.
- F. All floatation billets shall be configured as shown on the Plans, without laminations or glued joints, unless otherwise approved by the ENGINEER; billets shall be closed-cell, expanded polystyrene, in accordance with ASTM C578. Minimum requirements shall be as follows:
  - 1. Density between 0.9 and 1.0 pounds per cubic foot
  - 2. Contain not greater than 5% regrind material
  - 3. Compressive Strength 10 psi minimum at 10% deformation
  - 4. Flexural Strength 25 psi minimum
  - 5. 4% maximum water absorption by volume as tested by ASTM C-272
  - 6. All floatation billets shall be coated on all sides with "Polyshield SS-100", or approved equal, coating of seventy-five (75) mils in thickness, minimum. Coating shall be spray applied and cured per manufacturer recommendations. Alternative coatings shall either meet or exceed the characteristics of this material and be acceptable to the governing agencies for construction in the marine environment.
  - 7. Billets shall have a maximum variation from design dimensions of 1/8-inch.

#### SECTION 02895 – MOORING FLOATS

G. Rubber Shear Block and Compression Bushings shall be weather resistant, suitable for use in a marine environment, and comply with the following requirements:

Property	Requirement	ASTM Test
Min. Tensile Strength	2500 psi Min.	ASTM D412
Hardness-Shore A Durometer	80 +/- 5	ASTM D2240
Ultimate Elongation	300%	ASTM D412
Compression Set	25% max.	ASTM D395, Method B
Ozone Resistance	No Cracks	ASTM D1171, Method B
Water Resistance	10% Max. Swell	ASTM D471
Low Temp. Resistance	Non-Brittle	ASTM D2137, Method A
Heat Resistance		ASTM D573
Max. Change in Hardness	+10 pts.	
Max. Change in Tensile Strg	-25%	
Max. Change in Ult. Elong.	-25%	
Tear Resistance	200 ppi Min.	ASTM D624

Physical Constraints - Fit-up of each Rubber Shear Block connection is critical. Shear Blocks must fit snugly into the float tube steel frame, not allowing appreciable movement within the tube. CONTRACTOR shall coordinate with rubber manufacturer and float fabricator to produce sample Shear Blocks to be used to determine rubber dimensions required to achieve a fit that is snug-tight within the galvanized float tube frame. Dimensions of initially fabricated Shear Blocks may need to be modified, to achieve the final fit-up requirements prior to final fabrication of the rubber shear blocks. Tube steel inside dimensions may vary, particularly if tube steel has different heat numbers and/or is supplied from different mill runs.

### 2.5 DELIVERY, STORAGE, AND PROTECTION

- A. All float materials shall be protected during shipping and handling. Materials shall be stored above ground on pallets, platforms or other supports.
- B. Any mechanical damage incurred from handling and transportation shall be repaired by the CONTRACTOR at no expense to the OWNER.

# PART 3 – EXECUTION

#### 3.1 FABRICATION

A. Fabricator Qualifications: The float Fabricator shall have a minimum of five (5) consecutive years of experience in successfully fabricating and fitting metal components and steel structures similar to that indicated for this Project. Fabricator must have a record of successful in-service performance as well as sufficient production capacity to fabricate all structural steel without delaying the WORK. Also, float fabricator shall possess certification as AISC "Simple Steel Bridge" – (SBR) fabricator and shall submit qualifications and experience of project superintendent that will be responsible for supervision and oversight of all WORK.
- B. Quality Assurance. The float Fabricator must have an ongoing quality assurance program approved by a qualified, independent source. At the option of the ENGINEER, the Fabricator shall submit a copy of their operational quality assurance program, and shall not begin fabrication until the ENGINEER has approved this quality assurance program. The objectives of the quality assurance program are as follows:
  - 1. Completed products shall conform completely to all governing codes and specifications stipulated in the Design Contract Documents, and Plans.
  - 2. Quality Assurance Program is an integral part of the ongoing manufacturing activities of the Fabricator.

Although periodic inspections will be carried out by the ENGINEER, the purpose of these inspections is to note general conformance to the design documents. It is still the responsibility of the Fabricator to produce a quality product, in complete conformance with the design documents, and to document and correct any non-conformance. All documentation, including that submitted, shall be kept on file by the Fabricator, for review, if requested by the OWNER or ENGINEER.

Fabricator shall provide, to the ENGINEER, suitable documentation showing a minimum of three (3) previously successful, similarly constructed, float fabrication projects, including current names, addresses and contact numbers of the corresponding float owners.

- C. Fabrication Facility. The fabrication facility shall provide the proper environment and physical conditions necessary for high quality construction. The facility shall provide adequate work space, equipment, level working surfaces, and protection from direct sunlight, wind, and moisture. The Fabricator shall have the capability to carry out the following work in-house or on a contract basis:
  - Design of lifting and erection devices not shown on the Drawings
  - Preparation of Shop Fabrication Drawings
  - Receiving, checking and storing of materials
  - Dimensional checking and verification
  - Resolution of non-conformities
  - Documentation of all stages of work with capability of tracing all major components
  - Handling, storing, shipping and delivery
- D. The float units shall be assembled as shown on the Plans. All float units shall be clearly identified with the date of manufacture, and specific float designation per Plans. Any float materials damaged during transport and delivery and/or during handling and fabrication operations shall be repaired or replaced by the Fabricator, at the discretion of the ENGINEER, and at no additional cost to the OWNER.
- E. Mooring float frames shall be fabricated utilizing a jig or other means/methods to ensure as uniform, dimensionally consist, square, and true frames as possible.
- F. To the extent possible, float fabricator shall obtain the HSS chord tubes from the same mill run and heat numbers so as to ensure a consistent inside dimension for purposes of achieving the level of fit required for the rubber shear blocks. If not, then fabricator shall coordinate the layout of float frames so as to group chord tubes with matching inside dimensions and fabricate transitional and/or varying sized shear blocks as necessary for each group of chord tubes.

### SECTION 02895 – MOORING FLOATS

- G. Deck of individual float units shall be within the following level tolerances under design dead load:
  - Maximum transverse freeboard differential shall be one-half (0.5) inch.
  - Maximum longitudinal freeboard differential shall be one-half (0.5) inch.
- H. All steel float structural components, including bolts and miscellaneous hardware, shall be hot-dip galvanized per ASTM A123 or A153, and comply with Section 05120 Metal Fabrication.
- I. Anodes shall be installed per Plans, prior to application of steel pontoon coatings. Anodes shall be masked off or otherwise covered during application of steel pontoon coatings.
- J. All steel pipe pontoons shall be pressure tested for leaks, prior to application of coatings. It is intended that all closed shapes (i.e. pipes) as well as individual chambers created by internal diaphragms, shall be fabricated in such a manner as to be leak proof. Pipe bungs with threaded inserts are required for each individual chamber of the pontoons. These are intended to allow initial pressure testing by the Fabricator and subsequent inspections by the OWNER. Individual pontoon chambers shall be pressurized to a maximum pressure of 2 psi, and all welded joints shall be soap tested with an approved product, to locate potential leaks. Repairs shall be made to areas which fail to maintain pressure and/or do not pass the soap test. These areas shall be subsequently retested.. Adjacent chambers shall not be pressurized simultaneously. Fabricator shall document testing with a written report and photos, to be submitted to the ENGINEER. Successful testing of all pontoon chambers is required prior to application of coatings. Pressure tests shall be monitored by a QC or QA representative. Pressure testing means, methods and procedures shall be submitted to ENGINEER for approval.
- K. The float fabricator shall be required to perform quality control of the coated flotation billets, checking for adequate coating thickness and for the presence of any holes in the coating which expose the polystyrene. Application of the coating shall be accomplished with multiple layers or in such a manner as to minimize holes caused from trapped gases within the polystyrene.
- L. The ENGINEER may randomly cut a 2-inch-by-2-inch sample of approximately 5 to 10 percent of the coated flotation billets to check for adequate thickness of coating. If thickness is insufficient, the manufacturer shall be prepared to apply more layers as necessary to obtain the required minimum thickness. The manufacturer is responsible for repairing the coating after samples have been taken. Repairs shall be accomplished by reapplication of coating to the exposed area.

## 3.2 TRANSPORT AND DELIVERY

- A. The CONTRACTOR shall assume full responsibility for any damages or losses resulting from the handling or transporting of the float units and/or any float components during loading, shipping, transport and delivery to the fabrication and/or project site as well as the subsequent handling required on site for installation.
- B. Any float unit and/or float components damaged during transport and delivery and/or during any other handling operations prior to final acceptance shall be repaired or

#### **SECTION 02895 – MOORING FLOATS**

replaced by the CONTRACTOR at the discretion of the ENGINEER and at no additional cost to the OWNER.

#### 3.3 INSTALLATION

- A. The complete mooring float system shall be installed as shown in the Plans and/or to the highest industry standards if not fully shown on the Plans. All float connections are designed to accommodate the required vessel and wave loads only when installed as a complete float system, as shown on the Plans. Damage to the float connection hardware and float structure may occur if float is installed, and left in place, without the proper support and support structures around it. The CONTRACTOR shall repair and/or replace, at the OWNER's preference, and at no additional cost to the OWNER, any float unit and/or float components damaged due to improper support during installation.
- B. CONTRACTOR shall coordinate with the float fabricator and all transport companies to submit a float assembly and handling plan for review and approval, by the ENGINEER, prior to fabricating, assembling, handling, transporting and installation of the float and/or float modules. Plan shall address fabrication sequence, collective assembly and alignment of individual float units, fabrication, installation and assembly of all bolted float connections, steel coating repair procedures, and describe all lifting and transport equipment and devices as well as proposed transport configuration of float units.
- C. Steel mooring piles shall be installed through float unit pile hoops as specified under SECTION 02896-Steel Pipe Piles, and as shown on the Plans. Float unit shall be secured in true, straight alignment, as shown on the Plans, prior to pile installations.
- D. Construction methods and products not specifically mentioned in these Contract Documents shall be utilized using reasonable care and the highest quality construction practices. Final inspection and acceptance of all work and products not specifically mentioned in these Contract Documents shall be made by the ENGINEER. Approval shall be based upon conformance to the Contract Documents, quality of workmanship, applicable industry standards, and pertinent manufacturer's recommendations.

#### **SECTION 02896 - STEEL PIPE PILES**

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary to furnish and install all float system steel pipe mooring/anchor piles, fiberglass caps, pile driving shoes, drilled pile sockets, and all other related WORK in accordance with the requirements of the Contract Documents and as shown on the Plans.

#### 1.2 REFERENCES

- A. ASTM A252 Welded and Seamless Steel Pipe Piles
- B. ASTM A139 Electric-Fusion (Arc)-Welded Steel Pipe
- C. ASTM A123 Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
- D. AWS D1.1 Structural Welding Code Steel

#### 1.3 SUBMITTALS

- A. Manufacturer's Mill Certificate: Steel Certification including chemistry, yield strength, and mill numbers.
- B. Shop Drawings for all fabricated items per Section 05120 Metal Fabrication.
- C. Welding Procedures: All weld metal proposed to be used in the shop or in the field shall be submitted and approved for use prior to construction. The submittal shall contain all required information and the manufacturer's recommendations for the use of the product on this project.
- D. Pile Splice Design: Preapproved pile splices for ASTM A252, Grade 3 material shall meet AWS D1.1 requirements and shall be submitted for ENGINEER review.
- E. Pile Installation Plan: Provide narrative and illustrations as necessary to fully describe complete pile and pile socketing installation plan. The plan shall address, as a minimum, all equipment, labor, temporary pile support and template systems, methods/means to align and maintain pile alignment, survey control, work sequence, pile clean-out methods, and pile socketing methods/means of installation. The CONTRACTOR shall not mobilize hammers, drill equipment, or any other pile installation related equipment prior to receiving written approval, from the ENGINEER, for the Pile Installation Plan as described herein. The CONTRACTOR should allow one week for review of the Pile Installation Plan by the ENGINEER. All pile driving means and methods shall meet the requirements of the permits issued for this project.
- F. Manufacturer's information on all pile hammers intended for use, complete with satisfactory data to ensure properly suited for installation of pipe piles.
- G. Galvanizing certificates verifying that coated material conforms to Specifications.

#### SECTION 02896 - STEEL PIPE PILES

- H. Fiberglass Pile Caps: Submit manufacturer's product data sheet along with proposed attachment method.
- I. Pile Driving Shoes: Submit manufacturer's published literature for specific product, including specifications, and installation requirements for driving shoe pile tips as shown on the Plans.
- J. Drill Discharge Containment System: Submit Drill Discharge Containment System to be used during all pile installation operations which require drilling and discharge of soils and/or rock cuttings. Containment system must be of sufficient length, width and depth to completely contain discharge material during pile installation work.

## PART 2 - PRODUCTS

- 2.1 GENERAL
  - A. All materials shall conform to the Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to ensure that materials purchased will comply with the Contract Documents. The fabricator shall inspect all materials, upon arrival, for conformance with the purchase orders, and the fabricator shall confirm that mill certificates and test reports are provided and that they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to commencing any work involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified in the Contract Documents if the proposal for a substitution is not approved by the ENGINEER.
  - B. All materials incorporated into this project shall be new, unless otherwise noted on the Plans. Material not specifically noted in the Contract Documents or on the Plans shall be submitted by the CONTRACTOR for approval by the ENGINEER. Approval will be based on conformance to current standards utilized by the OWNER.
  - C. All materials shall conform to good workmanship, acceptable industry standards and manufacturer's recommendations.

#### 2.2 PILES

- A. All float mooring/anchor piles shall be straight seam ERW pipe resulting in a smooth exterior pile wall and conforming to ASTM A252, Grade 3. Carbon Equivalency shall not exceed 0.45.
- B. All steel pipe piles shall be hot-dip galvanized, full length, in accordance with ASTM A123, unless otherwise noted on the Plans.
- C. All steel pipe piles shall be furnished, complete with pile tips, in the lengths indicated on the Plans. Piles shall be delivered full length or field spliced in accordance with approved welding and galvanizing repair procedures. No additional compensation shall be made for splicing piles to make up the pile lengths shown on the Plans.

#### 2.3 MISCELLANEOUS

- A. Miscellaneous steel plates, shapes and fabricated weldments shall comply with Section 05120 Metal Fabrication.
- B. Fiberglass pile caps shall be as manufactured by *Cheyenne Manufacturing Inc.* or approved equal. Color shall be white. Attachments shall be per manufacture's recommendations to resists 100 mph wind speed.

### **PART 3 - EXECUTION**

#### 3.1 PREPARATION AND PROTECTION OF COATINGS

- A. The CONTRACTOR is responsible to become familiar with the site conditions and any available geotechnical information, prior to bid, so as to make their own assessment of pile installation means and methods. It is recommended that the CONTRACTOR visit the site, prior to bid, to assess the site conditions, particularly during a minus tide.
- B. Galvanized coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per Section 05120 Metal Fabrication.

#### 3.3 INSTALLATION

- A. The CONTRACTOR shall submit a detailed, narrative plan for all pile installation procedures. The plan shall include all pile hammer types and sizes, drill equipment, and written description of means and methods for all pile installation work. The CONTRACTOR shall not mobilize hammers and or any other related pile installation equipment prior to receiving written approval of the plan. The CONTRACTOR should allow one week for review of the plan by the ENGINEER. All pile driving means and methods shall meet the requirements of the PERMITS issued for this project.
- B. Unless otherwise directed by the ENGINEER, drilled pile sockets shall be installed at all pile locations, to the depth requirements specified on the Plans. Prior to drilling of pile sockets, piles shall initially be installed completely through existing overburden, and seated into any weathered and/or fractured rock, until refusal is obtained as determined by the ENGINEER. Drilled pile socket diameter shall be a maximum of 17 inches for a 16-inch diameter pile.
- C. An impact hammer suitably sized for the pile installation shall be utilized for final driving and acceptance of all piles. For pile sockets, piles shall be driven to bedrock refusal, at the bottom of the drilled pile socket following completion of drilling and removal of drilling equipment. Any hammer that causes damage to the piles during driving operations shall be substituted with an acceptable, alternate hammer at no additional expense to the OWNER. Impact hammers shall be supplied with new cap block cushions, which shall be changed at the manufacturer's recommended cycle.
- D. Obstructions may be encountered below mudline during pile driving. Any obstructions encountered within five feet of the existing mudline shall be removed at no additional cost to the OWNER. Obstructions extending below five feet from mudline elevation that

#### SECTION 02896 - STEEL PIPE PILES

require removal shall be removed in accordance with General Conditions, Article 9 – Changes. The CONTRACTOR shall be prepared to immediately remove obstructions in the event they are encountered, or shall alternatively move to other contract Work to prevent delays.

- E. All float mooring/anchor piles shall be installed at planned locations, through the pile hoops to assure that the floats move freely along the piles throughout all tide levels. Any pile installed in a manner that causes binding between the pile and pile hoop shall be extracted and re-driven at no additional cost to the OWNER. Forcing of piles to achieve required alignment will not be allowed. Minimum pile lengths and embedment requirements shall be as specified on the Plans.
- F. Piles shall be installed within 0.5% of specified vertical alignment and within 1 inch of specified location at cutoff. Misaligned or mislocated piles shall be extracted by the CONTRACTOR and shall be reinstalled at no additional cost to the OWNER. The CONTRACTOR shall have suitable equipment on site to extract piles that do not meet the location tolerances specified.
- G. All pile installations shall be conducted with the ENGINEER present. The CONTRACTOR shall assist the ENGINEER in monitoring the pile driving. Unless otherwise directed by the ENGINEER, the CONTRACTOR shall mark each pile with one-foot increments, with every five-foot increment numbered. The marks shall be visible and readable from all sides of the pile above local extreme low tide level. CONTRACTOR shall provide notification to ENGINEER a minimum of 24 hours prior to any pile installation.
- H. A drill discharge containment system must be used during pile installation operations when soil and/or rock cuttings from within the pile is removed (i.e. during pile socket installation). Drill discharge containment system shall be of adequate dimensions to achieve complete containment.
- I. The CONTRACTOR shall furnish and install new fiberglass caps in accordance with the manufacturer's recommendations for each float mooring/anchor pile as indicated on the Plans.
- J. All steel pipe pile cutoffs shall become the property of the CONTRACTOR and shall be removed in their entirety from the project site.
- K. Construction methods and products not specified in these Contract Documents shall be utilized using reasonable care and the highest quality industry standard construction practices. Final inspection and acceptance of all Work and products not specified in these Contract Documents shall be made by the ENGINEER. Approval shall be based upon conformance to the Contract Documents, quality of workmanship, applicable industry standards, and pertinent manufacturer's recommendations.

### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary to furnish and install coated expanded polystyrene (EPS) floatation billets, and all other associated WORK in accordance with the requirements of the Contract Documents and as indicated on the Plans.

### 1.2 REFERENCES

A. ASTM (American Society of Testing Materials) Specifications

### 1.3 SUBMITTALS

- A. Manufacturer's Certificates: Certify that products supplied meet or exceed specified requirements.
- B. Coating Product Data: Provide technical data on coating product. Data shall include product description, color, recommended uses, performance characteristics, limitations, and application instructions.
- C. Leveling Billet Installation Plan: The CONTRACTOR shall submit a plan for installation of floatation leveling billets. Provide a detailed narrative to fully describe the means/methods, tools and equipment for the installation of coated floatation billets at locations to be determined in the field by the ENGINEER for leveling the moorage floats.
- D. Billet manufacturer quality control procedures for coating application and subsequent testing.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Unless otherwise noted herein, all floatation billets shall be configured as shown on the Plans, without laminations or glued joints, unless otherwise approved by the ENGINEER. Billets shall be closed-cell, expanded polystyrene, in accordance with ASTM C578. Minimum requirements shall be as follows:
  - 1. Density between 0.9 and 1.0 pounds per cubic foot
  - 2. Contain not greater than 5% regrind material
  - 3. Compressive Strength 10 psi minimum at 10% deformation
  - 4. Flexural Strength 25 psi minimum
  - 5. 4% maximum water absorption by volume as tested by ASTM C-272
  - 6. All floatation billets shall be coated on all sides with "Polyshield SS-100", or approved equal, coating of sixty-five (65) mils in thickness, minimum. Coating shall be spray applied and cured per manufacturer recommendations. Alternative coatings shall either meet or exceed the characteristics of this material and be acceptable to the governing agencies for construction in the marine environment.

### SECTION 02897 – FLOATATION BILLETS

- 7. Unless otherwise noted herein or indicated on the Plans, dimensions of coated leveling billets to be supplied under Bid Item 2897.1 Supply Floatation Billet, shall be a standard 10"x20"x8'-0".
- 8. Billets shall have a maximum variation from design dimensions of 1/8-inch, unless otherwise noted.

# PART 3 – EXECUTION

## 3.1 FABRICATION

- A. At the discretion of the ENGINEER, randomly cut 2-inch-by-2-inch samples of approximately 5 to 10 percent of the coated floatation billets may be cut from the billets to check for adequate thickness of coating. If thickness is insufficient, the manufacturer shall be prepared to apply more layers as necessary to obtain the required minimum thickness. The manufacturer is also responsible for repairing the coating after samples have been taken. Repairs shall be accomplished by reapplication of coating to the exposed area.
- B. The manufacturer shall be required to perform quality control of the coated floatation billets, checking for adequate coating thickness and for the presence of any holes in the coating which expose the polystyrene. Application of the coating shall be accomplished with multiple layers or in such a manner as to minimize holes caused from trapped gases within the polystyrene.

#### 3.2 TRANSPORT AND DELIVERY

- A. The CONTRACTOR shall assume full responsibility for any damages or losses resulting from the handling or transporting of all floatation billets during loading, shipping, transport and delivery to the project site as well as the subsequent handling required on site for installation.
- B. Damage that occurs during transport and delivery and/or during any other handling operations prior to final acceptance shall be repaired or replaced by the CONTRACTOR at the discretion of the ENGINEER and at no additional cost to the OWNER.

#### 3.3 INSTALLATION

- A. The CONTRACTOR shall supply coated floatation billets per Specifications, in dimensions and quantities indicated in the Contract Documents, as shown on the Plans, and as indicated herein.
- B. The CONTRACTOR shall submit a plan for installation of floatation billets. The plan shall include means/methods for removal of marine growth as necessary to achieve a uniform bearing surface, as well as placement methodology for floatation leveling billets. Marine growth may be removed mechanically or hydraulically, without damaging existing float components, to achieve stable, secure positioning of floatation billets.
- C. The CONTRACTOR shall install the coated floatation billets, as necessary, to achieve desired leveling of the floats. Installation locations for the floatation billets shall be determined by the ENGINEER, in the field, after all electrical equipment, transition plates, gangways, water, power and lighting elements have been installed.

### SECTION 02897 – FLOATATION BILLETS

D. All remaining floatation billets not installed shall remain the property of the OWNER. The CONTRACTOR shall deliver and neatly stack all surplus floatation billets to a location to be chosen by the OWNER within five miles of the project site.

### PART 1 - GENERAL

### 1.1 **DESCRIPTION**

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing all safety ladders, fire extinguisher cabinets, life ring cabinets, hose mounts and all associated bases, connecting hardware and appurtenances.

### 1.2 SUBMITTALS

- A. Fire Extinguisher Cabinets, Life Ring Cabinets and Hose Mounts Submit manufacturer's published literature for specific product and associated attachment hardware.
- B. Portable Fire Extinguisher, Catalogue Cut sheet and Material Safety Data Sheet.
- C. Fabrication Shop Drawings for all fabricated steel items, prior to fabrication, per Section 05120 Metal Fabrication.

### PART 2 - PRODUCTS

### 2.1 FIRE EXTINGUISHER CABINETS

A. Fire extinguisher cabinets shall be as manufactured by *Cheyenne*, or approved equal, with a 20 lb. ABC fire extinguisher. All attachment hardware shall be hot-dipped galvanized.

#### 2.2 LIFE RING CABINETS

- A. Life ring cabinets shall be a standard size and color as manufactured by *Cheyenne*, or approved equal. All attachment hardware shall be hot-dipped galvanized.
- B. Each cabinet shall be equipped with a life ring and attached rope.
- 2.3 STEEL PRODUCTS
  - A. Steel base frames for cabinets, hose mounts, and all attachment hardware shall be hot dip galvanized unless otherwise noted and provided in accordance with the provisions of Section 05120-Metal Fabrication.

### 2.4 SAFETY LADDERS

- A. Safety ladders shall be fabricated as shown on the Plans and in accordance with the provisions of Section 05120-Metal Fabrication.
- B. Bolts and miscellaneous hardware shall comply with Section 05120-Metal Fabrication.
- C. UHMW components shall comply with Section 02895 Moorage Floats. Color shall be black.
- D. Steel coatings shall be per Section 09900 Coatings.

## PART 3 - EXECUTION

- 3.1 GENERAL
  - A. Base plates and support posts shall be constructed according to the Plans and in compliance with Section 05120 Metal Fabrication.

## SECTION 02899 – FLOAT APPURTENANCES

## 3.2 INSTALLATION

- A. Fire extinguisher and life ring cabinets shall be installed in the approximate locations shown on the Plans per ENGINEER Direction.
- B. Safety ladders hall be field installed/located on the float per OWNER direction.

## SECTION 02900 – CONTINGENCY ITEMS

### PART 1- GENERAL

#### 1.1 DESCRIPTION

A. The WORK under this Section is Contingent and includes all labor, materials, tools, and equipment associated with suspension of WORK due to the presence of marine mammals within the range stipulated in the project permits.

#### PART 2 – PRODUCTS – Not Used

#### **PART 3 - EXECUTION**

#### 3.1 GENERAL

- A. The OWNER shall provide a marine mammal observer to log marine mammal sightings within the ranges stipulated in the project permits.
- B. The CONTRACTOR shall suspend and resume WORK when directed to do so by the OWNER's marine mammal observer.
- C. CONTRACTOR shall coordinate with OWNER designated observer for suspension and resumption of WORK and logging of such activities.

#### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary to install anodes on to steel piles and all other related WORK in accordance with the requirements of the Contract Documents and as shown on the Plans.

#### 1.2 DESIGN CRITERIA

A. Anode Design Life: 15-20 Years

#### 1.3 SUBMITTALS

- A. Manufacturer's Anode Specifications and details including physical and electrochemical properties.
- B. Anode Installation Plan including equipment and personnel.
- C. Welding-Diver Qualifications and Qualified Welding Procedures in accordance with AWS D3.6 for any welding performed under water.
- D. Documentation for proposed welder-diver personnel showing experience of similar underwater anode installation projects. Include current names and contact numbers of corresponding project owners.
- E. Galvanized coatings repair procedure and product data.

#### **PART 2 - PRODUCTS**

#### 2.1 OWNER SUPPLIED PILE ANODES

A. Pile anodes to be installed under Additive Alternate A are to be OWNER supplied. CONTRACTOR shall coordinate with OWNER to obtain anodes and CONTRACTOR shall transport anodes to the project site. Submittal for anode specifications and physical properties not required.

#### 2.2 ANODES

- A. Anodes shall be "*Harbalum*" aluminum, as manufactured by *Harbor Island Supply*, or "*MA-3 Alloy*", as manufactured by *M&M Industries, Inc.*, or approved equal. Anodes shall be of the specified weight and dimensions as indicated on the Plans and shall meet requirements of Military Specification MIL-A-24779.
- B. Offset mounting tabs shall be fabricated from weldable structural steel plate or flat bar that complies with ASTM A36.
- C. A single sample from each batch shall be taken for chemical analysis. The sample shall be taken in the beginning of the first batch and at the end of the second batch; then at the

#### **SECTION 02996 – PILE ANODES**

beginning of the third batch and so on. Samples shall be assayed to verify required chemical composition. All anodes from batches whose chemical composition do not meet the requirements above shall be rejected.

D. Individual anodes shall have a weight within +/- 3% of the nominal weight for anodes. Minimum of 10% of the number of each anode type shall be weighed to confirm compliance.

## PART 3 - EXECUTION

- 3.1 ANODE INSTALLATION
  - A. All pile anodes shall be field welded to the piles in vertical position, at both ends, as shown on the Plans, per current AWS D3.6 Specification for Underwater Welding, by welder-diver certified in the particular position and process.
  - B. Welding Process: Shield Metal Arc. Prior to anode welding, pile surface shall be cleaned to sound metal using grinders, wire brushes, or other suitable means. All contaminants, such as petroleum products and rust, must be removed from the area to be welded.
  - C. Welding Position and Direction: Direction shall be down for vertical welding.
  - D. Welding Consumables: 1/8", 5/32", or 3/16" BROCO "SofTouch" mild steel electrodes (CS-1, CS-2, or CS-3) shall be used. Care shall be taken to insure waterproof coating is not damaged.
  - E. Electrical Characteristics: Welding shall be accomplished using direct current. The electrode shall be negative for mild steel electrodes.
  - F. Galvanized pile coatings removed prior to anode welding shall be repaired by coating the welded area with Carboline KOP-COAT A-788 Splash Zone Mastic, or approved equal, per manufacturer's recommendation.

#### 3.2 CONTINUITY TESTING AND POTENTIAL READINGS

A. After installation of anodes, a random 10% of all anodes shall be digitally photographed and tested to verify electrical continuity. Using a Silver/Silver Chloride reference electrode and a high impedance voltmeter, measure the pile to electrolyte potential. Potential readings shall be measured with the probe in contact with the pile and not in contact with the anode mounting tab. Diver shall remove coatings, rust or marine growth as necessary from the test point before taking a reading to ensure good electrical contact. Anode installation is acceptable if the test reading is -0.80 volts or more negative. Readings of -0.79 or less negative indicate a deficient installation and shall be remedied as necessary to achieve acceptable test reading. Test readings and corresponding photographs shall be documented and submitted to ENGINEER for records. Each anode tested and photographed shall be uniquely numbered/identified on plan drawing and correspond with test reading data.

### PART 1 - GENERAL

#### 1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing Portland cement concrete for structures in conformance with the Drawings and Specifications.

### PART 2 - PRODUCTS

- 2.1 PORTLAND CEMENT
  - A. Portland cement shall conform to the requirements of AASHTO M 85.
  - B. Unless otherwise permitted by the ENGINEER, the product of only one mill of any one brand and type of Portland cement shall be used on the Project.
- 2.2 FINE AGGREGATE. Fine aggregate for Portland cement concrete shall conform to the requirements of AASHTO M 6 with the following exceptions:
  - A. Delete section on deleterious substances and substitute the following:

- B. Delete paragraph 4.2 of AASHTO M 6.
- 2.3 COARSE AGGREGATE. Coarse aggregate for Portland cement concrete shall conform to the requirements of AASHTO M 80, Class A, with the following exceptions:
  - A. Delete section on deleterious substances and substitute the following:

The amount of deleterious substances shall not exceed the following limits:	
Coal and Lignite, percent by weight (only material that is brownish-black or black shall	
be considered coal or lignite.)	1.0% max.
Material passing the No. 200 sieve, percent by weight	1.0% max.
Thin-elongated pieces, percent by weight.	
(Length greater than 5 times average thickness)	15% max.
Sticks and roots, percent by weight	0.10% max.
Friable Particles, percent by weight	0.25% max.
Maximum loss from AASHTO T 96 shall be 50 percent.	
Maximum loss from AASHTO T 104 shall be 12 percent.	

B. Add the following: AASHTO T-104 shall be performed using sodium sulfate solution.

- 2.4 JOINT FILLERS. Joint filler, of the type designated in the contract, shall conform to the following:
  - A. Poured filler shall conform to AASHTO M 173 or AASHTO M 282 as specified.
  - B. Preformed fillers shall conform to AASHTO M 33 for bituminous type; AASHTO M 153 for sponge rubber (type I), cork (type II), and self-expanding cork (type III; AASHTO M 213 for non-extruding and resilient bituminous types and ASHTO M 220 for preformed elastomeric types as specified. The filler shall be punched to admit the dowels where called for on the plans. Joint filler shall be furnished in a single piece for the depth and width required for the joint unless otherwise authorized by the ENGINEER. When more than one piece is authorized for a joint, the abutting ends shall be fastened securely, and held accurately to shape, by stapling or other positive fastening satisfactory to the ENGINEER.
  - C. Foam filler shall be expanded polystyrene filler having a compressive strength of not less than 10 p.s.i..
  - D. Hot-poured sealants for concrete and asphaltic pavements shall conform to ASTM D 3405.
  - E. Hot-poured elastomeric type sealant for concrete pavements shall conform to ASTM D 3406.
  - F. Cold-poured silicone type sealant for concrete pavements shall conform to Federal Specification TT-S-1543, Class A. The sealant shall be a one part, low-modulus silicone rubber with an ultimate elongation of 1,200 percent.

## 2.5 CURING MATERIAL

- A. Curing material shall conform to the following requirements as specified:
  - 1. Burlap Cloth made from Jute Kenaf AASHTO M 182
  - 2. Sheet Material for Curing Concrete AASHTO M 171
  - 3. Liquid Membrane-Forming Compounds AASHTO M 148 for Curing Concrete, Type I
- B. The requirements specified in AASHTO M 148 covering "Liquid Membrane-Forming Compounds for Curing Concrete" shall be modified by adding the following:
  - 1. Liquid membrane-forming compounds utilizing linseed oil shall not be used.
- 2.6 AIR ENTRAINING AGENTS. Air-entraining admixtures shall conform to the requirements of AASHTO M 154.
- 2.7 MIXING WATER. Unless otherwise permitted in writing by the ENGINEER, all water shall be obtained from the City/Borough potable water system.

2.8 REINFORCING STEEL. Unless specified otherwise, reinforcing shall be galvanized and conform to ASTM A767, Grade 60, excluding the requirement for chromating. Welded wire fabric shall conform to AASHTO M 55. Submit material certifications for all reinforcing steel.

## 2.9 SHIPPING AND STORAGE OF CEMENT

- A. Cement may be shipped from pretested approved bins. The cement shall be well protected from rain and moisture, and any cement damaged by moisture or which fails to meet any of the specified requirements shall be rejected and removed from the WORK.
- B. Cement stored by the CONTRACTOR for a period longer than 60 days in other than sealed bins or silos shall be retested before being used. Cement of different brands, types, or from different mills shall be stored separately.

### 2.10 COMPOSITION OF CONCRETE

- A. All Portland cement concrete shall be ready-mix, provided by an approved plant regularly engaged in the production of concrete, unless otherwise authorized in writing by the ENGINEER. Ready-mix concrete shall conform to the requirements of AASHTO M 157.
- B. The CONTRACTOR shall furnish the mix design to the ENGINEER for approval. The mix design shall be suitable for its intended use. Concrete shall be designed using an absolute volume analysis. The CONTRACTOR shall be responsible for having each mix laboratory tested. Prior to the start of production of any mix design, the CONTRACTOR shall submit test results and certifications for all materials, detailed mix design data and results of laboratory tests to the ENGINEER for approval. Approval by the ENGINEER will be based on apparent conformity to these specifications. It shall remain the CONTRACTOR's responsibility during production to produce concrete conforming to the mix design and the minimum acceptance criteria in the contract. When requested by the ENGINEER, the CONTRACTOR shall submit samples of all materials for verification testing. Production shall not commence until the mix design is approved by the ENGINEER.
- C. Unless otherwise specified, the design mix shall meet the following:

Minimum cement content 7 sacks (658 lb.) per C.Y. Maximum water/cement ratio = 0.40 28 day compressive strength (f'c) 4000 psi unless otherwise noted. Slump 4"  $\pm$  1" Entrained Air 5% to 8% Coarse Aggregate AASHTO M 43, Gradation No. 67 Cement factors are based on 94-pound sacks

- D. The CONTRACTOR shall be responsible for producing and placing specification concrete with a cement content within a tolerance of 2%.
- E. The use of superplasticizers in the concrete mix to improve the workability of mixes with low water cement ratios will require prior written approval by the ENGINEER.

F. The CONTRACTOR may, subject to prior approval in writing, use alternative sizes of coarse aggregate as shown in Table 1 of AASHTO M 43. If the use of an alternative size of coarse aggregate produces concrete which exceeds the permissible water-cement ratio above, thereby requiring additional cement above that specified, no compensation will be made to the CONTRACTOR for the additional cement.

## 2.11 SAMPLING AND TESTING

- A. The OWNER will retain a qualified inspection and testing agency to sample and test concrete in accordance with the applicable Specifications. When the results of the field tests indicate the material does not conform to the requirements of the Specifications, the re-tests required by the ENGINEER shall be at the expense of the CONTRACTOR.
- B. Materials that fail to meet contract requirements, as indicated by laboratory tests, shall not be used in the WORK. The CONTRACTOR shall remove all defective materials from the site.
- C. Types and sizes of concrete specimens shall be in accordance with ASTM C 31. Additional slump tests and/or test cylinders may be required at the discretion of the ENGINEER. Should the analysis of any test cylinder not meet the preceding requirements of Article 2.10, Composition of Concrete, its representative concrete shall be removed and replaced at the CONTRACTOR's expense.
- D. Three copies of all test reports shall be furnished to the ENGINEER.

## 2.12 COLD WEATHER CONCRETE

- A. Concrete shall not be placed when the descending air temperature in the shade, away from artificial heat, falls below 40° F nor resumed before the ascending air temperature reaches 35°F, without specific written authorization. When the air temperature falls below 40° F, or is, in the opinion of the ENGINEER, likely to do so within a 24 hour period after placing concrete, the CONTRACTOR shall have ready on the job materials and equipment required to heat mixing water and aggregate and to protect freshly placed concrete from freezing.
- B. Concrete placed at air temperatures below 40°F shall have a temperature not less than 50°F nor greater than 70°F when placed in the forms. These temperatures shall be obtained by heating the mixing water and/or aggregate. Mixing water shall not be heated to more than 160°F.
- C. Binned aggregates containing ice or in a frozen condition will not be permitted, nor will aggregates which have been heated directly by gas or oil flame, or heated on sheet metal over an open fire. When aggregates are heated in bins, only steam-coil or water-coil heating will be permitted, except that other methods, when approved, may be used. If live steam is used to thaw frozen aggregate piles, drainage times comparable to those applicable for washed aggregates shall apply.

- D. When the temperature of either the water or aggregate exceeds 100° F, they shall be mixed together so that the temperature of the mix does not exceed 80° F at the time the cement is added.
- E. Any additives must have prior approval of the ENGINEER before being used.
- F. The use of calcium chloride is prohibited.
- G. When placing concrete in cold weather, the following precautions shall be taken in addition to the above requirements:
  - 1. Heat shall be applied to forms and reinforcing steel before placing concrete as required to remove all frost, ice, and snow from all surfaces which will be in contact with fresh concrete.
  - 2. When fresh concrete is to be placed in contact with hardened concrete, the surface of the previous pour shall be warmed to at least 35°F, thoroughly wet, and free water removed before fresh concrete is placed.
  - 3. Freshly placed concrete shall be maintained at a temperature of not less than 70°F for 3 days or not less than 50°F for 5 days, when Type I or II cement is used, and not less than 70°F for 2 days or not less than 50°F for 3 days, when Type III cement is used. The above requirements are not intended to apply during the normal summer construction season when air temperatures of 40°F or higher can reasonably be anticipated during the two-week period immediately following concrete placement, or until the concrete is no longer in danger from freezing.
- H. When temperatures below 20°F are not expected during the curing period and, in the opinion of the ENGINEER, no other adverse conditions, such as high winds, are expected, concrete temperatures may be maintained in thick concrete sections by retention of heat of hydration by means of adequately insulated forms.
- I. When, in the opinion of the ENGINEER, greater protection is required to maintain the specified temperature, the fresh concrete shall be completely enclosed and an adequate heat source provided. Such enclosure and heat source shall be so designed that evaporation of moisture from the concrete during curing is prevented. Precautions shall be taken to protect the structure from overheating and fire.
- J. At the end of the required curing period protection may be removed, but in such a manner that the drop in temperature of any portion of the concrete will be gradual and not exceed 30°F in the first 24 hours.
- K. For concrete placed within cofferdams and cured by flooding with water, the above conditions may be waived provided that the water in contact with the concrete is not permitted to freeze. Dewatering shall not be carried out until the ENGINEER determines that the concrete has cured sufficiently to withstand freezing temperatures and hydrostatic pressure.

L. The CONTRACTOR shall be wholly responsible for the protection of the concrete during cold weather operations. Any concrete injured by frost action or overheating shall be removed and replaced at the CONTRACTOR's expense.

### 2.13 FORMS

- A. Forms shall be so designed and constructed that they may be removed without injuring the concrete.
- B. Unless otherwise specified, forms for exposed surfaces shall be made of plywood, hard-pressed fiberboard, sized and dressed tongue-and-groove lumber, or metal in which all bolt and rivet holes are countersunk, so that a plane, smooth surface of the desired contour is obtained. Rough lumber may be used for surfaces that will not be exposed in the finished structure. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished structure. All forms shall be mortar tight, free of bulge and warp, and shall be cleaned thoroughly before reuse.
- C. Forms shall be so designed that placement and finishing of the concrete will not impose loads on the structure resulting in adverse deflections or distortions.
- D. The forms shall be so designed that portions covering concrete that is required to be finished may be removed without disturbing other portions that are to be removed later. As far as practicable, form marks shall conform to the general lines of the structure.
- E. When possible, forms shall be daylighted at intervals not greater than 10 feet vertically, the openings being sufficient to permit free access to the forms for the purpose of inspecting, and working.
- F. Metal ties or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 1 inch from the face without injury to the concrete. All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size.
- G. All exposed edges 90° or sharper shall be chamfered 3/4 inch unless otherwise noted. Chamfering of forms for re-entrant angles shall be required only when specifically indicated on the Plans.
- H. Forms shall be inspected immediately prior to the placing of concrete. Dimensions shall be checked carefully and any bulging or warping shall be remedied. All debris and standing water within the forms shall be removed. Special attention shall be paid to ties and bracing and where forms appear to be braced insufficiently or built unsatisfactorily, either before or during placing of the concrete. The ENGINEER shall order the WORK stopped until the defects have been corrected.
- I. Forms shall be constructed true to line and grade. Clean-out ports shall be provided at construction joints.
- J. All forms shall be installed in accordance with approved fabrication and erection plans.

- K. All porous forms shall be treated with non-staining form oil or saturated with water immediately before placing concrete.
- L. Falsework shall be built to carry the loads without appreciable settlement. Falsework that cannot be founded on solid footings must be supported by ample falsework piling. Falsework shall be designed to sustain all imposed loads.
- M. Detail drawings of the falsework shall be submitted for review, but such review shall not relieve the CONTRACTOR of any responsibility under the contract for the successful completion of the structure.
- N. Forms and falsework shall not be removed without the consent of the ENGINEER. The ENGINEER's consent shall not relieve the CONTRACTOR of responsibility for the safety of the WORK. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.
- O. To facilitate finishing, forms used on exposed vertical surfaces shall be removed in not less than 12 nor more than 48 hours, depending upon weather conditions.
- P. In warm weather, falsework and forms shall remain in place under slabs, beams, girders and arches for 14 days after the day of last pour when Type I or Type II cement is used, or for 7 days when Type III cement is used. Forms for slabs having clear spans or cantilever spans of less than 10 feet may be removed after 7 days when Type I or Type II cement is used, or after 4 days when Type III cement is used. In cold weather, the length of time that forms and falsework are to remain in place shall be as approved.
- Q. No superstructure load shall be placed upon finished concrete until the ENGINEER so directs, but the minimum time allowed for the curing of structural concrete in the substructure before any load of the superstructure is placed thereon shall be 7 days when Type I or Type II cement is used and 2 days when Type III cement is used.

## PART 3 - EXECUTION

- 3.1 GENERAL
  - A. All concrete shall be placed before it has taken its initial set and, in any case, within 30 minutes after mixing. Concrete shall be placed in such manner as to avoid segregation of coarse or fine portions of the mixture, and shall be spread in horizontal layers when practicable. Special care shall be exercised in the bottom of slabs and girders to assure the working of the concrete around nests of reinforcing steel, so as to eliminate rock pockets or air bubbles. Enough rods, spades, tampers and vibrators shall be provided to compact each batch before the succeeding one is dumped and to prevent the formation of joints between batches.

Extra vibrating shall be done along all faces to obtain smooth surfaces. Care shall be taken to prevent mortar from splattering on forms and reinforcing steel and from drying ahead of the final covering with concrete.

- B. Concrete shall not be placed in slabs or other sections requiring finishing on the top surface when precipitation is occurring or when in the opinion of the ENGINEER precipitation is likely before completion of the finishing, unless the CONTRACTOR shall have ready on the job all materials and equipment necessary to protect the concrete and allow finishing operations to be completed.
- C. Troughs, pipes, or short chutes used as aids in placing concrete shall be arranged and used in such a manner that the ingredients of the concrete do not become separated. Where steep slopes are required, troughs and chutes shall be equipped with baffle boards or shall be in short lengths that reverse the direction of movement. All chutes, troughs, and pipe shall be kept clean and free of hardened concrete by flushing thoroughly with water after each run. Water used for flushing shall be discharged clear of the concrete in place. Troughs and chutes shall be of steel or plastic or shall be lined with steel or plastic and shall extend as nearly as possible to the point of deposit. The use of aluminum for pipes, chutes or tremies is prohibited. When discharge must be intermittent, a hopper or other device for regulating the discharge shall be provided.
- D. Dropping the concrete a distance of more than 5-feet or depositing a large quantity at any point and running or working it along the forms will not be permitted. The placing of concrete shall be so regulated that the pressures caused by wet concrete shall not exceed those used in the design of the forms.
- E. High frequency internal vibrators of either the pneumatic, electrical, or hydraulic type shall be used for compacting concrete in all structures. The number of vibrators used shall be ample to consolidate the fresh concrete within 15 minutes of placing in the forms. In all cases, the CONTRACTOR shall provide at least two concrete vibrators for each individual placement operation (one may be a standby), which shall conform to the requirements of these specifications. Prior to the placement of any concrete, the CONTRACTOR shall demonstrate that the 2 vibrators are in good working order and repair and ready for use.
- F. The vibrators shall be an approved type, with a minimum frequency of 5,000 cycles per minute and shall be capable of visibly affecting a properly designed mixture with a 1-inch slump for a distance of at least 18-inches from the vibrator.
- G. Vibrators shall not be held against forms or reinforcing steel nor shall they be used for flowing the concrete or spreading it into place. Vibrators shall be so manipulated as to produce concrete that is free of voids, is of proper texture on exposed faces, and of maximum consolidation. Vibrators shall not be held so long in one place as to result in segregation of concrete or formation of laitance on the surface.
- H. Concrete shall be placed continuously throughout each section of the structure or between indicated joints. If, in an emergency, it is necessary to stop placing concrete before a section is completed, bulkheads shall be placed as the ENGINEER may direct and the resulting joint shall be treated as a construction joint.
- I. The presence of areas of excessive honeycomb, cracking and deviation of lines (i.e. bowing) may be considered sufficient cause for rejection of a structure. Upon written notice that a given structure has been rejected, the rejected WORK shall be removed and rebuilt, in part or wholly as specified, at the CONTRACTOR'S expense.

#### 3.2 PUMPING CONCRETE

- A. Concrete may be placed by pumping if the CONTRACTOR demonstrates that the pumping equipment to be used will effectively handle the particular class of concrete with the slump and air content specified and that it is so arranged that no vibrations result that might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced.
- B. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned. Slump tests shall be taken at the discharge end of the pipe.

#### 3.3 COLUMNS

A. Concrete in columns shall be placed in one continuous operation unless otherwise permitted. The concrete shall be allowed to set a least 12 hours before caps are placed.

#### 3.4 SLAB AND GIRDER SPANS

- A. Slabs and girders having spans of 30 feet or less shall be cast in one continuous operation.
- B. Girders spanning more than 30 feet may be cast in 2 operations, the first operation being the casting of the girder stems to the bottom of the slab haunches. Shear keys shall be provided for by inserting oiled timber blocks to a depth of at least 1-1/2 inches in the fresh concrete at the top of each girder stem. A sufficient number of blocks shall be used to cover uniformly about 1/2 the top surface of the girder stem and the blocks shall be removed as soon as the concrete has set sufficiently to retain their shape. The period between the first or girder casting and the second or slab casting shall be at least 24 hours. Immediately before the second casting, the CONTRACTOR shall check all falsework for shrinkage and settlement and shall tighten all wedges to insure minimum deflection of the stems due to the added weight of the slab.

## 3.5 SLABS ON STEEL BEAMS

- A. A concrete slab on simple steel girder spans may be placed in not more than three sections with the first section centered on the span.
- B. On truss spans or continuous girders, the concrete slab shall be placed as shown on the Plans or as directed by the ENGINEER.

#### 3.6 CONCRETE DEPOSITED UNDER WATER

A. If conditions render it impossible or inadvisable in the opinion of the ENGINEER to dewater excavations before placing concrete, the CONTRACTOR shall deposit under water, by means of a tremie or pump, a seal course of concrete of sufficient thickness to thoroughly seal the cofferdam. The concrete shall be carefully placed in a compact mass and shall not be disturbed after being deposited. Still water shall be maintained at the point of deposit.

- B. A tremie shall consist of a watertight tube having a diameter of not less than 10-inches with a hopper at the top. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the discharge end, always keeping it in the deposited concrete.
- C. Tremie tubes or pump discharge tubes used to deposit concrete under water shall be equipped with a device that will prevent water from entering the tube while charging the tube with concrete. Such tubes shall be supported so as to permit free movements of the discharge end over the entire top surface of the work and to permit rapid lowering, when necessary to retard or stop the flow of concrete. The tubes shall be filled by a method that will prevent washing of the concrete. The discharge end shall be completely submerged in concrete at all times and the tube shall contain sufficient concrete to prevent any water entry. The flow shall be continuous until the WORK is completed and the resulting concrete seal shall be monolithic and homogeneous.
- D. The exact thickness of the seal will depend upon the hydrostatic head, bond and spacing of piles, size of cofferdam, and other related factors, but in no case shall the seal be less than 2 feet in thickness, unless otherwise shown on the plans. Before dewatering, the concrete in the seal shall be allowed to cure for not less than five days after placing, or until the seal concrete has achieved a minimum compressive strength of 2,500 p.s.i. based on test cylinders cured under the same conditions as the in situ concrete, whichever occurs first.
- E. If a seal which is to withstand hydrostatic pressure is placed in water having a temperature below 45°F, the curing time before dewatering shall be increased as directed.
- F. Periods of time during which the temperature of the water has been continuously below 38°F shall not be considered as curing time.
- G. After sufficient time has elapsed to insure adequate strength in the concrete seal, the cofferdam shall be dewatered and the top of the concrete cleaned of all scum, laitance and sediment. Before fresh concrete is deposited, local high spots shall be removed as necessary to provide proper clearance for reinforcing steel.

#### 3.7 CONSTRUCTION JOINTS

- A. Construction joints shall be located where shown on the plans or as permitted by the ENGINEER. Construction joints shall be perpendicular to the principal lines of stress and in general shall be located at points of minimum shear.
- B. At horizontal construction joints, gage strips 1-1/2 inches thick shall be placed inside the forms along all exposed faces to give the joints straight lines. Before placing fresh concrete, the surfaces of construction joints shall be washed and scrubbed with a wire broom, drenched with water until saturated, and kept saturated until the new concrete is placed.
- C. Immediately prior to placing new concrete the forms shall be drawn tight against the concrete already in place. Concrete in substructures shall be placed in such manner that all horizontal construction joints will be truly horizontal and, if possible, in locations such that they will not be exposed to view in the finished structure. Where vertical

construction joints are necessary, reinforcing bars shall extend across the joint in such a manner as to make the structure monolithic. Special care shall be taken to avoid construction joints through large surfaces which are to be treated architecturally.

D. All construction joints shall be provided with concrete shear keys at least 1-1/2 inches deep and 1/3 of the concrete thickness in width, unless otherwise shown on the Plans.

### 3.8 EXPANSION JOINTS

- A. Expansion joints shall be located and formed as required on the plans.
- B. Open Joints. Open joints shall be placed in the location shown on the plans and shall be formed. The form shall be removed without chipping or breaking the corners of the concrete. Reinforcement shall not extend across an open joint, unless so specified on the plans.
- C. Filled Joints. Unless otherwise shown on the plans, expansion joints shall be constructed with pre-molded expansion joint filler with a thickness equal to the width of the joint.
- D. The joint filler shall be cut to the same shape and size as the adjoining surfaces. It shall be fixed firmly against the surface of the concrete already in place in such manner that it will not be displaced when concrete is deposited against it.
- E. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be removed.
- F. Joint sealer for use in deck joints shall be of the type shown on the plans conforming to the requirements of Article 2.4 Joint Fillers, of this Section. The faces of all joints to be sealed shall be free of foreign matter, paint, curing compound, oils, greases, dirt, free water, and laitance.
- G. Elastomeric Compression Seals. The joint seal shall be shaped as shown on the plans. It shall be installed by suitable hand or machine tools and thoroughly secured in place with a lubricant-adhesive recommended by the seal manufacturer. The lubricant-adhesive shall cover both sides of the seal over the full area in contact with the sides of the joint.
- H. The seal shall be in one piece for the full width of the joint. Any joints at curbs shall be sealed adequately with additional adhesive.
- I. The seal may be installed immediately after the curing period of the concrete. Temperature limitations of the lubricant-adhesive as guaranteed by the manufacturer shall be observed.
- J. Strip Seals. Expansion joint strip seals shall be as shown on the plans, and composed of a steel extrusion and an extruded strip seal. The steel shall conform to ASTM A242 or A588. The seal shall be manufactured of material conforming to the requirements of PART 2 of this Section. Strip seals shall be one-piece for the length of the joint.

- K. Installation of the expansion joints shall be in accordance with the manufacturer's recommendations, except that the joint opening shall be adjusted for the dimensions indicated on the Plans.
- L. Steel Joints. The plates, angles, or other structural shapes shall be accurately shaped at the shop to conform to the section of the concrete slab. The fabrication and painting shall conform to the requirements of the specifications covering those items. Care shall be taken to insure that the surface in the finished plane is true and free of warping. Positive methods shall be employed in placing the joints to keep them in correct position during the placing of the concrete. The opening at expansion joints shall be that designated on the plans at normal temperature.

### 3.9 ANCHOR BOLTS

- A. Anchor bolt assemblies conforming to the details shown shall be accurately secured in the forms in the positions shown on the plans, before any concrete is placed in the forms. The positions shall be checked and any adjustments made as soon as the concrete has been placed.
- B. When pipe sleeves or pre-cast holes are provided, no water shall be allowed to freeze in the cavity. If frost causes cracks in the concrete, the entire placement shall be removed and replaced at the CONTRACTOR's expense. When anchor bolts are installed in pipe sleeves or pre-cast holes, the cavity shall be completely filled with grout at the time the grout pads are constructed or at the time the bearing assemblies or masonry plates are placed.
- 3.10 PIPES, CONDUITS, AND DUCTS. Pipes, conduits, and ducts that are to be encased in concrete shall be installed in the forms by the CONTRACTOR before the concrete is placed. Unless otherwise indicated, they shall be standard, lightweight cast-iron water pipe or wrought iron. They shall be held rigidly so they will not be displaced during concrete placement.
- 3.11 FINISHING CONCRETE SURFACES. All concrete surfaces exposed in the completed WORK shall receive an Ordinary Finish, as described below, unless otherwise noted on the Plans or in other Specification sections.

#### 3.12 ORDINARY FINISH

- A. An Ordinary Finish is defined as the finish left on a surface after the removal of the forms, the filling of all holes left by form ties, and the repairing of all defects. The surface shall be true and even, free from stone pockets and depressions or projections. All surfaces that cannot be satisfactorily repaired shall be given a Rubbed Finish.
- B. The concrete in caps and tops of walls shall be struck off with a straightedge and floated to true grade. The use of mortar topping for concrete surfaces shall in no case be permitted.
- C. As soon as the forms are removed, metal devices that have been used for holding the forms in place, and which pass through the body of the concrete, shall be removed or cut back at least 1 inch beneath the surface of the concrete. Fins of mortar and all irregularities caused by form joints shall be removed.

- D. All small holes, depressions, and voids that show upon the removal of forms, shall be filled with cement mortar mixed in the same proportions as that used in the body of the WORK. In patching larger holes and honeycombs, all coarse or broken material shall be chipped away until a dense uniform surface of concrete exposing solid coarse aggregate is obtained. Feathered edges shall be cut away to form faces perpendicular to the surface. All surfaces of the cavity shall be saturated thoroughly with water, after which a thin layer of neat cement mortar shall be applied. The cavity shall then be filled with stiff mortar composed of 1 part of Portland cement to two parts of sand, which shall be thoroughly tamped into place. The mortar shall be pre-shrunk by mixing it approximately 20 minutes before using. The length of time may be varied in accordance with brand of cement used, temperature, humidity, and other local conditions. The surface of this mortar shall be floated with a wooden float before initial set takes place and shall be neat in appearance. The patch shall be kept wet for a period of five days.
- E. For patching large or deep areas, coarse aggregate shall be added to the patching material. All mortar for patching on surfaces which will be exposed to view in the completed structure shall be color matched to the concrete. Test patches for color matching shall be conducted on concrete that will be hidden from view in the completed WORK and shall be subject to approval.

### 3.13 RUBBED FINISH

- A. When forms can be removed while the concrete is still green, the surface shall be pointed and wetted and then rubbed with a wooden float until all irregularities and form marks are removed and the surface is covered with a lather composed of cement and water. If permitted, a thin grout composed of one part cement and one part fine sand may be used in the rubbing. This lather shall be allowed to set for at least five days. The surface shall then be smoothed by being rubbed lightly with a fine Carborundum stone.
- B. If the concrete has hardened before being rubbed, a medium coarse Carborundum stone shall be used to finish the surface. Such WORK shall not be done until at least 4 days after placing and it shall be done in the following manner. A thin grout composed of 1 part cement and 1 part fine sand shall be spread over a small area of the surface and rubbed immediately with the stone until all form marks and irregularities are removed and the surface is covered with a lather, after which the surface shall be finished as described above for green concrete.
- C. The surface shall be smooth in texture and uniform in appearance. The building up of depressions will not be permitted.
- D. If, through the use of first-class form materials and the exercise of special care, concrete surfaces are obtained that are satisfactory, the CONTRACTOR may be relieved entirely or in part from the requirement for rubbing.

#### 3.14 CONCRETE DECKS

A. A smooth riding surface of uniform texture, true to the required grade and cross section, shall be obtained on all decks. The CONTRACTOR may use hand tools or finishing

machines, or a combination of both, conforming to the requirements specified herein for finishing deck concrete.

- C. The rate of placing concrete shall be limited to that which can be finished before the beginning of initial set.
- D. After the concrete has been placed and consolidated, the surface of the concrete shall be carefully struck off by means of a hand operated strike board, operating on headers. A uniform deck surface true to the required grade and cross section shall be obtained.
- E. Following strike off, the surface of the concrete shall be floated longitudinally. In the event strike off is performed by means of a hand operated strike board, two separate hand operated float boards for longitudinal floating shall be provided. The first float shall be placed in operation as soon as the condition of the concrete will permit and the second float shall be operated as far back of the first float as the workability of the concrete will permit.
- F. Longitudinal floats, either hand operated or machine-operated, shall be used with the long axis of the float parallel to the centerline of the deck. The float shall be operated with a combined longitudinal and transverse motion planing off the high areas and floating the material removed into the low areas. Each pass of the float shall lap the previous pass by 1/2 the length of the float. Floating shall be continued until a smooth riding surface is obtained. The driving surface of the concrete shall have a heavy broom finish. Decks to have waterproof membranes shall be float finished.
- G. Hand operated float boards shall be from 12 feet to 16 feet long, ribbed and trussed as necessary to provide a rigid float, and shall be equipped with adjustable handles at each end. The float shall be wood, not less than 1 inch thick and from 4-inches to 8-inches wide. Adjusting screws spaced at not to exceed 24-inches on centers shall be provided between the float and the rib. The float board shall be true and free of twist.
- H. Immediately following completion of the deck finishing operations, the concrete in the deck shall be cured as specified in Article 3.15, Curing Concrete, of this Section.
- I. The finished surface of the concrete shall be tested by means of a straightedge 10 feet long. The surface shall not vary more than 0.01 foot from the lower edge of the straightedge. All high areas in the hardened surface in excess of 0.01 foot as indicated by testing shall be removed by abrasive means. After grinding by abrasive means has been performed, the surface of the concrete shall not be smooth or polished. Ground areas shall be of uniform texture and shall present neat and approximately rectangular patterns.

#### 3.15 CURB AND SIDEWALK SURFACES

A. Exposed faces of curbs and sidewalks shall be finished to true surfaces. Concrete shall be worked until coarse aggregate is forced down into the body of the concrete and a layer of mortar approximately 1/4 inch thick is flushed on the top. The surface shall then be floated to a smooth but not slippery finish.

#### 3.16 CURING CONCRETE

#### A. Water Curing

- 1. All concrete surfaces shall be kept wet for at least seven days after placing if Type I or II cement has been used or for three days if Type III cement has been used. Concrete shall be covered with wet burlap, cotton mats, or other materials meeting the requirements of AASHTO M 171 immediately after final finishing of the surface. These materials shall remain in place for the full curing period or they may be removed when the concrete has hardened sufficiently to prevent marring and the surface immediately covered with sand, earth, straw, or similar materials.
- 2. In either case the materials shall be kept thoroughly wet for the entire curing period. All other surfaces, if not protected by forms, shall be kept thoroughly wet, either by sprinkling or by the use of wet burlap, cotton mats, or other suitable fabric, until the end of the curing period. If wood forms are allowed to remain in place during the curing period, they shall be kept moist at all times to prevent opening at joints.
- B. Membrane Curing. Liquid membrane curing compound meeting the requirements of AASHTO M 148, Type I, may be permitted, subject to approval by the ENGINEER, except compounds utilizing linseed oil shall not be used. All finishing of concrete surfaces shall be performed to the satisfaction of the ENGINEER prior to applying the impervious membrane curing compound. The concrete surfaces must be kept wet with water continuously until the membrane has been applied. The manufacturer's instructions shall be carefully followed in applying the membrane, and in all cases the membrane curing compound must always be thoroughly mixed immediately before application. In case the membrane becomes marred, worn, or in any way damaged, it must immediately be repaired by wetting the damaged area thoroughly and applying a new coat of the impervious membrane curing compound.

## 3.17 BACKFILLING AND OPENING TO TRAFFIC

- A. Unbalanced backfilling against concrete structures will not be permitted until the concrete has attained a compressive strength of not less than 75% of the ultimate strength (f 'c) shown on the Plans.
- B. The compressive strength shall be determined from informational test cylinders cured on the site under similar conditions of temperature and moisture as the concrete in the structure.

## 3.18 CONCRETE SAMPLING AND TESTING

A. The OWNER will retain a qualified inspection and testing agency to sample and test concrete. Inspection shall be by an ACI Concrete Field Technician I or under the direction of a professional Civil Engineer registered in the State of Alaska. Testing shall be performed by an established lab under the direction of a professional Civil Engineer registered in the State of Alaska.

- B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratorycured specimens at 7 days and one set of two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  - 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, CONTRACTOR shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  - 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  - 9. Test results shall be reported in writing to ENGINEER, concrete manufacturer, and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  - 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by ENGINEER, but will not be used as sole basis for approval or rejection of concrete.
  - 11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by ENGINEER. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by ENGINEER.

- 12. Additional testing and inspecting, at CONTRACTOR's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- C. Measure slab flatness and levelness within 24 hours of finishing.
- 3.19 CLEANING UP. Upon completion of the structure and before final acceptance, the CONTRACTOR shall remove all falsework. Falsework piling shall be removed or cut off at least 2 feet below the finished ground line.
### **SECTION 03305 - CONCRETE ABUTMENT**

#### PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK under this Section shall include all labor, materials, tools and equipment necessary for excavation, backfill, grading, and installation of new, complete cast-in-place concrete abutment, including footings, backwalls, approach slab, shear keys, formwork, reinforcement bars, finishing, geotextile fabric, pipe conduit sleeves, steel railing assemblies, and all miscellaneous appurtenances and hardware, and all other related Work in accordance with the requirements of the Contract Documents and as shown on the Plans.

## 1.2 REFERENCES

- A. ASTM (American Society of Testing Materials) Specifications
- B. ACI (American Concrete Institute) Code
- C. AWS (American Welding Society) D1.4 Reinforcing Steel
- D. ASTM A615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- E. ASTM A706 Low Alloy Steel Deformed Bars for Concrete Reinforcement
- F. ASTM A767 Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- G. ASTM C150 Portland Cement
- H. ASTM C33 Concrete Aggregates
- I. ACI 301 Structural Concrete for Buildings
- J. ACI 304 Recommended Practice for Measuring, Mixing Transporting and Placing Concrete
- K. ACI 306R Cold-Weather Concreting
- L. ACI 308 Standard Practice for Curing Concrete
- M. ACI 309 Standard Practice for Consolidation of Concrete
- N. ACI 318 Building Code Requirements for Reinforced Concrete
- O. ACI 347 Recommended Practice for Concrete Formwork

## 1.3 SUBMITTALS

- A. Concrete Mix Design.
- B. Reinforcement Fabrication Drawings.

## **SECTION 03305 - CONCRETE ABUTMENT**

- C. Galvanizing Certification for Reinforcement.
- D. Structural Steel submittals per Section 05120 Metal Fabrication
- E. Geotextile Fabric Material

## 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with applicable ACI requirements.
- B. Acquire cement and aggregate from the same source for all Work.

# PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Concrete shall conform to the following requirements:
  - Minimum 28 day compressive strength f'c = 6,000 psi
  - Minimum cement content = 7 sacks per cubic yard
  - Maximum water cement ratio = 0.40
  - Slump range (before plasticizer) = 4" max.
  - Air Entrainment = 5% to 8%
  - Cement conform to ASTM C150 Type II, or Type I or III with tri-calcium aluminate content below 8%.
  - Aggregate conform to ASTM C33 with maximum size of 3/4 inch.
  - Water shall be potable, and free from amounts of oil, acid, alkali, and organic materials detrimental to the concrete.
- B. Reinforcing steel shall be new billet stock ASTM A615, Grade 60. Bent or welded bars shall be ASTM A706, Grade 60. All reinforcing steel shall be galvanized in accordance with ASTM A767. Galvanizing shall be performed after fabrication.
- C. Steel railing and all miscellaneous structural steel shall be hot-dip galvanized and conform to Section 05120 Metal Fabrication.
- D. All other miscellaneous materials shall conform to Section 03301 Structural Concrete.
- E. Abutment footing bedding material shall be as indicated on the Plans.
- F. Geotextile material shall be per Section 02714 Geotextile Reinforcement.

## 2.2 FORMWORK

A. Forms shall be designed and constructed to be removed without injuring the concrete. They shall be free of bulge and warp, and constructed so the finished concrete will be of the form and dimensions shown on the Plans, and true to line and grade. Forms for concrete containing a retarding admixture shall be designed for a lateral pressure equal to that exerted by a fluid weighing 150 pounds per cubic foot.

#### **SECTION 03305 - CONCRETE ABUTMENT**

### **PART 3 – EXECUTION**

## 3.1 FABRICATION

A. Concrete abutment - backwalls, footings, and approach slab shall be cast-in-place within the following tolerances:

Depth:	$\pm$ 1/8 inch
Width:	$\pm$ 1/8 inch
Length:	$\pm 1/2$ inch

B. Concrete abutment shall be constructed as shown on the Plans and in accordance with ACI standards. Provide medium transverse broom finish (perpendicular to traffic) on all exposed abutment horizontal surfaces. Provide rubbed finish on all exposed vertical surfaces.

#### 3.2 INSTALLATION

- A. Construction and installation of the complete abutment shall be as shown on the Plans, and/or to the highest industry standards if not fully shown on the Plans.
- B. CONTRACTOR is responsible to ensure that all necessary means and methods are properly designed, constructed and maintained for the loads they are intended to support and the work they are intended to accomplish.
- C. Excavation, backfill and compaction of material around/under abutment shall be considered incidental to abutment construction/installation WORK.
- D. Defective concrete shall be removed and replaced at no additional cost to the OWNER.
- E. All execution requirements shall comply with Section 03301 Structural Concrete.
- F. Construction methods and products not specifically mentioned in these Contract Documents shall be utilized using reasonable care and the highest quality construction practices. Final inspection and acceptance of all WORK and products not specifically mentioned in these Contract Documents shall be made by the ENGINEER. Approval shall be based upon conformance to the Contract Documents, quality of workmanship, applicable industry standards, and pertinent manufacturer's recommendations.

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary for fabrication, handling, transport and installation of all structural steel and aluminum items in accordance with the requirements of the Contract Documents and as shown on the Plans.

### 1.2 REFERENCES

- A. AISC (American Institute of Steel Construction) Code of Standard Practice Manual of Steel Construction Allowable Stress Design (ASD).
- B. ASTM (American Society of Testing Materials) Specifications
- C. ASTM A36/A36M Structural Steel.
- D. ASTM A6 General Requirements for Rolled Steel Plates, Shapes, Sheet piling, and Bars for Structural Use.
- E. ASTM A108 Steel Bars, Carbon Cold-Finished, Standard Quality.
- F. ASTM A123 Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- H. ASTM A325 High Strength Bolts for Structural Steel Joints.
- I. ASTM A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. ASTM A53 Steel Pipe.
- K. ASTM F593 Stainless Steel Bolts, Hex Cap Screws, and Studs.
- L. ASTM F594 Stainless Steel Nuts.
- M. AWS D1.1 Structural Welding Code Steel.
- N. The Aluminum Association Aluminum Design Manual: Specifications and Guidelines for Aluminum Structures.
- O. ASTM B209 Standard Specifications for Aluminum and Aluminum-Alloy Sheet and Plate.
- P. ASTM B210 Standard Specifications for Aluminum and Aluminum-Alloy Drawn Seamless Tube.
- Q. ASTM B221 Standard Specifications for Aluminum and Aluminum-Alloy Bar, Rod, Wire, Profiles and Tubes.

- R. ASTM B241 Standard Specifications for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Tube.
- S. ASTM B308 Standard Specifications for Aluminum and Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- T. AWS D1.2 Structural Welding Code Aluminum.

## 1.3 SUBMITTALS

- A. Fabrication Shop Drawings of all fabricated steel and aluminum items prior to fabrication.
  - 1. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld.
  - 2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 3. Indicate type, size and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
- B. Manufacturer's Mill Certificate: Steel certification for all steel used shall include chemistry, yield strength, and mill numbers.
- C. Galvanizing Certifications
- D. Galvanizing Repair Method and Materials
- E. Welding Procedures
- F. Welders Certificates: Certify welders employed in the work, verifying AWS qualification.
- G. Product data, samples, preparation, application, QA/QC Plan, and field repair of metal coatings per Section 09000 Coatings.
- H. Provide fabrication shop QA/QC Plan for review by ENGINEER. Provide qualification data for firms and/or persons to demonstrate their capabilities and experience. Include lists of projects with project names and addresses, and names and addresses of engineers, architects and owners.

## 1.4 QUALITY ASSURANCE

- A. Fabricate and install structural steel in accordance with AISC Code of Standard Practice.
- B. Fabricate and install aluminum in accordance with Aluminum Association Aluminum Design Manual.
- C. Quality Assurance. The metal fabricator must have an ongoing quality assurance program approved by a qualified, independent source. At the option of the ENGINEER, the fabricator shall submit a copy of their operational quality assurance program, and

shall not begin fabrication until the ENGINEER has approved this quality assurance program. The objectives of the quality assurance program are as follows:

- 1. Completed products shall conform completely to all governing codes and specifications stipulated in the Design Contract Documents, and Plans.
- 2. Quality Assurance Program is an integral part of the ongoing manufacturing activities of the Fabricator.

Although periodic inspections will be carried out by the ENGINEER, the purpose of these inspections is to note general conformance to the design documents. It is still the responsibility of the fabricator to produce a quality product, in complete conformance with the design documents, and to document and correct any non-conformance. All documentation, including that submitted, shall be kept on file by the fabricator, for review, if requested by the OWNER or ENGINEER.

- D. Fabrication Facility. The fabrication facility shall provide the proper environment and physical conditions necessary for welding, cutting, and general metal fabrication. The facility shall provide adequate work space, equipment, level surfaces, and protection from wind, moisture and freezing. The fabricator shall have the capability to carry out the following work in-house or on a contract basis:
  - Design of lifting and erection devices not shown on the drawings.
  - Preparation of shop fabrication drawings.
  - Receiving, checking and storing of materials for metal fabrication.
  - Dimensional checking and verification.
  - Resolution of non-conformities.
  - Documentation of all stages of work with capability of tracing all major components.
  - Finishing, repairing, storing and shipping.
- E. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the WORK. Shop welding procedures and qualifications shall be submitted for review by the ENGINEER.
- F. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code Steel, current edition, and AWS D1.2 Structural Welding Code Aluminum, current edition.
  - 1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
  - 2. Submit welding procedures in accordance with AWS Structural Welding Codes.

# 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Fabricator's shop in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Materials shall be protected during shipping and handling. Materials shall be stored above ground on

pallets, platforms or other supports. Materials shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members shall be adequately supported on skids to prevent damage from deflection.

- C. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
- D. Do not store materials or assembled structures in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

## **PART 2 - PRODUCTS**

- 2.1 MATERIALS All materials for metal fabrication shall conform to the Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to verify that materials purchased comply with the fore mentioned documents. The Fabricator shall inspect all materials, upon arrival, for conformance with the purchase orders. The Fabricator shall confirm that mill certificates and test reports are provided and that they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to commencing any WORK involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified on the design documents if the proposal for a substitution is not approved by the ENGINEER.
  - A. All miscellaneous steel shapes and plate steel shall be ASTM A36, hot-dip galvanized, unless otherwise noted.
  - B. Square and rectangular HSS shall be ASTM A500, Grade B, hot-dip galvanized, unless otherwise noted.
  - C. Pipe less than 12-inch diameter shall be ASTM A53, Grade B, Type E or S, hot-dip galvanized, unless otherwise noted. Pipe greater than 12-inch diameter shall conform to Section 02896 Steel Pipe Piles.
  - D. Bolts and Miscellaneous Hardware: Unless otherwise noted, all bolts shall be ASTM A307, hot-dip galvanized. Washers are required under both the head and nut of all bolts, unless otherwise noted. All nuts and washers shall be hot-dip galvanized. Plate washers, with a diameter equivalent to a malleable iron washer, shall be used in all areas where the bolt head or nut bear against wood, except under economy head bolts. All bolts called out as ASTM A325 shall be hot-dip galvanized. A325 bolts shall be installed per AISC turn-of-nut method, or other ENGINEER approved method, unless otherwise indicated on the Plans.

All bolts, nuts, washers, screws, and miscellaneous hardware called out as Stainless Steel shall be Type 316 Stainless Steel conforming to ASTM F593 and F594 as applicable.

All nails shall be hot-dip galvanized.

Shear studs shall conform to ASTM A108, Grade 1015, and welded per AWS D1.1.

E. Aluminum shall conform to 6061-T6, unless otherwise noted. Aluminum pipe and round bar shall be 6063-T6.

# 2.2 METAL COATINGS

- A. Unless otherwise noted, all steel shall be hot-dip galvanized in accordance with ASTM A123 or A153 as appropriate.
- B. All other metal coatings shall be per Section 09900 Coatings.

# PART 3 - EXECUTION

## 3.1 METAL FABRICATION

- A. Shop Inspection: The CONTRACTOR shall furnish the ENGINEER with 30 days notice of the beginning of WORK at the mill or in the shop so that special fabrication inspections may be scheduled by the ENGINEER.
- B. Fabricate and assemble components in a shop, to greatest extent possible. Workmanship and finish shall be equal to the best industry standards and in accordance with the requirements of AWS, AISC, and The Aluminum Association, as applicable.
  - 1. Mark and match-mark materials for field assembly.
  - 2. Fabricate for delivery in a sequence that will expedite erection and minimize field handling.
  - 3. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 4. Holes: Drill holes perpendicular to metal surfaces; do not flame-cut holes or enlarge holes by burning.
  - 5. Aluminum Fabrication: Edges shall be cut true, smooth and free of burrs. Flame cutting is not permitted. Corner edges shall be ground smooth. Holes shall be drilled or punched. Weld spatter and flash marks shall be removed and ground smooth. Mill stamps and markings shall be removed from all exposed surfaces.
- C. Structural material, either plain or fabricated, shall be stored at the fabricating shop above ground, on platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and shall be protected, as far as practical, from corrosion.
- D. All holes required for steel hot-dip galvanizing shall be clearly identified on the Shop Fabrication Drawings for ENGINEER review and approval. Fabricator shall coordinate with Galvanizer to determine size and quantity of holes required. Some, or all of the holes, may be required to be fully repaired per AWS D 1.1, at the discretion of the ENGINEER.

### 3.2 METAL ERECTION

A. <u>General</u>: The CONTRACTOR shall provide and later remove all falsework, temporary shoring, and bracing necessary for erection and to complete assembly. All such devices

shall be properly designed and constructed by the CONTRACTOR to meet anticipated construction and handling loads.

- B. <u>Handling and Storing of Materials</u>: Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Handling and erection procedures shall be conducted in a manner to avoid over stressing any structural element. Stress and deflection calculations shall be provided by the CONTRACTOR, as deemed necessary by the ENGINEER, for any erection procedure.
- C. <u>Method and Equipment</u>: Before starting the WORK of erection, the CONTRACTOR shall inform the ENGINEER fully as to the method of erection proposed, and the amount and character of equipment proposed to be used. Approval by the ENGINEER shall not be considered as relieving the CONTRACTOR of the responsibility for the safety of his method and equipment, or from carrying out the WORK in full accordance with the Plans and Specifications.
- D. <u>Assembling</u>: Metal parts shall be accurately assembled as shown on the Plans, following applicable Industry Standards, Codes, erection drawings and fabricators' match-marks. Excessive force or manipulation of parts shall not be allowed as determined by the ENGINEER. The material shall be carefully handled so that no parts will be bent, broken, or otherwise damaged. Hammering, which will injure or distort the members will not be permitted. Bearing surfaces shall be cleaned before the members are assembled.
- E. <u>Bolt Holes and Bolting:</u> Bolt holes and bolting shall follow the requirements as stated on the Plans and as indicated by applicable Industry Standards and Codes. Any steel to steel connections noted to be considered "slip-critical" shall be installed by the "turn-of-nut" tightening method per AISC. In addition to the requirements of AISC, bolting of slip-critical joints shall proceed in the following manner:
  - 1. The joint shall be fitted up and aligned with drift pins.
  - 2. Sufficient force shall be applied so as to bring the faying surfaces of steel into close contact. If high strength bolts are used for this purpose (i.e. used to pull steel into position), they shall be clearly marked for identification, and not used in the final connection.
  - 3. High strength bolts shall be installed and brought up to snug-tight condition, such as can be produced by a few blows of an impact wrench, or by an ordinary spud wrench.
  - 4. High strength bolts shall then be tightened by turn-of-nut method, progressing from the most rigid part of the joint toward the free edges.
  - 5. Bolts used to pull steel into position (mentioned above) shall then be removed, replaced with high strength bolts, and tightened as described above.
  - 6. The impact wrench used for bolt tightening shall be of adequate capacity so as to provide the required tightening in approximately 10 seconds.
  - 7. Bolt lengths shall be such that 0" to ¼" of the bolt shall extend past the end of the nut after tightening.

- F. <u>Welding</u>: All welding shall be in accordance with AWS D1.1 or AWS D1.2, current edition, as applicable. All welders shall be qualified per AWS for the type of welding anticipated. Welds will be spot tested by the ENGINEER by VT, MT, or UT and any welds which fail shall be repaired at the CONTRACTOR's expense, which will also include all costs for retesting. No welding through galvanized coatings will be permitted. The galvanizing within one inch of the weld shall be removed and repaired, after welding, according to these Specifications. All weld filler metal shall have chemistry similar to the base metal and shall have a minimum Charpy Impact Test Value of 20 ft-lbs. at -20 degrees F and have chemistry similar to the base metal. Filler metals shall only be used in welding positions recommended by the manufacturer. Welding materials shall be stored, and the condition maintained, according to AWS.
- G. <u>Galvanize Repair</u>: Galvanized coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per Section 09900 Coatings, Sub-Section 3.2.
- H. <u>Thermal Spray Metalizing (TSM) Repair</u>: TSM coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per Section 09900 Coatings, Sub-Section 3.2.

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. The WORK in this section shall include all labor, materials, tools and equipment necessary for surface preparation and application of all metal coatings, and all other miscellaneous associated work, in accordance with the requirements of the Contract Documents and as shown on the Plans.

## 1.2 REFERENCES

- A. ASTM (American Society of Testing Materials) Specifications
- B. ASTM A123 Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- D. SSPC (Steel Structures Painting Council) Steel Structures Painting Manual.
- E. SSPC Guide No. 23 for Thermal Spray Metallic Coating.

## 1.3 SUBMITTALS

- A. Product Data: Provide product data and/or technical specifications including manufacturer's instructions for surface preparation, required environmental conditions, etc., for all metal coating products.
- B. Samples: Submit (2) samples demonstrating color and texture for each proposed metal coating product.
- C. Coating Repair Methods and Materials: CONTRACTOR'S proposed repair methods, procedures and materials for all metal coatings damaged as a result of shipping, handling, welding or by other means.
- D. CONTRACTOR shall submit a Quality Plan for preparation and application of metal coatings for complete bridge, bridge support float and drive-down float assemblies. Quality Plan shall address solvent cleaning, blasting, surface profile standards, stripe coat and primer coat application, finish coat applications, coating thickness measurement and documentation, adhesion pull test procedures, independent inspection and documentation, as well as handling and transport methods.

### 1.4 QUALITY ASSURANCE

A. Qualifications: Thermal sprayed and painted coatings shall be applied by an experienced firm that has knowledge, procedures and equipment necessary to provide surface preparation and application of complex protective coating systems. Thermal sprayed and painted coatings shall be applied by a firm possessing an AISC Sophisticated Paint Endorsement - Enclosed (SPE) - P1 and meeting requirements of SSPC-QP 3.

# **PART 2 - PRODUCTS**

### 2.1 GALVANIZING

A. Unless otherwise noted, all steel components shall be hot-dip galvanized per ASTM A123 or A153, as appropriate.

## 2.2 THERMAL SPRAY METALLIC COATING

- A. Shall conform to SSPC Guide No. 23.
- B. Thermal Spray Metallic Coating as the initial coating for final paint coatings shall be with zinc only to a minimum dry coating thickness of 6 mils unless otherwise noted. The following items shall have Thermal Spray Metallic Coating as the initial coating:
  - 1) All mooring float steel pipe pontoons, saddle plates, saddle web and flange plates, the lower saddle connection plate (except faying surface), and all stringer connection plates and angles, unless otherwise noted herein.
  - 2) All pipe mooring bollards (except base plate faying surface).
  - 3) All safety ladder steel components, with exception of the steel holding pins and stainless steel hardware.
- C. Thermal Spray Metallic Coating as the final coating shall be top coated with clear sealer, PRO-LINE 4800/4801 PROTHANE H.S. as manufactured by *Sherwin-Williams*, or approved equal. The following items shall have zinc only Thermal Spray Metallic Coating to a minimum dry coating thickness of 15 mils, and shall be top coated with clear sealer to a dry film thickness (DFT) of 2-3 mils:
  - 1) All lower saddle connection plate faying surfaces.
  - 2) All mooring bollard base plate faying surfaces.

### 2.3 PAINT

- A. Steel components identified in 2.2, B, 1 above: Paint shall be Moisture-Cured Urethane as manufactured by *Sherwin-Williams*, or approved equal. Fabricator may submit alternate paint system for ENGINEER review. If alternate paint system is not approved, the following paint system shall be used:
  - First Coat: First Coat shall be *Sherwin-Williams Corothane I Mio-Zinc Primer*, or approved equal, to a minimum dry film thickness (DFT) of 3 mils.
  - Second Coat: Second Coat shall be *Sherwin-Williams Corothane I Coal Tar*, or approved equal, to a minimum dry film thickness (DFT) of 6 mils.
  - Third Coat: Third Coat shall be *Sherwin-Williams Corothane I Coal Tar*, or approved equal, to a minimum dry film thickness (DFT) of 6 mils. Color shall be black.

- B. Steel components identified in 2.2, B, 2 and 3 above: Paint shall be Moisture-Cured Urethane as manufactured by *Sherwin-Williams*, or approved equal. Fabricator may submit alternate paint system for ENGINEER review. If alternate paint system is not approved, the following paint system shall be used:
  - First Coat: First Coat shall be *Sherwin-Williams Corothane I Mio-Zinc Primer*, or approved equal, to a minimum dry film thickness (DFT) of 3 mils.
  - Second Coat: Second Coat shall be *Sherwin-Williams Corothane I Ironox B*, or approved equal, to a minimum dry film thickness (DFT) of 3 mils.
  - Third Coat: Third Coat shall be *Sherwin-Williams Corothane I HS Aliphatic Finish Coat*, or approved equal, to a minimum dry film thickness (DFT) of 3 mils.
  - Top coat color (third coat) shall be yellow. Fabricator shall submit color samples to ENGINEER for approval.

# 2.4 NON-SKID

A. Metal surfaces specified to be Non-Skid shall be thermal arc-sprayed with TH604 and/or TH605, as manufactured by *Thermion*, to achieve a very aggressive surface profile. Blast surface and prep as required by Non-Skid coating manufacturer, prior to Non-Skid coating application.

# PART 3 - EXECUTION

# 3.1 PREPARATION AND APPLICATION

- A. Galvanizing shall be per ASTM A123 or A153, as appropriate. Galvanizing shall be performed after fabrication, and all holes required for galvanizing shall be repaired per AWS D1.1, and in accordance with Sub-Section 3.2, unless otherwise approved by the ENGINEER.
- B. Preparation and application of Thermal Spray Metallic Coatings shall conform to SSPC Guide No. 23, having a minimum dry film coating thickness of 6 mils for metal required to be top coated with paint system, otherwise a minimum dry film coating thickness of 12 mils is required. Thermal Spray Metallic Coating damaged from shipping, handling, welding or by other means shall be repaired in accordance with SSPC Guide No. 23, Section 8.7.
- C. Paint shall be applied over new thermally sprayed metallic coated surfaces. These surfaces shall be prepared according to the paint manufacturers recommendations. Paint shall be applied in the number of layers recommended by the manufacturer. Paint systems must be applied strictly according to the manufacturer's recommendations, and correct application must be warranted by the paint manufacturer. Fabricator shall have qualified, experienced staff or shall hire a qualified, experienced, independent inspector to conduct testing and fully document, including photos, all coating preparation and application work.
- D. Metal surfaces specified to be Non-Skid shall be prepared per coating manufacturer's

## **SECTION 09900 - COATINGS**

recommendations and submitted Quality Plan. Coating thickness shall be 10 mils minimum. Seal and top coat per manufacturer's recommendations.

## 3.2 COATING REPAIRS

- A. CONTRACTOR shall submit metal coating repair methods and procedures for review and approval by the ENGINEER, prior to fabrication or mobilization of any equipment and materials.
- B. Paint Coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per manufacturer's recommendations. CONTRACTOR shall have sufficient amount of *Sherwin-Williams* product available on site for coating repairs prior to installation of steel structures.
- C. <u>Galvanize Repair</u>: Galvanized coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired by using the following hot-applied repair stick method:
  - 1. Repair sticks shall be zinc-cadmium alloys (melting point 518° 527°F) such as "Rev-Galv", or zinc-tin-lead alloys (melting point 446° 600°F) such as "Galv-Weld", "Zilt", and "Galv-over". The zinc-tin -lead alloys shall comply with U.S. Federal Specification O-G-93 and contain fluxing agents.
  - 2. Remove welding slag by chipping hammer and clean weld or damaged area by vigorous wire brushing.
  - 3. Preheat the region to be repaired by means of an oxyacetylene torch or other convenient method to between 600°F and 750°F. The alloys do not spread well at temperatures lower than 600°F. Also as temperatures rise above 600°F increasing amounts of dross form.
  - 4. Wire brush surface again.
  - 5. Apply coating by rubbing bar of the alloy over the heated surface while it is hot enough to melt the alloy.
  - 6. Spread the molten alloy by briskly wire brushing or rubbing with a flat edge strip of steel or palette knife. Minimum thickness of applied zinc stick material shall be 12 mils.
  - 7. Remove flux residues by wiping with a damp cloth or rinsing with water.
  - 8. Brush apply two top coats of zinc rich paint, ZRC or equal (cold galvanize repair).
- D. <u>Thermal Spray Metalizing (TSM) Repair</u>: Thermal Spray Metallic Coating damaged due to fabrication, welding, material handling or occurring during installation shall be repaired in accordance with SSPC Guide No. 23, Section 8.7.

### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following electrical materials and methods:
  - 1. Supporting devices for electrical components.
  - 2. Electrical identification.
  - 3. Electrical demolition.

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of Section 01300 CONTRACTOR Submittals.
- B. Provide catalog cut sheets providing product data for each type of product specified. Note specifically what component is being submitted when more than one model or version is shown on the cut sheet. Where there is more than one of each type of component (circuit breaker), label the top of each cut sheet with the specific component that the cut sheet applies to.
- C. Provide Shop Drawings detailing fabrication and installation of supports and anchorage for electrical items. Show all components of a system and how they relate to each other during installation. Include details of mounting brackets, wiring interconnections, single line diagrams, component layout diagrams for enclosures, materials lists for components in enclosures, wiring schematic diagrams with each wire numbered and each terminal numbered for wiring in enclosures. Provide Shop drawings for the panels, switchboard, pedestal bases with light pole, electrical equipment supports, and any other structural support brackets for electrical equipment.

### 1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 for components and installation.
- B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
  - 1. The Terms "Listed and Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

**BASIC ELECTRICAL** 

C. All expose hardware on this project shall be 316 stainless steel. Other types of nonmagnetic stainless steel is acceptable for bolts and washers. All steel components of all

electrical equipment and their support brackets and associated equipment, plates, etc. shall be 316L stainless steel. All junction boxes and enclosures shall be 316L stainless steel. Size all junction boxes and enclosures as required. All dimensions of enclosures, junction boxes shown are a minimum unless specifically stated as a maximum. Increase dimensions as required.

- D. Provide all work required to provide the electrical systems shown on the drawings and included in the specifications. Nothing on the drawings shall be construed to be a bill of materials. It is the contractor's responsibility to determine all equipment required to provide the electrical systems shown on the drawings and specifications. It is the contractor's responsibility to provide all necessary parts to perform the work including accessories. This includes other parts required by a manufacturer to mount their equipment.
- E. Demolition all of the electrical systems on the existing harbor. Coordinate with the City of Unalaska electric utility to disconnect the existing electrical service to the harbor. Coordinate with the utility to provide a new electrical service to the new harbor.

## 1.5 SEQUENCING AND SCHEDULING

- A. Coordinate electrical equipment installation with other trades.
- B. Arrange for chases, slots, and openings in float structure during progress of construction to allow for electrical installations.
- C. Coordinate installing required supporting devices and cut slots and holes as required in structural components as they are constructed. Obtain permission from CIVIL ENGINEER prior to cutting structural members. Field treat all hot dipped galvanized structure and components per civil after cutting.

# PART 2 - PRODUCTS

# 2.1 SUPPORTING DEVICES

- A. Channel and angle support systems, hangers, anchors, sleeves, brackets, fabricated items, and fasteners are designed to provide secure support from the structure for electrical components.
  - 1. Material: Type 316L stainless steel, except as otherwise indicated.
- B. Steel channel supports have 9/16-inch diameter holes at a maximum of 8 inches o.c., in at least one surface.
  - 1. Fittings and accessories mate and match with channels and are from the same manufacturer.

**BASIC ELECTRICAL** 

C. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel

clamps or "click"- type hangers per NEC for application. Use cushion type with NM portion against cable when securing cable to strut channel.

D. Expansion Anchors: Red Head, Hilti, or equal. Stainless steel.

## 2.2 ELECTRICAL IDENTIFICATION

- A. Manufacturer's Standard Products: Where more than one type is listed for a specified application, selection is Installer's option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Raceway and Cable Labels: Conform to ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway or cable size.
  - 1. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.
  - 2. Color: Black legend on orange field.
  - 3. Legend: Indicates voltage, panel, and circuit number. Locate every 100 feet in utilidor.
- C. Engraved, Plastic-Laminated Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched for mechanical fasteners 1/16-inch minimum thick for signs up to 20 sq. in., 1/8 inch thick for larger sizes. Engraved legend in black letters on white face.
- H. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

### 2.3 TOUCHUP PAINT

- A. For Equipment: Provided by equipment manufacturer and selected to match equipment finish.
- B. For Nonequipment Surfaces: Matching type and color of undamaged, existing adjacent finish.
- C. For Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer. Field treat hot dipped galvanized materials that are cut, drilled, scratched or otherwise disturbed in the field per Civil.

# PART 3 - EXECUTION

### 3.1 EQUIPMENT INSTALLATION REQUIREMENTS

A. Store all materials in dry heated storage prior to installing them on the project. Make arrangements for ENGINEER to inspect all power centers, power heads, pedestals, panels, etc. prior to being installed. None of this equipment may be installed without being inspected by the ENGINEER first. All electrical panels, contactors, power heads,

luminaires, and power center interiors shall be kept dry at all times including during and after installation.

- B. Install items level, plumb, and parallel and perpendicular to other structures and components, except where otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

## 3.2 ELECTRICAL SUPPORTING METHODS

- A. 316 Stainless steel. All locations on this Project are considered outdoors.
- B. Conform to manufacturer's recommendations for selecting supports.
- C. Strength of Supports: Adequate to carry all present and future loads, times a safety factor of at least 4; 200-lb- minimum design load.

## 3.3 INSTALLATION

- A. Install devices to securely and permanently fasten and support electrical components.
- B. Raceway Supports: Comply with NFPA 70 and the following requirements:
  - 1. Conform to manufacturer's recommendations for selecting and installing supports.
  - 2. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
  - 3. Provide supports for cables as shown on the drawings. Use nylon cable ties to secure cable to all supports at every support and as shown on the drawing. Only high quality Thomas & Betts, Burndy or equivalent cable ties may be used with a minimum 250 lb tensile strength. All nails shall be hot dipped galvanized. All screws shall be stainless steel.
- C. Install identification devices where required and on all circuit breakers, panels, power centers, pedestals, etc. Provide voltage and phase on labels. Submit labels for approval prior to making them.
  - 1. Install labels where indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.
  - 2. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated on the Contract Documents or required by codes and standards. Use consistent designations throughout the Project.
  - 3. Tag or label power circuits for future connection and circuits in raceways and enclosures with other circuits. Identify source and circuit numbers in each cabinet, pull box, junction box, and outlet box. Color coding may be used for voltage and phase indication.

- 4. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.
- D. Store all material and equipment in a dry, heated area until it is installed. Keep all material dry and if it has printed circuit boards or any other electronic components, keep it in a dry heated location after it is installed.

# 3.4 DEMOLITION

- A. Where electrical WORK to remain is damaged or disturbed in the course of the WORK, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Keep all existing electrical systems on the Project site fully operational during the course of the WORK. Coordinate outages with ENGINEER and the Port of Dutch Harbor Port Director. Outages are only to be on the portion of the WORK being done at the time. The remainder of the system shall remain energized.
- C. Remove all existing harbor electrical systems on floats to be removed. Remove service equipment back to utility transformer. Coordinate with City of Unalaska electrical utility to disconnect service and remove service conductors.

# 3.5 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill surfaces necessary for electrical installations. Perform cutting by skilled mechanics of the trades involved. All cutting, chases, and drilling shall be per structural drawings. If no specific instruction is given on the structural drawings the cutting, chases, and drilling shall be approved by the ENGINEER as to size, location, method, etc. If a float structure or member is cut, drilled, or a chase made through it without the permission of the ENGINEER or in violation with the structural drawings, it shall be replaced at the cost of the CONTRACTOR.
- B. Repair disturbed surfaces to match adjacent undisturbed surfaces. Field repair galvanized surfaces per Civil.

# 3.6 TOUCH-UP PAINTING

- A. Thoroughly clean damaged areas and provide primer, intermediate, and finish coats to suit the degree of damage at each location.
- B. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.

#### **SECTION 16120 - CONDUCTORS AND CABLES**

#### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

A. This Section includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

### 1.3 SUBMITTALS

A. Catalog cut sheets for all products used.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: In addition to requirements specified in Division 1 Section "Quality Control," an independent testing agency shall meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907; or shall be a full-member company of the InterNational Electrical Testing Association.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Architecting Technologies, to supervise on-site testing specified in Part 3.
- B. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- C. Comply with NFPA 70.

### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver wires and cables according to NEMA WC 26.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of cables with other installations.
- B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by ENGINEER.

#### **SECTION 16120 - CONDUCTORS AND CABLES**

#### **PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include, but are not limited to, the following:
  - 1. Wires and Cables:
    - a. American Insulated Wire Corp.; Leviton Manufacturing Co.
    - b. Carol Cable Co., Inc.
    - c. Southwire Company.
    - d. Priority Wire & Cable.
  - 2. Connectors for Wires and Cables:
    - a. AMP Incorporated.
    - b. General Signal; O-Z/Gedney Unit.
    - c. Monogram Co.; AFC.
    - d. Square D Co.; Anderson.
    - e. 3M Company; Electrical Products Division.

### 2.2 WIRES AND CABLES

- A. UL-listed wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.
- B. Rubber Insulation Material: Comply with NEMA WC 3.
- C. Thermoplastic Insulation Material: Comply with NEMA WC 5.
- D. Cross-Linked Polyethylene Insulation Material: Comply with NEMA WC 7.
- E. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 8.
- F. Conductor Material: Copper. Provide tinned copper in the pedestals and with type G or G-GC cable as shown on the drawings.
- G. Stranding: Solid conductor for No. 10 AWG and smaller; stranded conductor for larger than No. 10 AWG.
- H. All cables shall be type G or G-GC as shown on the drawings. All type G and G-GC cable shall be UL listed and labeled for constant submersion in water. All type G cable shall have ground conductors of sufficient size to comply with the NEC table 250.122 for equipment grounding conductors for the ampacity of the cable, i.e. a cable rated at 75 degrees for 230 amps shall have a min. no. 4 AWG ground or multiple grounds of equivalent total size.

### 2.3 CONNECTORS AND SPLICES

A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3 "Wire and Insulation Applications" Article.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

A. Examine utilidors and raceways to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected. Pull a mandrel through existing conduit prior to pulling wires or cables.

### 3.2 WIRE AND INSULATION APPLICATIONS

- A. Underground: Type RHW or XHHW, in raceway.
- B. Feeders: Type XHHW, in raceway.
- C. Floats: Type G or G-GC cable. All conduits on the gangways, in the ground, all chases in concrete floats, steel mounting plates, all support brackets, etc. are designed for the cable sizes shown on the drawings and for type G or G-GC cable. SOOW cord may be used for the 3/c no. 12 photocell cable only.
- D. Pedestals: Provide tinned copper conductors with XHHW insulation or an insulation rated at 600V and listed for wet locations.

## 3.3 INSTALLATION

- A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."
- B. Remove existing wires from raceway before pulling in new wires and cables.
- C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Support cables according to Division 16 Section 16050 Basic Electrical Materials And Methods. Support cables as shown on the drawings.
- F. Identify wires and cables according to Division 16 Section 16050 Basic Electrical Materials And Methods.

## **SECTION 16120 - CONDUCTORS AND CABLES**

G. Provide additional pull points in the form of conduit bodies or 316 stainless steel NEMA 4X enclosures where the amount of bend in a raceway system exceeds 360 degrees or does not meet the NEC for the application.

## 3.4 CONNECTIONS

- A. Conductor Splices: Keep to minimum. In float circuits, the only splices shall be in the electrical service equipment, panels, or at the power pedestals, unless otherwise noted. No splices in any circuit except in the enclosure where the circuit originates and the enclosure where the conductor is terminated, unless otherwise noted.
- B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced. All splices in the floats shall be water-proof using either epoxy or tape that will be waterproof once the installation is complete.
- C. Use splice and tap connectors compatible with conductor material.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

# 3.5 FIELD QUALITY CONTROL

A. Verify all connections are properly tight. Verify no cable has been damaged. Replace any that has.

### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
  - 1. Raceways include the following:
    - a. RMC.
    - b. RNC.
  - 2. Boxes, enclosures, and cabinets include the following:
    - a. Device boxes.
    - b. Outlet boxes.
    - c. Pull and junction boxes.
    - d. Cabinets and hinged-cover enclosures.
- B. Related Sections include the following:
  - 1. Division 16 Section 16050 Basic Electrical Materials And Methods for raceways and box supports.
  - 2. Division 16 Section 16140 Wiring Devices for devices installed in boxes.

#### 1.3 DEFINITIONS

- A. RMC: Rigid metal conduit.
- B. RNC: Rigid non-metallic conduit.

#### 1.4 SUBMITTALS

A. Product Data: For raceways and fittings, boxes, hinged-cover enclosures, and cabinets

### 1.5 QUALITY ASSURANCE

- A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

- B. Comply with NECA's "Standard of Installation."
- C. Comply with NFPA 70.

### 1.6 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

# **PART 2 - PRODUCTS**

## 2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include, but are not limited to, the following:
  - 1. Metal Conduit and Tubing:
    - a. Carol Cable Co., Inc.
    - b. Grinnell Co.; Allied Tube and Conduit Div.
    - c. Monogram Co.; AFC.
    - d. Triangle PWC, Inc.
  - 2. Conduit Bodies and Fittings:
    - a. American Electric; Construction Materials Group.
    - b. Crouse-Hinds; Div. of Cooper Industries.
    - c. Emerson Electric Co.; Appleton Electric Co.
    - d. Hubbell, Inc.; Killark Electric Manufacturing Co.
    - e. Lamson & Sessions; Carlon Electrical Products.
    - f. O-Z/Gedney; Unit of General Signal.
    - g. ETCO Speciality Products, Inc.
  - 3. Boxes, Enclosures, and Cabinets:
    - a. Butler Manufacturing Co.; Walker Division.
    - b. Crouse-Hinds; Div. of Cooper Industries.
    - c. Hoffman Engineering Co.; Federal-Hoffman, Inc.
    - d. O-Z/Gedney; Unit of General Signal.
    - e. Robroy Industries, Inc.; Electrical Division.
    - f. Thomas & Betts Corp.

## 2.2 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

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### 2.3 NONMETALLIC CONDUIT AND TUBING

A. RNC: Schedule 40 or 80 PVC per NEMA TC 2 and applicable standards.

### 2.4 OUTLET AND DEVICE BOXES

A. Stainless Steel, 316L.

### 2.5 PULL AND JUNCTION BOXES

A. Stainless Steel, type 316L.

## 2.6 ENCLOSURES AND CABINETS

A. All enclosures and cabinets: Stainless Steel type 316L unless noted otherwise.

### **PART 3 - EXECUTION**

### 3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 WIRING METHODS

- A. Outdoors: Use the following wiring methods:
  - 1. Exposed: Schedule 80 PVC, or as noted on the drawings.
  - 2. Underground: Rigid steel, or as noted on the drawings.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): Liquid tight non-metallic conduit.
  - 4. Boxes and Enclosures: NEMA 4X, stainless steel, type 316 unless noted otherwise.

### 3.3 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section 16050 Basic Electrical Material And Methods.
- D. Use temporary closures to prevent foreign matter from entering raceways.

- E. Protect conduit from filling with water during construction.
- F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- G. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.
- H. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
- I. Join raceways with fittings designed and approved for the purpose and make joints tight.
  - 1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
  - 2. Use insulating bushings to protect conductors.
- J. Tighten set screws of threadless fittings with suitable tools.
- K. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.
- L. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- M. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of the pull wire.
- N. The purpose of a lot of the conduit in this project is to provide physical damage protection to the type G-GC and type G cable. Minimum conduit sizes are shown. Size the conduit so the cable can be easily installed and so good air flow can be maintained in the conduit to allow the cable to dissipate heat. Increase conduit sizes as required.

### 3.4 **PROTECTION**

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

## 3.5 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

A. This Section includes receptacles and finish plates.

#### 1.3 SUBMITTALS

- A. Product Data: For each product specified including all equipment and materials used in the pedestals.
- B. Shop Drawings: For each pedestal in each configuration; power & light, power only, light only for all receptacle configuration 100A, 60A, 50A, 30A, all combinations as shown on the drawings.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- B. Comply with NEMA WD 1.
- C. Comply with NFPA 70.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include, but are not limited to, the following:
  - 1. Wiring Devices:
    - a. Bryant Electric, Inc.
    - b. GE Company; GE Wiring Devices.
    - c. Hubbell, Inc.; Wiring Devices Div.
    - d. Leviton Manufacturing Co., Inc.
    - e. Pass & Seymour/Legrand; Wiring Devices Div.
  - 2. Pedestals: Eaton Marine Power or equal.

### 2.2 RECEPTACLES

#### **SECTION 16140 - WIRING DEVICES**

A. Provide commercial specification grade receptacles and switches 20A, 120V rated, in the vault.

## 2.3 PEDESTALS

A. Provide pedestals made of the materials and with the features and functions shown on the contract drawings. The powerheads shall be UL listed as a marine pedestal assembly. All substitutions shall have the same features and functions as the pedestals shown on the drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install devices and assemblies plumb and secure.
- B. Install as shown on the drawings and per the manufacturer's instructions.

## 3.2 IDENTIFICATION

- A. Comply with Division 16 Section 16050 Basic Electrical Material And Methods.
  - 1. Receptacles: Identify as shown on the drawings.
  - 2. Label receptacles and circuit breakers with voltage and amperage rating with engraved phenolic labels screwed into the pedestal under the door.

## 3.3 CONNECTIONS

- A. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.
- B. Tighten electrical connectors and terminals according to manufacturers published torquetightening values. If manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

## 3.4 FIELD QUALITY CONTROL

- A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.
- B. Replace damaged or defective components.

### 3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 16 Section 16120 Conductors And Cables.

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the contract and Division 1 Specification Sections.
- B. Product Data for grounding rods, connectors and connection materials, and grounding fittings.

## 1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with UL 467.
- C. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include, but are not limited to, the following:

- 1. Ideal Industries, Inc.
- 2. Burndy
- 3. O-Z/Gedney Co.
- 4. Thomas & Betts, Electrical.

## 2.2 GROUNDING AND BONDING PRODUCTS

A. Governing Requirements: Where types, sizes, ratings, and quantities indicated are in excess of National Electrical Code (NEC) requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

## 2.3 WIRE AND CABLE GROUNDING CONDUCTORS

- A. Comply with Division 16 Section 16120 Conductors And Cables. Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
  - 1. Material: copper. Use only copper wire.
- B. Equipment Grounding Conductors: Insulated with green color insulation.
- C. Grounding-Electrode Conductors: Stranded cable.
- D. Underground Conductors: Bare, tinned, stranded, except as otherwise indicated.
- E. Bare Copper Conductors: Conform to the following:
  - 1. Solid Conductors: ASTM B 3.

### 2.4 MISCELLANEOUS CONDUCTORS

- A. Grounding Bus: Bare, annealed-copper bars of rectangular cross section.
- B. Braided Bonding Jumpers: Copper tape, braided No. 30 AWG bare copper wire, terminated with copper ferrules.
- C. Bonding Straps: Soft copper, 0.05 inch (1 mm) thick and 2 inches (50 mm) wide, except as indicated.

### 2.5 CONNECTOR PRODUCTS

- A. Pressure Connectors: High-conductivity-plated units.
- B. Bolted Clamps: Heavy-duty type.
- C. Exothermic-Welded Connections: Provided in kit form and selected per manufacturer's written instructions for specific types, sizes, and combinations of conductors and connected items.
#### 2.6 GROUND RODS

A. Use stainless steel ground rods in salt water. Provide <sup>3</sup>/<sub>4</sub>"x10' ground rods. Use copper clad steel rods in earth.

#### PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. Equipment Grounding Conductors: Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
  - 1. Install equipment grounding conductor with circuit conductors for the items below in addition to those required by Code:
    - a. Feeders and branch circuits.
    - b. Lighting circuits.
    - c. Receptacle circuits.
  - 2. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- B. Separately Derived Systems: Where NEC requires grounding, ground according to NEC Paragraph 250-26.
- C. Metal Poles Supporting Outdoor Lighting Fixtures: Ground pole to a grounding electrode in addition to separate equipment grounding conductor run with supply branch circuit.
- D. Ground neutral of all transformers. Provide a ground rod into the salt water at each transformer and ground per NEC. Connect ground at transformer to enclosure, mounting brackets, grounding conductors in all cables entering power center and ground rod. Note, UHMW is used as an insulating means in this project. Make sure all metallic components including brackets and mounting equipment is grounded.

#### 3.2 INSTALLATION

- A. General: Ground electrical systems and equipment according to NEC requirements, except where Drawings or Specifications exceed NEC requirements.
- B. Grounding Conductors: Route along the shortest and straightest paths possible, except as otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Float Stucture: Ground all steel float structures to electrical grounding system. This includes the new gangway, and other steel on the marine structures and floats. Install lugs on the steel when grounding or use exothermically welded connections. Repair connections with galvanizing per the ENGINEER.

#### 3.3 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to assure 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.
- B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressuretype grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

#### **END OF SECTION**

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes power panelboards and associated auxiliary equipment rated 600 V and less.
- B. Related Sections include the following:
  - 1. Division 16 Section 16050 Basic Electrical Materials and Methods for general materials, installation, and labeling methods.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of panelboard and switchboard, accessory item, and component specified. Shop drawings for all switchboards.
- B. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- C. Maintenance Data: For panelboard components to include in the maintenance manuals specified in Division 1. Include manufacturer's written instructions for testing circuit breakers.

#### 1.4 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- C. Comply with NFPA 70.
- D. Comply with NEMA PB 1.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include the following

PANELBOARDS PAGE 16470 - 1

#### 1. Square D Co.

The panelboards and switchboard have been designed based upon equipment manufactured by Square D Co. Mounting details and equipment layout are based upon the Square D Co. equipment. If another manufacturer's equipment is used, make all changes necessary to the mounting and layout as required. Any changes needed to accommodate an approved substitution manufacturer's equipment shall be done at the contractor's cost.

#### 2.2 PANELBOARD FABRICATION

- A. Enclosures: Flush- or surface-mounted cabinets as indicated. NEMA 3R, unless otherwise indicated to meet environmental conditions at installed location.
  - 1. Outdoor Locations: NEMA 250, Type 3R, stainless steel type 316L. The switchboard shall be NEMA 250, Type 3R, stainless steel type 316L. Stainless steel type 316 may be utilitzed for non-welded enclosures.
- B. Front: Secured to box with concealed trim clamps, unless otherwise indicated. Front for surface-mounted panelboards shall be same dimensions as box. Fronts for flush panelboards shall overlap box, unless otherwise indicated.
- C. Directory Frame: Metal, mounted inside each panelboard door.
- D. Bus: Hard drawn copper of 98 percent conductivity.
- E. Main and Neutral Lugs: Compression type.
- F. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. Bonded to box.
- G. Service Equipment Approval: Listed for use as service equipment for main switchboard and panel L.
- H. Future Devices: Equip with mounting brackets, bus connections, and necessary appurtenances, for the overcurrent protective device ampere ratings indicated for future installation of devices.
- I. Switchboards: Provide a floor mounted structure with dedicated dead front panels for each section. Provide doors for each section. Divide switchgear into sections as shown on the drawings and per UL requirements. Provide all the same applicable features of the panelboards (copper buss, ground bus, neutral bus, etc.)

#### 2.3 BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: In panelboard front, with concealed hinges. Secure with flush catch and tumbler lock, all keyed alike.

#### 2.4 DISTRIBUTION PANELBOARDS

- A. Doors: In panelboard front, except omit in fusible-switch panelboard, unless otherwise indicated. Secure door with vault-type latch with tumbler lock, all keyed alike.
- B. Branch-Circuit Breakers: Where overcurrent protective devices are indicated to be circuit breakers, use bolt-on circuit breakers, except circuit breakers 225-A frame size and greater may be plug-in type where individual positive-locking device requires mechanical release for removal. Provide I-Line type panels for panels A & B.
- C. AIC Rating: Provide the AIC rating shown on the drawings. Provide 60,0000 symmetrical amps interrupting capacity minimum for panel board interior and all branch circuit breakers minimum at Switchboard. Provide 22,000 AIC for panels and circuit breakers in load centers and panel L, unless otherwise noted. Provide 25,000 AIC for the panels and circuit breakers in panels A and B.
- D. Branch Circuit Breaker Mounting: The Switchboard and Panels A and B shall be I-Line style. This means that the branch circuit breakers may be added to the panel without having to add provisions to prepare the panel for the circuit breaker.

#### 2.5 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: NEMA AB 1, handle lockable.
  - 1. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting capacity rating to meet available fault current.
  - 2. Application Listing: Appropriate for application.
  - 3. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.
  - 4. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.

#### 2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items as required for overcurrent protective device test, inspection, maintenance, and operation.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install panelboards and accessory items according to NEMA PB 1.1.
- B. Mounting Heights: Mount as shown on drawings. No electrical connections shall be allowed within 12 inches of the base of any power center or within 18" of the float surface.
- C. Mounting: Plumb and rigid without distortion of box. Mount flush panelboards uniformly flush with wall finish.

#### **SECTION 16470 - PANELBOARDS**

- D. Circuit Directory: Type directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing.
- E. Install filler plates in unused spaces.
- F. Wiring in Panelboard Gutters: Arrange conductors into groups, and bundle and wrap with wire ties after completing load balancing.

#### 3.2 IDENTIFICATION

- A. Identify field-installed wiring and components and provide warning signs as specified in Division 16 Section 16050 Basic Electrical Materials And Methods.
- B. Panelboard Nameplates: Label each panelboard with engraved laminated-plastic or metal nameplates mounted with corrosion-resistant screws.

#### 3.3 GROUNDING

A. Make equipment grounding connections for panelboards as indicated.

#### 3.4 CONNECTIONS

A. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

#### 3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

#### END OF SECTION

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes digital meters for metering utility power at pedestals and panels.
- B. Related Sections include the following:
  - 1. Division 16 Section 16050 Basic Electrical Materials and Methods for general materials, installation, and labeling methods.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of meter, accessory item, and component specified and needed or required. Shop drawings for all meters. Provide shop drawing from powerhead manufacturer showing meter and all components with their wiring. Obtain written acceptance from City of Unalaska Electrical Utility of the meter installation prior to shipping power heads from the manufacturer.
- C. Maintenance Data: Complete installation, operations and maintenance manual with spare parts list and contact information for technical support and parts supplier.

#### 1.4 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Revenue Grade Accuracy. Certified by independent test lab to ANSI C12.20 national accuracy standards (+/- 0.2% from 1% to 100% of rated load.)
- C. Comply with NFPA 70.
- D. Provide UL listed to latest applicable standards of safety.

#### **PART 2 - PRODUCTS**

2.1 MANUFACTURERS

#### **SECTION 16470 - METERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the WORK include the following
  - 1. E-Mon Energy Monitoring Products

The metering enclosures and pedestal have been designed based upon equipment manufactured by E-Mon. Enclosure sizes and power head configuration and size are based upon the E-Mon equipment. If another manufacturer's equipment is approved during the submittal process, make all changes necessary to the sizes of enclosures, powerheads, conduit, etc. as required. Any changes needed to accommodate an approved substitution manufacturer's equipment shall be done at the contractor's cost.

#### 2.2 METER FEATURES

- A. Enclosures: Industrial grade steel enclosure with padlocking hasp and mounting flanges for installation inside NEMA 4X enclosure back panel or inside pedestal powerhead back panel. Knockouts for <sup>1</sup>/<sub>2</sub>" conduit on top and <sup>3</sup>/<sub>4</sub>" conduit on bottom. Provide grommets for conductors entering knockouts as conduit will not be used in this application.
- B. Direct-read 2-line alpha numeric LCD display without multiplier displays cumulative kWh and "real-time" kW load. Meter shall provide rate of consumption indication and also a test sequence to ensure integrity of the display.
- C. Demand option displays kW/Demand and kW Peak date and time (15 minute interval standard, 30 minute or 60 minute intervals available.) Provide with Demand option.
- D. Provide 0-2 volt output split core current sensors to allow installation on existing systems, ease of maintenance, and accurate remote mounting of current sensors up to 2000 feet from meter without power interruption. Sensors shall be available from 100 amp to 1600 amp.
- E. Onboard installation diagnostics and verification system.
- F. Parallel up to three (3) sets of current sensors for cumulative reading.
- G. Meter can be used on the following configurations: 3-Phase, 4-Wire.
- H. Fixed-Value pulse output.
- I. Meter shall be provided with a non-volatile memory to maintain reading during power outages.
- J. Meter shall provide a load indicator to indicate real-time consumption levels for field testing and certification.
- K. Meter shall provide current sensor installation diagnostics indicator.
- L. Meter shall be provided with modular connector(s) to provide interfacing with:
  AMR (Automatic Meter Reading)
  Building Management/Energy Management Systems

#### 2.3 ADDITIONAL COMPONENTS AND FEATURES

A. Provide with all associated components for a fully operational meter including wiring, current transformers, potential transformers, sensors, etc. as needed or required.

#### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install meters in enclosures with minimum size as shown on drawings. Increase enclosure size as required.
- B. Install meters in power heads as an integral part of the powerhead. Meter shall be installed in power head by power head manufacturer and powerhead UL listing shall include meter installed in power head.
- C. Provide all necessary wiring and install all necessary components to provide a functioning meter that meters all power entering panel or powerhead as applicable.
- D. Coordinate meter installation with City of Unalaska Electrical Utility to assure the utility acceptance of the installation. Obtain utility acceptance of the shop drawings showing the meter and associated components and wiring in the power heads in writing prior to shipping power heads from manufacturer. Allow utility to inspect meter installation both in power heads and in panel and enclosure on site after installation and before substantial completion. Make all changes to installation as directed by utility prior to substantial completion. Obtain utility acceptance of the meter installation in writing prior to substantial completion.
- E. Install meter and all associated components and per manufacturer's instructions, recommendations and as applicable, the power head manufacturer's instructions and recommendations, as well as City of Unalaska Electrical Utility direction, recommendations, and instructions.

#### 3.2 IDENTIFICATION

- A. Identify field-installed wiring and components and provide warning signs as specified in Division 16 Section 16050 Basic Electrical Materials And Methods.
- B. Meter nameplates Provide device that the meter is metering on a phenolic label screwed to the face of the meter enclosure.

#### 3.3 GROUNDING

- A. Make grounding connections for meters as required per manufacturer and NFPA 70.
- 3.4 CONNECTIONS

#### **SECTION 16470 - METERS**

A. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

#### 3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

#### **END OF SECTION**

#### SECTION 16476 - DISCONNECT SWITCHES AND CIRCUIT BREAKERS

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes individually mounted switches and circuit breakers used for the following:
  - 1. Service disconnect switches.
  - 2. Feeder and equipment disconnect switches.
  - 3. Feeder branch-circuit protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 16 Section 16140 Wiring Devices for attachment plugs and receptacles, and snap switches used for disconnect switches.

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the contract and Division 1 Specification Sections.
- B. Product Data for disconnect switches, circuit breakers, and accessories specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain disconnect switches and circuit breakers from one source and by a single manufacturer.
- B. Comply with NFPA 70 for components and installation.
- C. Listing and Labeling: Provide disconnect switches and circuit breakers specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering disconnect switches and circuit breakers that may be incorporated into the WORK include, but are not limited to, the following:
  - 1. Molded-Case Circuit Breakers:
    - a. Square D Co.

#### 2.2 DISCONNECT SWITCHES

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD (Heavy Duty), with lockable handle, 600V rated.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD (Heavy Duty), clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.
- C. Enclosure: NEMA KS 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.
  - 1. Outdoor Locations: Type 4X, type 316L stainless steel.

#### 2.3 ENCLOSED CIRCUIT BREAKERS

- A. Enclosed, Molded-Case Circuit Breaker: NEMA AB 1, with lockable handle.
- B. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting rating to meet available fault current.
- C. Application Listing: Appropriate for application, including switching fluorescent lighting loads or heating, air-conditioning, and refrigerating equipment.
- D. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.
- E. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.
- F. Enclosure: NEMA AB 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.
  - 1. Outdoor Locations: Type 4X, type 316L stainless steel.
- G. AIC Rating: The main circuit breakers shall have a 60,000 AIC interrupting rating. See Section 16470 for interrupting ratings of circuit breakers in panelboards.

#### SECTION 16476 - DISCONNECT SWITCHES AND CIRCUIT BREAKERS

#### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install disconnect switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.
- B. Install disconnect switches and circuit breakers level and plumb.
- C. Install wiring between disconnect switches, circuit breakers, control, and indication devices.
- D. Connect disconnect switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer.
  - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- E. Identify each disconnect switch and circuit breaker according to requirements specified in Division 16 Section 16050 Basic Electrical Materials And Methods.

#### 3.4 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

#### END OF SECTION

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

A. This Section includes exterior lighting units with luminaires, lamps, ballasts, poles/support structures, and accessories.

#### 1.3 DEFINITIONS

- A. Lighting Unit: A luminaire or an assembly of luminaires complete with a common support, including pole, post, foundation, or other structure, and mounting and support accessories.
- B. Luminaire (Light Fixture): A complete lighting device consisting of lamp(s) and ballast(s), when applicable, together with parts designed to distribute light, to position and protect lamps, and to connect lamps to power supply.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of lighting unit indicated, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
  - 1. Materials and dimensions of luminaires and poles.
  - 2. Certified results of independent laboratory tests for fixtures and lamps for electrical ratings and photometric data.
  - 3. High-intensity-discharge luminaire ballasts.
  - 4. Provide information on the candela output along the vertical axis for each luminaire to show compliance with the requirements on the drawings.
  - 5. Show glare control features on each luminaire used for ballfield lighting.
- B. Shop Drawings: Anchor-bolt templates keyed to specific poles and certified by manufacturer. Shop Drawings of the poles for use by the pole fabricator.
- C. If an alternate foundation system is proposed by the CONTRACTOR, submit shop drawings and design calculations for the foundation system.
- D. Product Certificates: Signed by manufacturers of lighting units certifying that products comply with requirements.
- F. Maintenance Data: For lighting units to include in maintenance manuals specified in Division 1.
- 1.5 QUALITY ASSURANCE

- A. Luminaires and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use, location, and installation conditions by a testing agency acceptable to authorities having jurisdiction
- B. Comply with ANSI C2.
- C. Comply with NFPA 70.
- D. FM Compliance: Units for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM.

#### 1.6 DELIVERY, STORAGE, AND HANDLING OF POLES

A. Retain factory-applied pole wrappings on metal poles until just before pole installation. For all poles, handle with web fabric straps.

#### 1.7 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive OWNER of other rights OWNER may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by CONTRACTOR under requirements of the Contract Documents. Provide a general warranty for all materials and workmanship for a period of three years from the date of Substantial Completion.
- B. Special Warranty: Written warranty, signed by manufacturer and Installer agreeing to replace external parts of luminaires and poles exhibiting a failure of finish as specified below. This warranty is in addition to, and not a limitation of, other rights and remedies OWNER may have under requirements of the Contract Documents.
  - 1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
  - 2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
  - 3. Warranty Period: Manufacturer's standard, but not less than five years from date of Substantial Completion.

#### 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
  - 2. Glass and Plastic Lenses, Covers, and Other Optical Parts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.
  - 3. Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

4. Reflectors, Glare Shields, Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated on the drawings.

#### 2.2 LUMINAIRES

- A. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- B. Metal Parts: Free from burrs, sharp corners, and edges.
- C. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.
- F. Exposed Hardware Material: Stainless steel.
- G. Plastic Parts: No plastic parts.
- H. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
- I. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.
- J. Photoelectric Relays: As follows:
  - 1. Contact Relays: Single throw, arranged to fail in the on position and factory set to turn light unit on at 1.5 to 3 fc (16 to 32 lx) and off at 4.5 to 10 fc (48 to 108 lx) with 15-second minimum time delay.
  - 2. Relay Mounting: In electrical enclosures.

- K. High-Intensity-Discharge Ballasts: Comply with ANSI C82.4. Constant wattage autotransformer or regulating high-power-factor type, unless otherwise indicated.
  - 1. Ballast Fuses: One in each ungrounded supply conductor. Voltage and current ratings as recommended by ballast manufacturer.
  - 2. Single-Lamp Ballasts: Minimum starting temperature of minus 40 deg C.
  - 3. Open-circuit operation will not reduce average life.
  - 4. High-Pressure Sodium Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg C.
  - 5. Noise: Uniformly quiet operation, with a noise rating of B or better.
  - 6. Surge Protector: Hard-wired unit external to ballast case, rated for supply circuit line voltage, and encapsulated for circuit and moisture protection. Three-stage surge protection with three suppression modes provides 330-V peak clamping, line to neutral, line to ground, and neutral to ground. Pulse life is 500 3KA-8x20 microsecond impulses, and response time is less than 1 nanosecond. Internal fuse takes device off line on failure and lights a light-emitting diode failure indicator.
- L. Lamps: Comply with the standard of the ANSI C78 series that is applicable to each type of lamp. Provide luminaires with indicated lamps of designated type, characteristics, and wattage. Where a lamp is not indicated for a luminaire, provide medium wattage lamp recommended by manufacturer for luminaire.
  - 1. Metal-Halide Color Temperature and Minimum Color-Rendering Index: 3600 K and 70 CRI, unless otherwise indicated.
- M. Additional Requirements: As shown on the drawings.

#### 2.3 LUMINAIRE SUPPORT COMPONENTS

- A. Description: Comply with AASHTO LTS-3 for pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation. Wind loads shall be in accordance with UBC-1997.
- B. Wind-Load Strength of Total Support Assembly: Adequate to carry support assembly plus luminaires at indicated heights above grade without failure, permanent deflection, or whipping with a basic wind speed of 90 mph and with the application of the revelant height, exposure, gust factor, and pressure coefficients. Support assembly includes pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.
  - 1. Strength Analysis: For each pole type and luminaire combination, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- C. Finish: Match finish of pole/support structure for arm, bracket, and tenon mount materials.
- D. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

- 1. Materials: Will not cause galvanic action at contact points.
- 2. Mountings: Correctly position luminaire to provide indicated light distribution.
- 3. Anchor Bolts, Nuts, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated.
- 4. Anchor-Bolt Template: Plywood or steel.

#### 2.4 FINISHES

- C. Steel: Grind welds and polish surfaces to a smooth, even finish.
  - 1. Galvanized Finish: Hot-dip galvanize after fabrication to comply with ASTM A 123.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Luminaire Attachment: Fasten to indicated structural supports.
- B. Luminaire Attachment with Adjustable Features or Aiming: Attach luminaires and supports to allow aiming for indicated light distribution.
- C. Lamp luminaires with indicated lamps according to manufacturer's written instructions. Replace malfunctioning lamps.
- D. Provide hot dipped galvanized poles and mast arms. All luminaires shall be light gray, unless otherwise noted.

#### 3.2 CONNECTIONS

- A. Ground equipment.
  - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Ground metal poles/support structures according to Division 16 Section 16452 Grounding.

#### 3.3 FIELD QUALITY CONTROL

- A. Inspect each installed unit for damage. Replace damaged units.
- B. Advance Notice: Give dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests and Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source, and as follows:

- 1. Measure light intensities at night if specific illumination performance is indicated. Use photometers with calibration referenced to NIST standards.
- 2. Check intensity and uniformity of illumination.
- 3. Check excessively noisy ballasts.
- E. Prepare a written report of tests, inspections, observations and verifications indicating and interpreting results.
- F. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.
- 3.4 CLEANING AND ADJUSTING
  - A. Clean units after installation. Use methods and materials recommended by manufacturer.
  - B. Adjust luminaires and luminaires with adjustable lamp position to provide required light distributions and intensities.

### END OF SECTION



**GEOTECHNICAL REPORT** 

# City of Unalaska Robert Storrs Harbor Geotechnical Site Investigation

#### **PREPARED FOR:**



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SEPTEMBER 2014

PND 132021.03

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# 1.0 Introduction

A limited geotechnical field investigation was performed for the City of Unalaska in support of the Robert Storrs Small Boat Harbor (SBH) Replacement project. The City of Unalaska is currently planning a phased approach to replace and reconfigure the existing Robert Storrs SBH floats. Additional proposed harbor improvements will include expansion of the harbor upland parking area.

The field investigation involved a subsurface drilling and sampling program. The objective of the program was to determine the harbors subsurface soil and bedrock characteristics with a primary concern to obtain knowledge of the bedrock elevation and the quality of the bedrock. Results obtained from the investigation will be used in support of the pile foundation design to replace the existing, reconfigured float support piles.

The drilling program consisted of drilling seven offshore boreholes. Borehole locations were field adjusted as required around existing harbor infrastructure and operations. See Appendix A, sheet 3 for the current proposed harbor replacement and reconfiguration design and borehole sampling locations.

PND provided field personnel to log the boreholes and oversee the drilling investigation program consisting of two 12-hour shifts.

Formal Notice to Proceed with this investigation was given on December 20, 2013.

This geotechnical field investigation was completed in March 8-12, 2014.



# 2.0 Drilling Equipment and Sampling Methods

GeoTek Alaska, Inc. based out of Anchorage, Alaska provided the drilling personnel and equipment for this investigation. The drilling program was staged aboard the boat, "The Redeemer", provided by Magone Marine Services, Inc. Drilling was completed using a truck-mounted CME-75 drilling rig (Figure 1), equipped with 4.25-inch (inner diameter), 1/8-inch-thick-walled, flush-coupled casing, NWJ drill rods, and a circulation pump. Equipment provided for sampling soil sediment included a 37/s-inch-diameter tricone bit, an oversize split-spoon sampler (2.4-inch inner diameter) and a 340 lb. auto hammer. Equipment provided for bedrock sampling included NQ-size drill rods with wireline, overshot and a diamond drill bit.

The test borings were positioned using swing ties to previously surveyed locations.

When sampling soil sediment, typical rotary wash methods were performed by advancing the casing to the desired depth then cleaned using a tricone bit and circulating water. Sediment sampling was then taken just beyond the casing. A modified version of the standard penetration testing was performed using an oversized split spoon sampler and performed per standards *ASTM D1586-11 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.* The sampler was advanced into the soil with a 340 lb. auto hammer and a 30 inch drop for each hammer blow. Penetrometer testing consisted of driving an NWJ rod with a blunt tip to refusal using the 340-lb hammer.

When sampling bedrock, typical wireline diamond core drilling methods were performed incorporating standards provided in *ASTM D 2113-08 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation*.



Figure 1: The Redeemer with truck-mounted CME-75 drill rig moored in front of Robert Storrs Harbor.

Collected subsurface soil samples were double-bagged to preserve in-situ moisture content and transported to the PND laboratory in Anchorage for further testing and characterization. Rock core



samples were placed in core boxes for visual classification. Successive drill runs were labeled and measured for recovery and Rock Quality Designation (RQD) values performed using standards provided in *ASTM D6032 Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core.* 

One 5-inch rock core sample was collected from BH-08 at 32.8 feet and sent to DOWL-HKM's Alaska Testlab for unconfined compression testing (ASTM D7012).

Soils were described and classified according to ASTM D2487 and ASTM D2488. Further lab characterization included the following tests:

Moisture Content	(ASTM D2216)
Particle Size Analysis	(ASTM D422; D6913)
Fine Content - #200 Sieve Wash	(ASTM D1140)

# 3.0 Site Conditions

There are three existing floats in Robert Storrs SBH, see Appendix A sheet 2 for the existing harbor conditions plan. Floats A and B extend away from the shoreline along Pace Setter Way. The proposed replacement and reconfiguration of floats A and B would space the floats further apart and extend them into deeper portions of the harbor. Float C would be replaced approximately 20 feet offshore from its existing location, running parallel to the shoreline with an access point along South Pace Setter Way.

# 4.0 Regional Geology

Robert Storrs SBH is located on the southern edge of Expedition Island in Iliuliuk Bay just southwest of Unalaska, AK. Expedition Island is an interisland in the north-northeast region of Unalaska Island. Like much of Unalaska Island and the Aleutian Islands, most bedrock in the Robert Storrs SBH area consists of middle Tertiary (less than 65 million years ago) extrusive volcanic flows and various volcaniclastic to sedimentary rocks as part of the Unalaska formation (Lankford and Hill, 1979). The formation was later intruded by early Miocene to late Pleistocene granitic batholiths, including Shaler granodiorite observed throughout Unalaska Island along with numerous smaller bodies of granodiorite (Drewes et al., 1961). These intrusions created localized uplift, alteration and metamorphism throughout the preexisting Unalaska formation that is visible in rock samples collected at the Robert Storrs SBH.

Soils throughout Unalaska Island are a combination of volcanic tephra (Makushin, Akutan and various other Aleutian Ridge volcanic activities), colluvium and marine-eroded deposits. Glacial erosion is prominent throughout the island in the form of U-shaped valleys, cirques, and various ice-scoured features, which is evident in the valley below Arch Rock to the northwest of Robert Storrs SBH.

# 5.0 Investigation Results



### City of Unalaska Robert Storrs Small Boat Harbor Replacement – Geotechnical Report

In the following review, unless noted otherwise, depths are given relative to the mudline surface. Sectional views depicting interpreted, harbor subsurface soil and bedrock geometry are provided in Appendix A. Borehole logs with detailed soil and rock descriptions from this current investigation drilling are attached in Appendix B, and a lab summary for all samples tested is provided in Appendix C.

#### **Overview**

The subsurface of Robert Storrs SBH in the vicinity of Float A and Float B consists of a shoreward, relatively thin horizon of soil sediment that thickens offshore in a wedge-shape form, mantling offshore sloping bedrock.

The sediment consists of an upper horizon of very soft, organic-rich silt with underlying angular gravel and sand. The organic material is black-colored, very soft "soupy", and produces a strong methane odor (marine vegetation and shell fragments), and is present likely due to the sheltered nature of their position in the harbor with less marine erosion.

Bedrock consists of a very fine to fine grained, generally massive and faintly laminated, silicified, hard, volcanic rock. The rock brakes in a blocky manner and possesses complex joint orientations. The bedrock appears to grade from an initial surficial zone of moderate to highly weathered material, to a more competent rock down depth. The extent of the weathering within the harbor area could not be confirmed due to the limited bedrock sampling.

Results obtained from the limited amount of bedrock sampling are consistent with historic boreholes presented in a 1984 report by Monte Weaver for Alaska Department of Transportation and Public Facilities, which discussed original Iliuliuk Bay float relocation efforts.

#### Float A

BH-05 and BH-06 were positioned and drilled off an alignment paralleling the proposed Float A. Only BH-05 recovered soil samples, as the ship could not maintain its position over BH-06 due to high winds. Penetrometer testing was completed in BH-06 to refusal at 35.8 feet. BH-06 encountered fairly soft material to 6 feet (casing sank under self-weight) and then required 2-11 blows per 6 inches from 6 to 33 feet. BH-05 had 7 feet of poorly graded sand with silt and gravel overlying 8 feet of poorly graded gravel with silt and sand. Gravel angularity and uniformity suggests it is weathered bedrock, consistent with the more competent green epidote-chlorite-altered volcanic bedrock at 15 feet. Notable fibrous balls of tremolite (i.e. asbestos) were observed in dry samples at 10 feet, captured in the #60 through #200 sieves during particle size analysis (Figure 2).



Figure 2: Asbestos in BH-05, #200 sieve under 30x Magnification (5 mm pencil used for scale).

Historic drilling by Weaver (1984) found similar soils near floats A and B, consisting of 0.3-2.2 feet of loose 'organic muck' overlying up to 1 foot of angular and silty gravels, underlain by 0-6.2 feet of



severely weathered bedrock. Drilling results from this current investigation found up to 45 feet of fine silty or sandy material overlying up to 14 feet of gravel offshore from Float A and Float B.

#### Float B

BH-07, BH-08 and BH-09 were positioned and drilled off an alignment for the proposed Float B. Drilling results are generally consistent with historic drilling from Weaver (1984), discussed above. BH-07 recovered 6 inches of blue-green clay-chlorite-altered volcanic bedrock immediately at the mudline. Casing was unable to advance beyond the initial bedrock sample.

BH-08 intersected an approximate 8 ft. thick horizon of sand and silt with variable organics overlying an approximate 14 ft. thick horizon of angular gravel and sand. Diamond core drill sampling showed underlying the granular soil sediment is very fine to fine grained (aphanitic-porphyritic), hard, silicified, weakly altered volcanic bedrock, see Figure 3. Unconfined compressive strength testing at 32.8 feet in BH-08 was 18,429 psi (completed by DOWL-HKM, Appendix D).

Similar to BH-06 near Float A, the casing in BH-09 sank under self-weight to about 25 feet (firm around 20 feet briefly), intersecting black soupy silt with organics and a strong methane odor. Angular gravel and sand with weathered green-colored rock fragments were intersected below 25 feet to refusal at 45 feet.



Figure 3: Bedrock sampled in BH-08.

Float C



BH-01 and BH-03 were positioned and drilled off an alignment for the proposed Float C.

Soils in BH-01 consist mostly of poorly graded, green sand with underlying gravel, though the angularity and uniformity of the underlying gravel suggests it is weathered bedrock (Figure 4). More competent green-gray colored, weathered bedrock was recovered below 13 feet.

BH-03 returned more diverse soil types from silty sand to well-graded and poorly graded gravel, with refusal encountered at 26.5 feet. Silty gravel recovered below 25 feet in BH-03 was a deep redorange color with abundant pyrite crystals (2-3%), suggesting the potential for arsenic-bearing arsenopyrite in addition to regularly oxidized iron-bearing sulfides.

BH-01 and BH-03 results are fairly similar to drilling done by Weaver (1984), which found sandy silt overlying 9.5 to 23.8 feet of sandy gravel.

#### Grain Size

Gradation curves from full sieve analyses are provided in Appendix C. Fines content (mostly silt) in gravel samples is generally <10%, with the exception of a silty gravel in BH-03 at 25 feet with 16.9%

fines. A combination of limited mechanical and full sieves analyses revealed 17-37% sand content in gravel samples. Most gravel is poorly graded, with the exception of well-graded gravel with sand in BH-03 at 10 feet.

# 6.0 Summary

Subsurface soil sediment in the



Figure 4: Highly weathered bedrock from BH-1.

vicinity of Robert Storrs SBH is generally comprised of an upper horizon of very soft organic silts overlying angular gravels and sands. Bedrock underlying the soils consists of very fine to fine grained, massive, silicified, hard, extrusive volcanic rock. In the region of Float A and Float B the depth to bedrock is shallow near shore (BH-07 encountered refusal conditions at the mudline surface), and slopes offshore to a depth of 45 feet below the mudline surface at BH-09. In the region of Float C the bedrock depth ranged from approximately 13 feet at the northern float end to 26.5 feet at the southern float end.

Typical to the bedrock is a surficial zone of moderate to highly weathered material of variable thickness that grades to more competent material down depth; where highly weathered the rock appears in places to be completely indistinguishable from gravel and sand soil sediment. The bedrock, where competent, breaks in a blocky manner and possesses complex joint orientations.



# 7.0 References

- Drewes, H. et al., 1961. Geology of Unalaska Island and Adjacent Insular Shelf, Aleutian Islands, Alaska. Geological Survey Bulletin: 1028-S. United States Government Printing Office: Washington D.C., pg. 646-668.
- Lankford, S.M. and Hill, J.M., 1979. *Stratigraphy and Depositional Environment of the Dutch Harbor member* of the Unalaska Formation, Unalaska Island, Alaska. Geological Survey Bulletin: 1457-B. United States Government Printing Office: Washington D.C.Results from the drilling program
- Weaver, M. August, 1984. Geotechnical Report for Iliuliuk Harbor Float Relocation, Unalaska (Dutch Harbor). Report prepared by Alaska Department of Transportation and Public Facilities, Standards and Technical Services - Materials Section. Anchorage, Alaska. Project No. K31438.

# 8.0 Closure

This report was prepared in accordance with generally accepted professional principles and practices in the field of geotechnical engineering at the time this report was prepared. This report describes the background information, and geotechnical data gathered during this investigation that may be of interest to the Contractor.

The nature and extent of subsurface variations across the site may not become evident until construction. If during construction, fill, sediment, rock, or bedrock appear to be different from those described herein, PND's geotechnical engineer should be advised at once so re-evaluation of the information contained in this report can be made and evaluated by designers of this facility.

PND is not responsible for safety programs, methods or procedures of operation, or the construction of the design recommendations provided in this report. Where recommendations are general or not called out, the recommendations shall conform to standards of the industry. This geotechnical report is for use on this project only and is not intended for reuse without written approval from PND. This geotechnical report is not to be used in a manner that would constitute a detriment directly or indirectly to PND.

PND is a member of the American Society of Foundation Engineers (ASFE). Included in Appendix E is a copy of the ASFE publication "Important Information about your Geotechnical Engineering Report". The report is included in this report to help the Owner, Contractor, and others who read this document understand the limitations described above and the additional limitations contained in this publication and made a part of this report. This document should be read carefully with assumptions and limitations thoroughly understood. If in the opinion of Contractors' bidding on this project sufficient information has not been made available to satisfactorily bid the project then the Contractor should perform additional geotechnical investigations as necessary to satisfy themselves as to site conditions.





# VICINITY MAP, SITE PLAN AND

# **BOREHOLE LOCATIONS,**

SITE SECTIONS


ENGINEERS, INC. DRAWN BY: PJD DESIGNED BY: PND DATE: June 2014 CHECKED BY: SH PROJECT NO: 132021 SHEET 1 OF 9

Unalaska, Alaska Phone: 907.586.2093 Fax: 907.586.2099

www.pndengineers.com

















BOREHOLE SUMMARY TABLE										
BOREHOLE	MUDLINE ELEV. (FEET MLLW)	BEDROCK/REFUSAL ELEV. (FEET MLLW)								
BH - 05	-29.5	-45.0								
BH - 06	-41.5	-77.3								

1. DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).

SECTION IS A DIAGRAMMATIC REFERENCE FOR INFORMATIONAL PURPOSES ONLY. CONDITIONS ARE SUBJECT TO CHANGE THROUGHOUT INVESTIGATION AREA.
 VARIATION IN MUDLINE ELEVATIONS WERE OBSERVED BETWEEN BATHYMETRIC SURVEY DATA AND LEADLINE MEASUREMENTS TAKEN ABOARD SHIP AT BOREHOLE COLLARS.
 SOIL AND BEDROCK ELEVATIONS FOR TESTHOLES DRILLED PRIOR TO THIS INVESTIGATION ARE SHOWN APPROXIMATE.

	REVISIONS DESCRIPTION	DWN.	CKD.	APP.	PN	D	9360 Glacier Highway, Ste. 100 Juncau, Alaska 99801 Phone: 907-586-2093
${\cal O}$ City of Unalaska					ENGINEEL	RS, INC.	Fax: 907-586-2099 www.pndengineers.com
					DESIGN: CRS CHE	CRED: CRS	scale: AS SHOWN
					DRAWN: PJD APP	ROVED: <u>CRS</u>	

- PROPOSED UPLAND FILL	
PACE SETTER WAY	20
	O MLLW
	-20
	-40
	-60
	-80

# PRELIMINARY

А SHEET 4 ог 9

#### CITY OF UNALASKA ROBERT STORRS HARBOR

SHEET TITLE:

"A" FLOAT ELEVATION

DATE: AUGUST 2014





2	"B" F	LOAT	ELEVA	
3	S	CALE IN F	FEET	
	0	20	40 F	Г.
VERTICAL	SCALE E	QUALS H	ORIZONTAL	SCALE

BOREHOLE SUMMARY TABLE									
BOREHOLE MUDLINE ELEV. BEDROCK/REFUSA (FEET MLLW) ELEV. (FEET MLLW)									
BH - 07	-14.5	-15.0							
BH - 08	-31.8	-52.5							
BH - 09	-47.5	-92.5							

1. DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).

SECTION IS A DIAGRAMMATIC REFERENCE FOR INFORMATIONAL PURPOSES ONLY. CONDITIONS ARE SUBJECT TO CHANGE THROUGHOUT INVESTIGATION AREA.
 VARIATION IN MUDLINE ELEVATIONS WERE OBSERVED BETWEEN BATHYMETRIC SURVEY DATA AND LEADLINE MEASUREMENTS TAKEN ABOARD SHIP AT BOREHOLE COLLARS.
 SOIL AND BEDROCK ELEVATIONS FOR TESTHOLES DRILLED PRIOR TO THIS INVESTIGATION ARE SHOWN APPROXIMATE.

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(7) or $(17 - 1 - 1)$			ENCINEERS INC	Fax: 907-586-2099
U City of Unalaska			ENGINEERS, INC.	www.pndengineers.com
			DESIGN: CRS CHECKED: CRS	SCALE:
			DRAMAL PJD ARREQUED, CRS	AS SHOWN
			DRAWN: APPROVED:	

# PRELIMINARY

#### CITY OF UNALASKA ROBERT STORRS HARBOR

SHEET TITLE:

"B" FLOAT ELEVATION

DATE: AUGUST 2014

PN&D PROJECT NO.: 132021.01

A SHEET 5 OF 9



#### LEGEND



<b>B" - FLOAT ELEVATION</b>	
3 OPTIONAL	
SCALE IN FEET	
0 20 40 FT.	
VERTICAL SCALE EQUALS HORIZONTAL SCALE	

BOREHOLE SUMMARY TABLE								
BOREHOLE MUDLINE ELEV. BEDROCK/REFUS (FEET MLLW) ELEV. (FEET ML								
BH - 07	-14.5 -15.0							
BH - 08	-31.8	-52.5						
BH - 09	-47.5	-92.5						

#### NOTES:

1. DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).

SECTION IS A DIAGRAMMATIC REFERENCE FOR INFORMATIONAL PURPOSES ONLY. CONDITIONS ARE SUBJECT TO CHANGE THROUGHOUT INVESTIGATION AREA.
 VARIATION IN MUDLINE ELEVATIONS WERE OBSERVED BETWEEN BATHYMETRIC SURVEY DATA AND LEADLINE MEASUREMENTS TAKEN ABOARD SHIP AT BOREHOLE COLLARS.
 SOIL AND BEDROCK ELEVATIONS FOR TESTHOLES DRILLED PRIOR TO THIS INVESTIGATION ARE SHOWN APPROXIMATE.

	REVISIONS			_)(		9360 Glacier Highway
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						Phone: 907-586-2093
					INC	Fax: 907-586-2099
U City of Unalaska				ENGINEERS,	INC.	www.pndengineers.c
				CRS CHECKER	. CRS SCA	LE:
					CPS	AS SHOWN
					D:	

# PRELIMINARY

#### CITY OF UNALASKA ROBERT STORRS HARBOR

SHEET TITLE:

"B" FLOAT ELEVATION OPTIONAL

	A	
6	SHEE OF	<sup>-</sup> 9
C		

DATE: AUGUST 2014





BOREHOLE SUMMARY TABLE									
BOREHOLE MUDLINE ELEV. BEDROCK/REFUSA (FEET MLLW) ELEV. (FEET MLLW									
BH - 5	-29.5	-44.5							
BH - 7	-14.5	-15.0							

1. DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).

Section is a diagrammatic reference for informational purposes only. Conditions are subject to change throughout investigation area.
 Variation in mudline elevations were observed between bathymetric survey data and leadline measurements taken aboard ship at Borehole collars.
 Soil and bedrock elevations for testholes drilled prior to this investigation are shown approximate.

	DESCRIPTION	DWN.	CKD. APP	][		NT	T	9360 Glacier Highway, Ste. 100 Juneau, Alaska 99801
${\cal U}$ City of Unalaska					ENGIN	IN IEERS	, INC.	Phone: 907-586-2093 Fax: 907-586-2099 www.pndengineers.com
					esign: <u>CRS</u>	CHECK	ED: ED:	GCALE: AS SHOWN
					rawn: <u>PJD</u>	APPRO	ved: <u>CRS</u>	

# PRELIMINARY

А SHEET 7 ог 9

#### CITY OF UNALASKA ROBERT STORRS HARBOR

SHEET TITLE:

HARBOR SECTION

ATE: AUGUST 2014





DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).
 SECTION IS A DIAGRAMMATIC REFERENCE FOR INFORMATIONAL PURPOSES ONLY. CONDITIONS ARE SUBJECT TO CHANGE THROUGHOUT INVESTIGATION AREA.

3. VARIATION IN MUDLINE ELEVATIONS WERE OBSERVED BETWEEN BATHYMETRIC SURVEY DATA AND LEADLINE MEASUREMENTS TAKEN ABOARD SHIP AT BOREHOLE COLLARS. 4. SOIL AND BEDROCK ELEVATIONS FOR TESTHOLES DRILLED PRIOR TO THIS INVESTIGATION ARE SHOWN APPROXIMATE.



 SOUTH PACE SETTER WAY	20
	0 MLLW
	-20
	-40
	-60

# PRELIMINARY



1. DATUM ELEVATION IS MEAN LOWER LOW WATER (MLLW = 0 FEET).

2. SECTION IS A DIAGRAMMATIC REFERENCE FOR INFORMATIONAL PURPOSES ONLY. CONDITIONS ARE SUBJECT TO CHANGE THROUGHOUT INVESTIGATION AREA. 3. VARIATION IN MUDLINE ELEVATIONS WERE OBSERVED BETWEEN BATHYMETRIC SURVEY DATA AND LEADLINE MEASUREMENTS TAKEN ABOARD SHIP AT BOREHOLE COLLARS. 4. SOIL AND BEDROCK ELEVATIONS FOR TESTHOLES DRILLED PRIOR TO THIS INVESTIGATION ARE SHOWN APPROXIMATE.

	REVISIONS		9360 Glacier
	DESCRIPTION	DWN. CKD. APP.	Juneau, Alask
			Eax: 907-586
U City of Unalaska			ENGINEERS, INC. www.pndeng
only of officialistic			
			CDS ODS SCALE:
			DESIGN: CHS CHECKED: CRS AS S
			DRAWN: PJD APPROVED. CRS

(	OLE SUMMARY TABLE								
	MUDLINE ELEV. (FEET MLLW)	BEDROCK/REFUSAL ELEV. (FEET MLLW)							
	-17.3	-32.3							
	-25.5	-52.0							

# PRELIMINARY

#### CITY OF UNALASKA **ROBERT STORRS HARBOR**

SHEET TITLE:

**C-FLOAT ELEVATION** 

Α SHEET 9 OF 9

DATE: AUGUST 2014

# APPENDIX B

# STANDARD BOREHOLE LOG DETAILS AND BOREHOLE LOGS

# SOILS CLASSIFICATION, CONSISTENCY AND SYMBOLS

## **CLASSIFICATION**

Identification and classification of the soil is accomplished in general accordance with the ASTM version of the Unified Soil Classification System (USCS) as presented in ASTM Standard D2487. The standard is a qualitative method of classifying soil into the following major divisions (1) coarse grained, (2) fine grained, and (3) highly organic soils. Classification is performed on the soils passing the 75 mm (3 inch) sieve and if possible the amount of oversize material (> 75 mm particles) is noted on the soil logs. This is not always possible for drilled test holes because the oversize particles are typically too large to be captured in the sampling equipment. Oversize materials greater than 300 mm (12 inches) are termed boulders, while materials between 75 mm and 300 mm are termed cobbles. Coarse grained soils are those having 50% or more of the non-oversize soil retained on the No. 200 sieve (0.075 mm); if a greater percentage of the coarse grains is retained on the No. 4 (4.76 mm) sieve the coarse grained soil is classified as gravel, otherwise it is classified as sand. Fine grained soils are those having more than 50% of the non-oversize material passing the No. 200 sieve; these may be classified as silt or clay depending their Atterberg liquid and plastic limits or observations of field consistency. Refer to the most recent version of ASTM D2487 for a complete discussion of the classification method.

## SOIL CONSISTENCY - CRITERIA

Soil consistency as defined below and determined by normal field and laboratory methods applies only to non-frozen material. For these materials, the influence of such factors as soil structure, i.e. Fissure systems, shinkage cracks, slickensides, etc., must be taken into consideration in making any correlation with the consistency values listed below. In permafrost zones, the consistency and strength of frozen soils may vary significantly and unexplainably with ice content, thermal regime and soil type.

	Standa Relat	Undrained Shear Strength			
N60	Density	Relative Density	N60	Consistency	psf
0-4	Very Loose	0-15%	< 2	Very Soft	< 250
4-10	Loose	15-35%	2 - 4	Soft	250 - 500
10-30	Medium	35-65%	4 - 8	Medium	500 - 1000
30-50	Dense	65-85%	8 - 15	Stiff	1000 - 2000
> 50	Very Dense	>85%	15 - 30	Very Stiff	2000 - 4000
			> 30	Hard	> 4000

Terzaghi, Peck, and Mesri Soil Mechanics in Engineering Practice, 3rd Edition, pg 60-63 Ref: ASTM D1586 Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (USCS)

## SAMPLER TYPE SYMBOLS

- А Auger Sample Bulk (grab) Sample Bs Cs Core Barrel w/ Single Tube Cd Core Barrel w/ Double Tube Ct Core Barrel w/ Triple Tube Hl 2.5" Split Spoon w/ Air Hammer
- 1.4" Split Spoon w/ Air Hammer Hs
- Pb Pitcher Barrel 2.5" Split Spoon w/ 140# Hammer 2.5" Split Spoon w/ 300# Hammer Sm 2.5" Split Spoon w/ 340# Hammer
- 2.5" Split Spoon, Pushed Sp
  - 1.4" Split Spoon w/ 140# Hammer
- 1.4" Split Spoon w/ 47# Hammer St
- Sx 2.0" Split Spoon w/ 47# Hammer
- Sz 1.4 Split Spoon w/ 340# Hammer
- Ts Shelby Tube
- Tm Modified 2.5 O.D. Shelby Tube

Note: Split Spoon size refers to sampler inside diameter.



PND Designed: PND Drawn: Checked: PND Project No.: 132021 Date: March, 2014

Sl

Sh

Ss

# STANDARD BOREHOLE LOG DETAILS

BOREHOLE LOGS

		SOIL/ROCK	<b>CDESCRIPTION</b>			S	SAMI	PLES		(	GR	AF	Н			COMMENTS	
Depth (Feet)	GRAPHIC SYMBOL	Soil Name, Colo Relative Den Mineralogy, Rock Na	r, Moisture Condition, 1sity, Soil Structure, Other Information me, Description	Number	Type	Location	Recovery (%) (RQD)	Penetration Blows per 6/Inch (per Foot)* or {Rock Quality}		BLC 20 PC 1 V/ 2	)W C 40 CKE 2 NNE S 4	OUN T PE SHEA	T (BP 60 N. (TS <u>3</u> R (TS 6	F)* 80 F) 4 F) 8	•	Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation Additional Information	Elevation (Feet)
		0' - 0.30' A.C. PA	AVEMENT													Begin drilling 10/24/03	- 24.43
- - <u>-</u>		POORLY-GRA W/ SILT AND Gray, Moist, De	.DED GRAVEL SAND (GP-GM) nse, Subangular	1	Ss		30	20-20-25 (45)								8:00 a.m. 1.5' to 2' - Hard, loud drilling (Cobbles/Boulder encountered)	
- 2					<u> </u>		-				$\square$	+					22.43 —
_		SLATY ARGII grayish black, fi bedded, mediur steeply dipping	LLITE ne grained, thin m hard, BX-U,	2	Ct		56 (50)	{Poor}								drillhole blockage	
12	3		4	5	6	7	8	9				10	)]	1		11	12
	COLUMN DESCRIPTIONS																
	Denth	LA ,	Depth (in feet) below	v th	e ori	വിന	d surf:	ace									
	Wator	T and	Crown dwater loval #	V U.	. 51.	hi	1 o deil	line Donthe or	بنه ا	~~~~~		- *0	204	-lad			
	water		Groundwater lever re	-	acu .	win	le am	ing. Depuis ai	ia m	ш <b>с</b> :	5 an	210	COL	acu	111	comments column.	
3	Graphi	<u>c Log</u>	Graphic depiction of	: ma	iteria	ils e:	ncoun	itered.									
4	Soil/ R Descrij	lock ption	Description of mater defined in Fig. B-5 as	rials nd F	enc 3-6,	oun	tered,	including USC	S so	il d	.esc	ript	ion	s an	d r	ock desciptions	
5	Sample	e Number	Sample identification	ı nu	mbe	:r.											
6	Sample	: Type	Type of soil or rock	sam	iple (	colle	ected a	at depth interva	ıl de	pic	ted;	; syr	mbo	ols e	xpl	ained on Fig. B-1.	
7	Sample	- Location	Location of soil or re	o <b>c</b> k <sup>-</sup>	sam	ple 1	taken.										
8	Sample	Recovery	Soil: Percentage of sa	amp	ole re	cov	ered.	Rock: Percenta	ge o	f sa	ımţ	ole r	reco	ver	ed a	and RQD value.	
9	Sample Rock (	: Blows or Quality	Soil: Number of blov drop. Blows per foot	ws to t giv	o ad 7en i:	lvan n pa	ce driv ırenth	ven sampler ea eses. Rock: Ro	ch 6 ck qi	-ino uali	:h i ity 2	nter 15 de	rval efin	usi: ed f	ıg s ror	ampler type specified with a 30 n RQD value.	-inch
10	<u>Graphs</u>	3	Graphic log depicting blow counts per foot with a specified split spoon, Pocket Penetration and Vane Shear tests depicted where taken on fine grained soils.														
11	Comm	ents	Comments or observ	vatic	ons (	on d	rilling	/sampling by c	lrille	ro	r Pl	ND	fie	ld p	erse	onnel.	
12	Elevati	on	Elevation (in feet) w	ith r	cespe	ect t	o Mea	n Lower Low	Wat	er (	MI	LW	V) o	r ot	her	datum where specified.	

### GENERAL NOTES

- 1. Field descriptions may have been modified to reflect laboratory test results.
- 2. Descriptions on these boring logs apply only at the specific locations at the time the borings were drilled. They are not warranted to be representative of subsurface conditions at other locations or times.
- 3. Split spoon blow counts shown are uncorrected raw data. Various hammer sizes and split spoon sizes were used and have not been corrected to a Standard Penetration Test (SPT). Blow counts may vary substantially between SPT and these methods.

PND	Designed: PND Drawn: PND	STANDARD I	BOREHOLE
	Checked: PND	LOG DE	ETAILS
ENGINEERS, INC.	Project No.: 132021 Date: March, 2014	BOREHOLE LOGS	FIGURE B-2

## Soil Legend

NA A			SYM	BOLS	TYPICAL
IVI7		7113	GRAPH	LETTER	DESCRIPTIONS
	GRAVEL AND	CLEAN GRAVELS		GW	Well-graded gravels, gravel sand mixtures, little or no fines
COARSE	GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
SOILS	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO	GRAVELS WITH FINES		GM	Silty gravels, gravel-sand-silt mixtures
	4 SIEVE (4.75mm)	(APPRECIABLE AMOUNT OF FINES)		GC	Clayey gravels, gravel-sand-clay mixtures
	SAND AND	CLEAN SANDS		SW	Well-graded sands, gravely sands, little or no fines
MORE THAN 50%	SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE (4.75mm)	(LITTLE OR NO FINES)		SP	Poorly graded sands, gravelly sands, little or no fines
200 SIEVE (0.075mm)		SANDS WITH FINES		SM	Silty sands, sand-silt mixtures
		(APPRECIABLE AMOUNT OF FINES)		SC	clayey sands, sand-clay mixtures
				ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
				MH	Inorganic silts, micaceous or diatomceous fine sandy or silty soils, elastic silts
MORE THAN 50% PASSING NO. 200 SIEVE (0.075mm)	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		СН	Inorganic clays of high plasticity, fat clays
				ОН	Organic clays of medium to high plasticity, organic silts
ню	DILS	<u>v vv vv</u>	РТ	Peat and other highly organic soils	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

# Stratigraphic Contact

- Distinct contact between soil strata or geologic units

Gradual change between soil strata or geologic units

- Approximate location of soil strata change within a geologic soil unit

## Laboratory / Field Tests List of Abbreviations

%F	Percent Fines	-	HA	Hydron	neter Analysis	PP	Pocket Penetrometer
AL	Atterberg Limits		LMA	Limited	Mechanical Analysis	SA	Sieve Analysis
CP	Laboratory Compaction te	est .	MC	Moistur	e Content	TV	Torvane
CO	Consolidation test		MD	Moistur	e content and Dry density	ΤX	Triaxial Shear
DP	Depth "Peat" Probe		OC	Organic	: Content	UC	Unconfined Compression
DS	Direct Shear		PM	Permea	bility or Hydraulic Conductivity	VS	Vane Shear
	I	Designed:	PND		STANDA	ם מ	OBEROLE
			-			ND D	ONLITOLL

P N D	Designed: PND Drawn: PND Checked: PND	STANDARD I LOG DI	BOREHOLE ETAILS
ENGINEERS, INC.	Project No.: 132021 Date: March, 2014	BOREHOLE LOGS	FIGURE B-3

## METRIC CONVERSIONS

ENGINEERS, INC	C. Project No Date:	<ul><li>b.: 132021</li><li>March, 2014</li></ul>	BORE	HOLE I	.OGS	FIGURE	B-4
P N D	Designed: Drawn: Checked:	PND PND PND		STAN	DARD I Log de	BOREHOLE ETAILS	
	1 toot/sec	= 0.3048 m/se	с	1 m/sec	= 3.281 fee	rt/sec	
Speed	1 mile/hour	= 1.609 km/hc (=0.447 m/sec)	$\begin{array}{llllllllllllllllllllllllllllllllllll$		= 0.622 mil = 2.237 mp	le/hour bh	
Moment	1 lbft.	= 0.1383 kq-m (= 1.3558 Nm)		1 kq-m 1 N-m		= 7.23 lbfoot = 0.7376 lbfoot	
Coefficient of consolidation $C_V$ :	1 sq. ft./year	= 0.0929 m²/ye (= 0.002946 mr	ear m²/sec)	1 m²/year 1 mm²/sec	= 10.76 sq. = 339.4 sq.	ft./year ft./year	
Coefficient of Compressibility $M_v$ :	1 sq. ft./U.S. ton 1 sq. in./lb	$= 0.0104 \text{ m}^2/\text{k}^3$ $= 14.22 \text{ cm}^2/\text{k}^3$	N g				
Flow Velocity	1 gal./min. 1 ft./sec.	$= 6.309 \text{ x } 10^{-5} \text{ m}$ = 0.3048 m/sec	m³/sec c	1 m <sup>3</sup> /sec 1 m/sec	= 15,850 ga = 3.28 ft./s	allons per minute sec	
	1 U.S. ton/sq. ft. [Note: 1 kPa	(= 0.04760  kPa) = 95.76 kPa = 1 kN/m <sup>2</sup>	)	1 kPa	= 20.886  fr = 0.01044	D./sq. 1001 U.S. ton/sq. foot	
	1 lb./sq. ft.	(= 6.895  kPa) = 4.882 kg/cm <sup>2</sup> (= 0.04788  kPa)	2	1 kPa 1 kg/cm <sup>2</sup> 1 kPa	= 0.145  lb. = 0.2048  lk = 20.886  lk	./sq. inch b./sq. ft.	
Pressure/Stress	1 lb./sq. in.	= 0.1571  km/m = 0.0703 kg/cm	n <sup>2</sup>	$1 \text{ km/m}^3$ $1 \text{ kg/cm}^2$	= 0.365 lb. = 14.22 lb.		
Density	1 lb./cu. ft.	$= 16.019 \text{ kg/m}^3$	3	1 kg/m³ 1 kN/m³	= 0.0624 ll	b./cu. foot	
Force	1 lb. 1 ton	= 4.448 N =8.896 kN		1 N 1 kN	= 0.225 lb. = 0.1124 U	J.S. ton	
Mass	1 lb.	= 0.4536 kg		1 kg	= 2.205 lb.		
	1 U.S. gallon	= 3.785 liters		1 liter	= 0.264  U.	S. gallon	
Volume	1 cu. inch 1 cu. foot	= $16.387 \text{ cm}^3 \text{ (cc)}$ = $0.0283 \text{ m}^3$		1 cm <sup>3</sup> 1 m <sup>3</sup>	= 0.061  cu = 35.31  cu = 1.308  cu	. inch . foot	
	1 acre 1 sq. mile	= 0.4047 hectare = 2.59 km <sup>2</sup>		1 hectare 1 km <sup>2</sup>	= 2.47 acre = 0.386 sq.	mile	
Area	1 sq. inch 1 sq. foot	$= 6.452 \text{ cm}^2$ = 0.0929 m <sup>2</sup>		1 cm <sup>2</sup> 1 m <sup>2</sup>	= 0.155 sq. = 10.764 sc	inch q. foot	
	1 toot 1 mile	= 0.3048 m = 1.6093 km		1 m 1 km	= 3.281  fee = 0.621 m	et ile	
Length	1 inch	= 25.4 mm		1 mm	= 0.0394 ir	nch	

# ROCK DESCRIPTIVE INDEX

# STANDARD SYMBOLS AND NOMENCLATURE

The Standard Graphic Symbols used in this report are consistent with those used by the U.S. Geological Survey. Other nomenclature and categorical descriptions follow those presented by the American Society of Civil Engineers, the International Society of Rock Mechanics and others.

# DESCRIPTION OF RELATIVE WEATHERING

Modified from the Geological Society Engineering Group, Great Britain:

BX-U - Fresh, no visible sign of weathering;

BX-W

- FW Faintly weathered: weathering limited to the surface of major discontinuities;
- SW Slightly weathered: penetrative weathering developed on open discontinuity surfaces, but only slight weathering of rock material;

MW Moderately weathered: weathering extends throughout the rock mass, but the rock material is not friable;

- HW Highly weathered: rock is wholly decomposed and in a friable condition, but the rock texture and structure are preserved;
- BX-R Residual soil: a soil material with the original texture, structure and mineralogy of the rock completely destroyed.

# DESCRIPTION OF HARDNESS

ASCE Field Measurements, unrelated to Moh's scale for minerals. Material must be unfrozen for this determination.

very hard-Can not be scratched with knife or sharp pick.hard-Can be scratched with knife or pick only with difficulty.moderately hard-Can be scratched readily with knife or pick.medium-Can be grooved or gouged by firm pressure on knife or pick point.soft-Can be gouged or grooved readily with knife or pick point.very soft-Can be carved with knife. Can be excavated readily with point of pick.

# DESCRIPTION OF UNIT THICKNESS

Modified from the Geological Society Engineering Group, Great Britain:

Measurement I (equal to and I	Parameters less than)	Bedding Plane Spacing Massive	Discontinuity Spacing (joints, fractures, fissures)
>78.7 inches 78.7 inches 23.6 inches 7.9 inches 2.4 inches 0.8 inches 0.2 inches 0.1 inches	>2000 mm 2000 mm 600 mm 200 mm 20 mm 6 mm 2 mm	massive very thick thick medium thin very thin thickly laminated thinly laminated	very thick wide moderately wide narrow very narrow extremely narrow

Discontinuity filling material and surface roughness should also be noted whenever possible.

P N D	Designed: PND Drawn: PND Checked: PND	STANDARD I Log de	BOREHOLE ETAILS
ENGINEERS, INC.	Project No.: 132021 Date: March, 2014	BOREHOLE LOGS	FIGURE B-5

## COMPARISON CHART FOR ESTIMATING COMPOSITION

Modified from R.D. Terry and others, Journal of Sedimentary Petrology, 1955.



# ROCK DESCRIPTIVE INDEX

#### BEDDING OF FRACTURE ATTITUDE

Very Gentle	=	1° to 5°
Gentle	=	$5^{\circ}$ to $20^{\circ}$
Moderate	=	$20^{\circ}$ to $45^{\circ}$
Steep	=	$45^{\circ}$ to $80^{\circ}$
Verv Steep	=	80° to 90°

#### Note:

The angle is measured perpendicular to the core axis.

### ROCK QUALITY DETERMINATION (RQD)

The figure is derived by adding the lengths of cored rock pieces which measure over 4 inches (10 cm) and dividing the sum by the total length of core recovered. Mechanical breaks are refitted to count as one piece, provided they form the requisite length of 4 inches.

\* Performed on core not less than 2" diameter.

RQD (%)	DESCRIPTION OF ROCK QUALITY
0 - 25	VERY POOR
25 - 50	POOR
50 - 75	FAIR
75 - 90	GOOD
90 - 100	EXCELLENT

### BEDROCK LITHOLOGIES



WEATHERED BEDROCK



#### GEOLOGIC TIME SCALE:

[	—			Duration	
Era	Pe	riod	Epoch	in millions	Time B.P. *
	Quate	ernary	Pleistocene	1.8	18-
1 <u>1</u>		Neo-	Pliocene	3.7	5.3 -
N S	ary	gene	Miocene	18.4	23.7
<u>j</u>	erti	ene	Oligocene	12.9	36.6
CEN	L	aleog	Eocene	21.2	- 00.0 - τρ
-		Ľ.	Paleocene	8.6	66.4
ZOIC		Cre	etaceous	78	
MESOZ		Ju	ırassic	64	- 144
		T	riassic	37	- 208 -
		 Рє	ermian	41	240 -
	iferous	Pen	nsylvanian	34	- 286 -
	Carbon	Mis	ssissippian	40	
DIC		De	evonian	48	— 360 —
J.EOZ(		Si	llurian	30	409
PA		Orc	lovician	67	- 438 -
		Ca	mbrian	65	570 —
]	PREC	AME	SRIAN		

\* ESTIMATED TIME BEFORE THE PRESENT (B.P.) MILLIONS OF YEARS



Designed: PND Drawn: PND Checked: PND

Project No.: 132021 Date: March, 2014

# STANDARD BOREHOLE LOG DETAILS

BOREHOLE LOGS

FIGURE B-6

			SOIL DESCRIPTION			S	AMJ	PLES		(	GR	AP	H			COMMENTS	
Depth (feet)	Water Table	Graphic Symbol	Soil Name, Color, Moisture Content, Relative Density, Soil Structure, Mineralogy, Other Information	Number	Tvpe	Location	Recovery % (ROD %)	Penetration Blows per 6/Inch (per foot)* or	,	B 20 PO( 1 VA 0 2	LOW <u>40</u> CKET <u>2</u> NE SI 0 4	СОU 60 Г РЕN <u>3</u> НЕАН 0 б	/NT 8 1 (tsf) R (tsf) 6 0		- Ca F	using Depth, Drilling Rate, Juid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
0  	.0		WELL-GRADED SAND WITH GRAVEL (SW) dark gray, wet, loose; angular, flat and elongated gravel; fine to coarse sand; organic odor, gravel to 2.25 in dia.; 10% shell fragments and marine vegetation (by volume)	1	Sh	1	34	2-2-2-2 (4)							Beg Tim 4.2: rein	gin Drilling: 3/8/14; ne: 5:45 PM 5 inch dia. casing nforced	
2 	5.0														_		-19.8 -
- - - - - 7	7.5		NO RECOVERY: soil classification based on cuttings - green sand with shell fragments	2	Sł	h	0	12-10-8-6 (18)							casi faci	ing driven to 7 ft to ilitate drilling noler pushing rock @ 7	-24.8 -
-  -  -  10	).0		POORLY-GRADED GRAVEL WITH SAND (GP) greenish gray, wet, very dense; coarse, angular, flat and elongated	_											eet @	10 ft tricone bit grinding	-27.3 -
-  	2.5		gravel; fine to coarse sand; angularity and uniformity of fragments indicative of weathered bedrock BEDROCK (VOLCANIC) greenish gray, crystalline and ophenitic porphyritic massive	3A 3B	Sh	ı h	105 56	8-9-29-40 (38)*							*SP 3A	PT value representative of and 3B	-29.8 -
- 	.0		bedded, medium hard to hard, rock is slightly weathered to fresh (BX- SW to BX-U); rock is broken in blocky fragments; complex jointing END DRILLING @ 15.0-Feet (See Comments)												@ 1 > 10 to 1 Tern Tim	14 ft hard casing advance 00 blows/ 12 inches down 15 ft minated Drilling: 3/8/14; ne: 8:30 PM	-32.3 -
17	'.5														_		-34.8 -
20	).0—	<u> </u>	<u> </u>														-37.3-
		P	N D Logged By: F Data Entry: † Checked:	- >JD/Si PJD SH	H	<b>_</b>		R	OI	3E Di	R] utc	ГS ch	ST( Ha	OR arb	RS or,	S HARBOR Alaska	
	E	'NGIN	EERS, INC. Project No.: 1 Date:	13202 <sup>,</sup> Mar. 2	1 2014	1 1		]	Bŀ	<b>I-</b> C	)1					FIGURE B-7 1 of 1	7

Γ				SOIL DESC	RIPTION			S	AMI	PLES		GF	RAPI	ł		COMMENTS	
9	(12ć	able		Soil Name, Color	. Moisture				y %	Penetration Blows per		BLOV 20 40		VT 80		Casing Depth, Drilling Rate,	g
J) 'Tr	ar) Ind	ater T <sub>6</sub>	aphic mbol	Content, Relative Soil Structure, M	e Density, lineralogy,	mber	be	cation	cover OD %	6/Inch (per foot)	•	POCKI 1 2	ET PEN	(tsf)		Fluid Loss, Drill Pressure, Tests, Instrumentation,	svation et)
Ĺ	-00 -00	W۶	Syı	Other Inform	nation	Nu	Ty	Lo	Rec	or {Rock Quality}	<b>^</b>	VANE : 0,2 0,4	SHEAR	(tsf) 4		Additional Information	 
L	0.0			POORLY-GRADED SILT AND GRAVEI	SAND WITH L (SP-SM)										B T	egin Drilling: 3/11/14; ime: 4:25 PM	-23.5
╞				black, wet, very loose angular, flat and elong	; coarse, gated gravel;	1	Sh		34	2-1-1-0 (2)					4. re	25 inch dia. casing inforced	-
				in. dia.; 10% shell fragmarine vegetation (by	gments and volume):										bl	ack-colored mud cuttings	-
╞	2.5		<u>ل</u> لي	strong organic odor	GRAVEL										d	own to 2.5 ft.	-28.0-
L		-		WITH SAND (GP) greenish gray, wet, lo	ose; coarse,												-
-				angular, flat and elong fine to coarse sand; or gravel to 0.75-in_dia:	sated gravel; ganic odor, weak organic										_		-
	5.0			odor	weak organic												- 20.5
╞	5.0		$\mathcal{O}^{\mathcal{O}}$														-30.5
F						2	Sh		42	3-3-3-2 (6)	•				-		-
			$^{\circ}0^{\circ}$														-
-	7.5																-33.0-
F																	-
╞			$2^{\circ}$														-
E	10.0					_											-35.5-
╞				WELL-GRADED GR SAND (GW) greenish gray, wet lo	AVEL WITH					3 3 3 3							-
E				coarse, angular, flat ar gravel; fine to coarse	nd elongated sand; gravel to	3	Sh		55	(5)							-
╞				1.25-in. dia											ac	dvanced casing down to 20	-
F	12.5														ft	due to time constraints	-38.0-
-																	-
																	-
_	15.0																-40.5 —
																	-
_																	-
-	175																-
_	17.5																-43.0-
╞																	-
				SILTY SAND (SM) olive gray, wet, medit	ım dense; fine										a m	) 19 ft: wash color turned a nilky color	-
_	-20.0			sand; angular gravel to	<u>o 1.0-in. dia.</u>												<del>-</del> -45.5
					Logged By: P	JD/SI	Н			R	()F	SER	<u>г s</u>	TO	RR	SHARBOR	
		Ι	<b>D</b>	ND	Data Entry: P. Checked: S	JD H						Dut	ch I	Hart	bor	, Alaska	
		EN	' NGINI	EERS, INC.	Project No.: 13	3202 <sup>-</sup>	1			]	BH	[-03				FIGURE B-8	3
Ś				-	Date: M	ar. 20	014			1		. 05				1 of 2	

Γ				SOIL DESC	RIPTION			S	AMP	PLES		GR	APH	[		COMMENTS	
Douth (foot)		Water Table	Graphic Symbol	Soil Name, Color Content, Relativ Soil Structure, M Other Inforn	r, Moisture e Density, lineralogy, nation	Number	Type	Location	Recovery % (RQD %)	Penetration Blows per 6/Inch (per foot) or {Rock Quality}		BLOV 20 40 POCKE 1 2 VANE \$ 0,2 0,4	V COUN 60 T PEN ( 3 5HEAR ( 0,6	T $80$ tsf) $4$ tsf) $4$ 0.8	- (	Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
_	20.0-			SILTY SAND (SM) olive gray, wet, mediu sand; angular gravel t dia.(continued)	um dense; fine o 1.0-in.	4	Sh		75	6-5-7-7 (12)							43.3 - - -
_	22.5				,								·. ·. ·.				-48.0 — - -
	25.0			Contact based on drill comments) SILTY GRAVEL WI (GM) orange, wet, very den angular, flat and elong	ling action (see TH SAND se; coarse, gated gravel:	5	Sh		89	21-44-50 (94)			•			) 25 ft: casing driving hard	- -50.5 — -
-	27.5			fine to coarse sand; gg fragments contained a oxidized mineralizatio END DRILLING @ 2 of Sh contained green fragments)	avel-size bundant on 26.5-Feet (Tip -colored rock											50/1 inch ferminated Drilling: 3/11/14; fime: 5:15 PM	 -53.0 
_	30.0																- - -55.5 — -
14	32.5																 -58.0
IEERS.GDT 8/14/14 ©20	35.0																-60.5 —
	37.5														_		-63.0 —
ROBERT STORRS H/	•40.0-																- - 
OG 132021		Ŀ	<b>)</b>	ND	Logged By: P.	JD/SI JD	Η			R	OE	BER' Dute	T S' ch F	ГОF Iarb	RR	S HARBOR Alaska	
30REHOLE L	]	EN	JGINI	EERS, INC.	Checked: SI Project No.: 13 Date: M	⊣ 3202′ ar. 2(	1 014			]	BH	[-03				FIGURE B-8	3

Γ				SOIL DESC	RIPTION			S	AMP	LES		0	GRA	٩PF	I		COMMENTS	
	et)	ble		Soil Name, Color	· Moisture				%	Penetration Blows per		BI 20	LOW 40	COUN 60	NT 80		Casing Denth Drilling Rate	
	h (fe	er Tal	bol	Content, Relative	e Density,	ber		tion	very 0 %)	6/Inch	•	POC	CKET	PEN (	(tsf)	•	Fluid Loss, Drill Pressure,	ation )
	Dept	Wate	Grap Sym	Other Inform	nation	Num	Type	Loca	Recc (RQI	Or Or			T NE SH	IEAR	(tsf)		Additional Information	Elev (feet
	<u>-0.</u> 0	0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-		POORLY-GRADED SILT AND GRAVEI	SAND WITH					{KOCK Quality}			0.4	0.0	0.8		Begin Drilling: 3/8/14: Time: 9:50 PM	-29.5-
╞				brown, wet, very loos angular, flat and elong	e; coarse, pated gravel:	1	Sh		100	2-1-2-2	-						4.25 inch dia. casing	_
┢				fine to coarse sand; gi in. dia.; 4% shell frag	ravel to 1.75- ments (by					(5)							3 ft into mudline surface with	_
		-		volume)													additional 2 ft while advancing Sh	-
	- 2.:																	-32.0-
																		_
┢																		-
	- 5 (																	-34 5
┢													-					_
		•																_
	- 7.	5		POORLY-GRADED WITH SILT AND SA	GRAVEL ND (GP-GM)												casing firms at 7 ft then advanced with hammer to 8	-37.0 —
┢		¢		greenish gray, wet, m coarse, angular, flat a	edium dense; nd elongated								-				ft tricone bit grinding @ 7 ft with change in week color to	_
		-		2-in. dia; 1% shell fra	sand; gravel to gments (by	2	Sh		50	9-7-5-4							green gray	_
				of gravel indicative of	weathered		511		50	(12)								_
┢	-10.0	0															while sampling @ 10 ft -	-39.5 —
		-				3	Sh		67	5-6-5-5							casing drops approx 6 inches	_
									07	(11)								-
		_											-					-
	-12.;	5																-42.0-
014																		_
/14 ©2		¢																_
T 8/14	15.(	0															Sh hammer blows $> 50/6$ inches (hammer ringing)	-44.5 —
RS.GD				BEDROCK (VOLCA) greenish gray, crystall	NIC) ine and	4	Sh		67	50							Terminated Drilling: 3/9/14:	-
IGINEE				aphanitic-porphyritic, broken; weathered to	hard, angular, fresh rock								-				Time: 12:05AM	-
				END DRILLING @	15.5-Feet (See													_
(GPJ	-17.5	5		Comments)														-47.0 —
ARBOF																		_
RRS H																		-
RT STC																		-
ROBE	-20.0	0				1												-49.5
132021					Logged By: P.	JD/SI	1			R	OF	3EI	R1	- S'	ТО	R	RS HARBOR	
LOG		Ī	<b>D</b>	ND	Data Entry: P. Checked: SI	Н						Ðι	itc	hŦ	Īar	bc	or, Alaska	
EHOLE		EN	' IGINI	EERS, INC.	Project No.: 13	3202´	l			1	RН	I-U	5				FIGURE B-9	)
BOR				, .	Date: M	ar. 20	014			1		L - U	5				1 of 1	

Γ		SOIL DESCRIPTION SAM						AMP	LES			GR.	APE	[		COMMENTS			
	Depth (feet)	Water Table	Granhic	Symbol	Soil Name, Color Content, Relativ Soil Structure, M Other Inforn	, Moisture e Density, lineralogy, nation	Number	Type	Location	Recovery % (RQD %)	Penetration Blows per 6/Inch (per foot) or {Rock Quality}	•	B 20 PO 1 VA 0 2	LOW 40 CKET 2 NE SH 0 4	COUN 60 PEN ( 3 HEAR 0 6	T 80 tsf) 4 (tsf) 0 8	•	Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
ŀ	-0.0	0-			SILT (ML)						(noen guuny)							Begin Drilling: 3/11/14; Time	-41.5
-	-				Ship initially couldn't	maintain												4.25 inch dia. casing reinforced - sunk initial 6 ft below mudline under own weight	-
	- 2.: - - -	5			test to bed rock was p no soil sampling; soil of this probe hole are based on drilling obse nearby sampled boreh	enformed with classifications inferred and rvations and oles												NWJ rod (2.75 inch dia.) with cap used as penetrometer probe and driven with 340 lb auto hammer	-44.0 - -
	- 5.( - -	0																	-46.5 —
	- - — 7.:	5			SILTY SAND WITH (SM)	GRAVEL													- -49.0
	- - - 	0																@ 6 A to 20 At average DDE	- - - -51.5—
	-																	a = 6.4	- - -
14/14 ©2014		5																	-54.0 - - -
D ENGINEERS.GDT 8		0																	-56.5 — - -
ARBOR.GPJ PNI	- —17.: -	5																	- -59.0 — -
ERT STORRS H	-																		-
G 132021 ROBE	-20.0	ـــــــــــــــــــــــــــــــــــــ	<u> </u>			Logged By: SH Data Entry: PJ	H ID				R	DE	BE	R	S'	ГС	)R	RS HARBOR	-61.5
BOREHOLE LO		El	NC	 GINI	EERS, INC.	Checked: SH Project No.: 13 Date: Ma	H 2021 ar. 20	1 014			l	ЗE	I-(	)6	11 1			FIGURE B-1 1 of 2	0

Г			SOIL DESC	RIPTION			S	AMP	PLES		(	GR/	APH	[			COMMENTS	
Depth (feet)	Water Table	Graphic Symbol	Soil Name, Color Content, Relativ Soil Structure, M Other Inform	r, Moisture e Density, lineralogy, nation	Number	Type	Location	Recovery % (RQD %)	Penetration Blows per 6/Inch (per foot) or {Rock Quality}		B 20 PO 1 VA 0.2	LOW 40 CKET 2 NE SH 0.4	COUN 60 TPEN ( 3 IEAR ( 0,6	T 80 tsf) 4 tsf) 0.8	•	Cas Fh	ing Depth, Drilling Rate, uid Loss, Drill Pressure, Fests, Instrumentation, Additional Information	Elevation (feet)
	22.5		SILTY SAND WITH (SM)(continued)	GRAVEL														01.3 
	25.0															@ 20 = 7.9	0 ft to 33 ft: average BPF 9	-66.5 — - -
-	27.5																	-69.0 — - - -
-	30.0																	-71.5
14 ©2014 	32.5		POORLY-GRADED WITH SILT AND SA	GRAVEL AND (GP-GM)	-											@ 3. @ 34	3 ft: BPF = 27 4 ft: BPF = 69	-74.0 — - -
D ENGINEERS.GDT 8/14/	35.0		END PROBE @ 35.8 Comments)	3-Feet (See	_											@ 3: Tern Time	5 ft: BPF = 100/10 in. ninated Probe: 3/11/14; e not recorded	-76.5 — - -
STORKS HARBOR.GPJ_PNL	37.5																	- -79.0 - -
	40.0																	
ELOG 132021 RO		P	N D	Logged By: SI Data Entry: P. Checked: SI	H JD H				R	OI	BE Di	R7 utc	S h H	ГО Iar	R	RS or, 1	HARBOR Alaska	
BOREHOL	E	NGIN	EERS, INC.	Project No.: 13 Date: M	32021 ar. 20	1 014			]	BF	<b>I-</b> (	)6					FIGURE B-1 2 of 2	0

				SOIL DESC	RIPTION	ON   SAMPLES   GRAPH   COMMENTS												
	it)	le			N				%	Penetration		BL	OW C	COUN	г <b>о</b> 🗖			
	l (fee	. Tab	ol	Content, Relative	e Density,	er		ion	%) %)	6/Inch	•	POC	KET	PEN (t	sf)		Fluid Loss, Drill Pressure,	tion
	epth	/ater	raph ymb	Soil Structure, M Other Inforn	ineralogy, nation	umb	ype	ocat	SOD	(per foot) or		1 VAN	2 E SH	3 FAR (1	sf)		Tests, Instrumentation, Additional Information	leva eet)
ļ	口 ——0	0	Go			Z	F	Ч	RG	{Rock Quality}	(	).2	0.4	0.6	0.8	_		田田 —-14 5—
	-		$\bigwedge \circ \bigwedge$	Green-colored, fine gr	ained; ck fragments □	1	Sh		67	3-50							Begin Drilling: 3/9/14; Time: 3:50 AM	-
	_			with black soupy silt a	and broken											4	4.25 inch dia. casing firmed	_
+	_			END DRILLING (Re	fusal) @ 0.5-												a) mudline surface	_
╞	-			Feet (See comments)												- i	below mulline $> 50$ with no	_
ŀ	- 2.	5														ľ	advance	-17.0 —
	-																Casing stops further advance ("ringing")	_
ŀ	-																	-
	-															-	Terminated Drilling: 3/9/14; Time: 4:30 AM	_
ł	-																	-
	- 5.	0																-19.5 —
	_																	
	_																	_
	_																	_
	- 7.	5																-22.0 —
	_															_		_
╞	-																	-
╞	-																	_
ł	-																	_
ŀ	-10.	0																-24.5 —
	-																	_
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	- 12	5																27.0
	- 12.	5																-27.0
4	_																	_
. ©20	_																	_
/14/14	-																	_
DT 8	-15.	0																-29.5 —
RS.G	-																	_
GINEE	-											+				$\neg$		_
DEN	-																	_
N PN	-																	-
JR.GF	-17.	5																-32.0 —
IARBC	_																	_
RS H	_																	_
STOF	_																	_
BERT	-20.	0																
1 ROI					x ·-													
13202		_	_   _		Logged By: PJ	ט				R	ЭE	BEI	RT	S	[O]	RF	RS HARBOR	
LOG		Ι	2	ND	Checked: SL	U I				_		Du	itcl	h F	lart	0	r, Alaska	
10LE					Project No.: 13	2021				-	<u> </u>						FICUDE P 1	1
30REF		Eſ	NGINI	LEKS, INC.	Date: Ma	ar. 20	)14			ł	ЗH	<b>I-0</b> ′	/				1 of 1	I

Γ				SOIL DESC	RIPTION			S	AMP	LES		G	RA	PH			COMMENTS	
	Depth (feet)	Water Table	Graphic Symbol	Soil Name, Color Content, Relativ Soil Structure, M Other Inforn	r, Moisture e Density, lineralogy, nation	Number	Type	Location	Recovery % (RQD %)	Penetration Blows per 6/Inch (per foot)* or {Rock Quality?		BLC 20 4 POCk 1 1 VANE	OW C 40 KET F 2 E SHI	OUNT 60 PEN (ts 3 EAR (ts 0.6	80 f) 4 if) 4 0 8		Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
	0. - -	0		WELL-GRADED SA SILT (SW-SM) greenish gray, wet, lo coarse sand; organic o gravel to 1-in. dia.	ND WITH ose; fine to odor, angular	1	Sh		50	1-2-2-2 (4)						B T 4 re	Begin Drilling: 3/9/14; Time: 10:35 AM 25 inch dia. casing einforced	
-	- 2. - - -	5																-34.3 — - - -
	- 5. - - - - 7.	0		NO RECOVERY (cla based on cuttings)	assification	2	Sh		0	3-2-1-2 (3)								-36.8 — — — -39.3 —
	- - - 10.'	0		POORLY-GRADED WITH SAND (GP) greenish gray, wet, lo angular, flat and elong fine to coarse sand; 1 fragments (by volume Sample No. 3 contain pumice clasts < 0.2-ir	GRAVEL ose; coarse, gated gravel; % shell )) ed subrounded n. dia. (< 1%)					5-4-2-2						@	② 8 ft tricone bit grinding	-41.8 —
©2014	- - 	5				3	Sh		13	(6)								-44.3 — 
PND ENGINEERS.GDT 8/14/14	- 	0		Sample No. 4 contain pumice clasts < 0.5-ir	ed subrounded 1. dia. (< 2%)	4	Sh		25	3-2-1-2 (3)								 -46.8  
BERT STORRS HARBOR.GPJ		5																-49.3 — - -  -51.8 —
LOG 132021 ROF		]	P	N D	Logged By: P. Data Entry: P. Checked: SI	JD/Sł JD H	1			R	OE	BEF Du	RT tcł	ST n H	[O] art	RR	RS HARBOR r, Alaska	
BOREHOLE		El	I NGINI	EERS, INC.	Project No.: 13 Date: M	32021 ar. 20	) 014			]	ЗH	[-08	3				FIGURE B-12 1 of 2	2

			SOIL DESC	RIPTION			S	AMF	PLES		G	RA	PH			COMMENTS	
eet)	ıble		Soil Name, Color	. Moisture				% (	Penetration Blows per		BLO 20 4	W C( 0	DUNT 60	80		Casing Depth, Drilling Rate,	-
oth (fe	ter Ta	phic nbol	Content, Relativ Soil Structure, M	e Density, lineralogy,	nber	e	ation	overy D %)	6/Inch (per foot)*	•	РОСК 1 2	ET P	EN (ts	f) •		Fluid Loss, Drill Pressure, Tests, Instrumentation,	vatior (1)
Dep	Wa	Gra Syn	Other Inform	nation	Nui	Typ	Loc	Rec	or {Rock Quality}	<b>^</b> (	VANE 0.2 0	SHE 4	AR (ts 0.6	f) <b>(</b>		Additional Information	Ele (fee
	).0—		POORLY-GRADED WITH SILT AND SA	GRAVEL	5A	Sh		100	10-7-4-50 (11)*	È					*§ 5/	SPT value representative of A, 5B and 5C	
F			greenish gray, wet, ve coarse, angular, flat a	ry dense; nd elongated	зв	Sn											_
-			gravel; fine to coarse 2.5-in. dia; 0.2' thick	sand; gravel to silt lens;	5C	Sh											-
	2.5		angularity and uniform indicative of weathere	nity of gravel ed bedrock													-54 3 —
-			BEDROCK (VOLCA greenish gray, crystall	NIC) line and	6	Cd		100	(Very poor)								-
╞			aphanitic-porphyritic, bedded, hard, rock va	massive ries from	0			(0)									-
			MW to BX-U); locall faint gently dipping for	y rock shows													-
-2	5.0		blocky; complex joint sets, gentle to steeply	ing (multiple dipping)	7	Cd		100	{Poor}								-56.8-
					,			(22)	(1001)								-
					8	Cd		34	{Poor}								-
-								(33)									_
-2'	7.5				9	Cd		(50)	{Poor}								-59.3 —
_																	-
-					10	Cd		80	{Very poor}								-
-30	0.0																-61.8-
-																	-
╞																	-
_					11	Cd		102 (28)	{Poor}							nona quatina uvinda shin	-
-32	2.5														ca	an't maintain hole position	-64.3 —
					12	Cd		100	{Fair}								-
			END DRILLING @ 3	33.8-Feet - See				(70)								ferminated Hole: 3/9/14;	-
- 1			Comments													ime: 10:50 PM	-
	5.0																-66.8—
															_		_
																	-
5 - 3'	7.5																-69.3 —
															-		-
																	-
5 																	_
4	0.0—																-71.8-
				Logged By: PJ	ID/SI	1			D		ED	т	ст		<u>9</u> 0	SHAPROP	
	]	P	N D	Data Entry: PJ	ID 4				IV.		Dut	ch	H	arb	or	; Alaska	
	FI		EFRS INC	Project No.: 13	י 202	1				יזכ		,				FIGURE B-1	2
	Ľ		$\Box \Box \Lambda O, \Pi N C.$	Date: Ma	ar. 20	014				3H	-08	)				2 of 2	

Γ					SOIL DESC	RIPTION			S	AMP	LES		(	GR	AF	PH			COMMENTS		
	t)	le				N				%	Penetration		$\blacksquare BLOW COUNT \blacksquare 20 40 60 80 40 40 40 40 40 40 40 40 40 40 40 40 40$								
	(fee	Tab			Content, Relative	, Moisture e Density,	er		uo	ery %)	5 6/Inch			CKE1	<u>о</u> Г РЕ	N (ts	<u>ευ</u> f) (	•	Fluid Loss, Drill Pressure,	ion	
	epth	'ater	raph	,mb	Soil Structure, M Other Inform	ineralogy,	quin	ype	ocati	ecov 10D	(per foot)		1	2		3	4		Tests, Instrumentation, Additional Information	levat eet)	
	ă 0	_≥	J	S	Ould Inform	lation	Ź	Ę,	Ľ	$\mathbb{R}^{\mathbb{R}}$	{Rock Quality}		0.2	$\frac{0.4}{10}$	HEA 0	rk (ts .6	1) 0.8			표별 - 47.5	
	0.0				SILT (ML)	ith organias:													Begin Drilling: 3/12/14; Time: 12:20 AM	-47.5	
	-				strong methane odor;	NO SAMPLE;													4.25 inch dia. casing sinks	_	
	_				classification based or drilling action (see co	n cuttings and mments)													initial 20 ft below mudline	_	
	-				e (	,													20 ft then sinks to 25 feet	_	
	- 2.4	5																	weight	-500-	
		5																	-		
	-																			_	
	-												_		_					_	
	-																			-	
╞	- 5.0	0																		-52.5 —	
╞	-																			-	
	-												-		-		_			_	
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ŀ	-																			-	
ŀ	- 7.	5																		-55.0 —	
	-																			_	
	-																			_	
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	- 10 (	n																		57 5	
	- 10.0	5																		-57.5	
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	-																			_	
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	-12.5	5																		-60.0 —	
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014	-																			_	
14 ©2	-												+		-		-			-	
8/14/	-																			-	
GDT	-15.0	0																		-62.5 —	
ERS.	-																			_	
IGINE	-																			-	
Ш	-																			_	
PJ PI	-	_																		65.0-	
OR.G	1/	,																		-03.0	
HARB	_																			_	
RRS	-																			-	
T STO	-																		casing firms at 20 feat	-	
DBER	-20.0	0																	casing minis at 20 reet	-67.5-	
)21 RC						Logged Rv. PI	ID														
1320		D Data Ent					ID				R	OI	<u>3</u> E	R	Ľ,	<b>S</b> Ţ	Ο	RI	RS HARBOR		
LOG			5		ND	Checked: SH	4						D	utc	h	Н	ar	bo	or, Alaska		
HOLE		ENGINEERS, INC. Project No.: 132					2021		ł										FIGURE B-13		
BORE		141		11 N J		Date: Ma	ar. 20	)14				1-(	19					1 of 3			

ſ				SOIL DESC	RIPTION	S	AMP	PLES		(	GR/	APH	[		COMMENTS			
	Depth (feet)	Water Table	Graphic Symbol	Soil Name, Colo Content, Relativ Soil Structure, M Other Inforr	r, Moisture e Density, fineralogy, nation	Number	Type	Location	Recovery % (RQD %)	Penetration Blows per 6/Inch (per foot) or {Rock Quality}	•	BI 20 POC 1 VAN 0.2	LOW 0 40 CKET 2 NE SH 0,4	COUN 60 PEN (t 3 IEAR (t 0.6	Г 80 sf) 4 tsf) 0,8		Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
-	20.0 	,		SILT (ML) black, wet, "soupy" w strong methane odor; classification based o drilling action (see comments) <i>(continued</i> )	vith organics; NO SAMPLE; n cuttings and											c u t	casing continues to sink under own weight to 25 feet below mudline surface	
-	- 	;																-70.0— -
-	-			Contact based on dril comments)	l action (see													
-				SILTY SAND WITH (SM) black and greenish gr mixture of silt and sa angular, coarse (up to rock fragments; class on grab samples taket	GRAVEL ay, wet, nd with green, 2.5-in. dia.) ification based a from soil											C	casing firms at 25 ft	-72.5 — - - -
-	—27.5  	0 		stuck in casing														-75.0 
-	- 																	- -77.5 — -
©2014	_ 32.5 																	
NGINEERS.GDT 8/14/14	- 															(i c	@ 30 ft to 40 ft: average casing BPF = 35	
<b>DR.GPJ PND E</b>	- 	e																-85.0-
TORRS HARB(	- -	· • · · • • ·																-
DBERT ST	- 40.0																	 
LOG 132021 RC		I	)	ND	Logged By: P. Data Entry: P. Checked: SI	- D D				R	OE	BE] Di	RT itc	ST h H	ГО Iarl	RF	RS HARBOR r, Alaska	
BOREHOLE		EERS, INC.	Project No.: 13 Date: M	3202´ ar. 2(	1 014			]	ЗE	I-0	9				FIGURE B-13 2 of 3			

Γ				SOIL DESC	RIPTION			S	AMP	LES		(	GR/	API	H		COMMENTS			
	Ð	le							%	Penetration	$\blacksquare BLOW COUNT \blacksquare 20 40 60 80$									
	(fee	Tab	.2 E	Soil Name, Color Content, Relativ	, Moisture e Density,	er		uo	%)	Blows per 6/Inch	•	PO	CKET	PEN	(tsf)	•	Fluid Loss, Drill Pressure,	, ion		
	spth	ater	aphi	Soil Structure, M	lineralogy,	qui	'pe	cati	20 QD	(per foot)	-	1	2	3	4	-	Tests, Instrumentation,	evat set)		
	ă ,	`≽	ΩŞ	Other Infold	nation	ź	É	Ц	R	{Rock Quality}		VAI 0,2	NE SF 0,4	1EAR 0,6	. (tsf) 0.8		Additional information	(fe		
ſ	-40.0	)		SILTY SAND WITH	GRAVEL													-87.5		
F				(SM) black and greenish gr	av. wet.													-		
F		ľ		mixture of silt and sar	nd with green,													-		
F		-		rock fragments; class	fication based													-		
F		ľ	• <b>•</b> •	on grab samples taken	n from soil												@40 ft to 44 ft: average	-		
F	-42.5	5		stuck in cusing(contra	incu)												casing BPF = $70.8$	-90.0 —		
F		ľ																-		
F																		-		
ŀ	-																	-		
F		-															@ 45 ft casing hammer blov	s –		
F	-45.0	)	<u></u>	END PROBE @ 45.0	)-Feet - See												> 150 with no advance - casing "ringing"	-92.5 —		
F				Comments														-		
F																		-		
																		-		
F																	Terminated Hole: 3/12/14;	-		
	-47.5	,															11me: 2:00 AM	-95.0-		
																		-		
	50 (																	07.5		
	- 50.0	)																-97.5-		
	-52 4																	-100.0-		
	. 52.2	,																-100.0		
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T 8/1	- 55 (	)																-102.5-		
S.GD		-																-		
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T QN																				
GPJ	-57.5	5																-105.0		
BOR.													_							
HAR																				
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BER	-60.0	)																-107.5-		
21 RC			Logged Bv: PJD																	
1320.					Data Entrar D	עי				R	DE	<b>B</b> E	RТ	S	TC	)R	RS HARBOR			
LOG		Ι	<b>)</b>	N D	Checked SL	ישי א			Dutch Harbo								or, Alaska			
IOLE					Project No · 13	2021		ł								ELCLIDE P	12			
CREH		ENGINEERS, INC. Project No.: 132021								I	3H	<b>I-</b> 0	9					<b>E B-13</b> of 3		
ы												<u> </u>								



LABORATORY RESULTS



## SUMMARY OF LAB AND FIELD CHARACTERISTICS

ENGINEERS, INC.

Client: City of Unalaska

Project: Robert Storrs Harbor Improvements Project Number: 132021 Project Location: Dutch Harbor, Alaska Reviewed By: RZ / SH Review Date: 5/2/2014

Project Number: 132021											Review L										
	Θ	Dept	th (ft)	pot	(%)	yapı	Gra	dation	(%)	cle )	Group	Symbol	e %)	pt)	Wt.	Nt.	(%)	6-in	ape	t a	sts
	Borehol	Тор	Bottom	Boring Meth	Liquid Limit	Plasticity Ir (%)	Gravel	Sand	Fines	Max Parti Size (in	Soil	lce	Moistur Content (	Salinity (p	Total Unit (pcf)	Dry Unit \ (pcf)	Organic Content (	Blows per	Particle Sh	Particle Angulari	Other Te
	BH-01	0	2	CWR	-	-	-	-	-	2.25	SPg	-	16	-	-	-	-	2,2,2,2	E&F	A	
	BH-01	7	9	CWR	-	-	-	-	-	-	SPg	-	-	-	-	-	-	12,10,8,6	-	-	
	BH-01	12	12.8	CWR	-	-	75	21	4	2	GPs	-	10	-	-	-	-	8,9	E&F	A	
	BH-01	12.8	14	CWR	-	-	-	-	-	-	BR	-	-	-	-	-	-	8,9	-	-	
	BH-03	0	2	CWR	-	-	-	-	-	1	SPg-SM	-	44	-	-	-	-	2,1,1,0	E&F	A	
	BH-03	5	7	CWR	-	-	67	30	3	0.75	GPs	-	12	-	-	-	-	3,3,3,2	E&F	A	
	BH-03	10	12	CWR	-	-	75	23	2	1.25	GWs	-	10	-	-	-	-	3,3,2,2	E&F	Α	
	BH-03	20	22	CWR	-	-	-	-	-	0.75	SM	-	15	-	-	-	-	6,5,7,7	E&F	A	
	BH-03	25	26.5	CWR	-	-	46	37	17	1.5	GMs	-	17	-	-	-	-	21,44,50	E&F	A	
	BH-05	0	2	CWR	-	-	-	-	-	1.75	SPg-SM	-	36	-	-	-	-	2,1,2,2	E&F	A	
	BH-05	8	10	CWR	-	-	65	27	8	2	GPs-GM	-	14	-	-	-	-	9,7,5,4	E&F	A	
	BH-05	10	12	CWR	-	-	69	24	7	1.75	GPs-GM	-	12	-	-	-	-	9,7,5,4	E&F	A	
	BH-05	10.5		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	5,6,5,5	-	-	
	BH-05	15	15.5	CWR	-	-	-	-	-	-	BR	-	-	-	-	-	-	80	-	-	
	BH-06	0		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-06	5		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-06	15		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-06	34		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-06	35		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-07	0	0.5	CWR	-	-	-	-	-	-	BR	-	-	-	-	-	-	3,50	-	-	
	BH-08	0	2	CWR	-	-	-	-	-	1	SP-SM	-	23	-	-	-	-	1,2,2,2	E&F	Α	
	BH-08	5	7	CWR	-	-	-	-	-	-	SP-SM	-	-	-	-	-	-	3,2,1,2	-	-	
	BH-08	7		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	3,2,1,2	-	-	
	BH-08	10	12	CWR	-	-	54	44	2	2	GPs	-	13	-	-	-	-	5,4,2,2	F	A	
	BH-08	15	17	CWR	-	-	78	18	5	2.25	GPs	-	11	-	-	-	-	3,2,1,2	E&F	Α	
	BH-08	20	20.5	CWR	-	-	-	-	-	2	GPs-GM	-	9	-	-	-	-	10,7	E&F	A	
	BH-08	20.5	20.7	CWR	-	-	-	-	-	1	SM	-	22	-	-	-	-	10,7	E&F	A	
A:U I	BH-08	20.7	21.3	CWR	-	-	-	-	-	1.5	GP-GM	-	9	-	-	-	-	49	E&F	Α	
13/14 0	BH-08	22	24.5	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
6 - 979	BH-08	24.5	26	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
BRARY.	BH-08	26	27	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
	BH-08	27	27.8	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
ם - אס	BH-08	27.8	30.3	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
CR.GPJ	BH-08	29		CCm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	BH-08	30.3	32.8	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
VIARY -	BH-08	32.8	33.8	CCm	-	-	-	-	-	-	BR	-	-	-	-	-	-	-	-	-	
	BH-09	0	25	CWR	-	-	-	-	-	-	ML	-	-	-	-	-	-	-	-	-	
3 & FIEL	BH-09	20		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-09	25	45	CWR	-	-	-	-	-	-	SMg	-	-	-	-	-	-	-	-	-	
21																					



# SUMMARY OF LAB AND FIELD CHARACTERISTICS

ENGINEERS, INC.

Client: City of Unalaska

Project: Robert Storrs Harbor Improvements

Project Location: Dutch Harbor, Alaska Reviewed By: RZ / SH

Project Nu	mber:	13202	1						_		Review D	ate: 5/	2/2014	4						
υ	Depth (ft)		por	t (%)	ndex	Gradation (%)			cle )	Group	e %)	pt)	Wt.	Mt.	с %)	6-in	lape	e ity	sts	
Borehol	Тор	Bottom	Boring Meth	Liquid Limi	Plasticity Ir (%)	Gravel	Sand	Fines	Max Parti Size (in	Soil	lce	Moistur Content (	Salinity (p	Total Unit (pcf)	Dry Unit / (pcf)	Organi Content (	Blows per	Particle Sh	Particl Angular	Other Te
BH-09	29		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH-09	34		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH-09	41		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH-09	44		CWR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

APPENDIX C



APPENDIX C

#### **Strength and Graph Results** of Rock Cores (ASTM D7012)

#### **DOWL HKM** 4/25/2014




**Photo Log** 

Page 1 of 1

Project Name: 132021- RS			
Client: PND Engineers, Inc.			
Location: BH-08, Sample 12, 32.8' – 33.1'			
W.O: A33969	Lab No: 267	Date: April 24, 2014	



After Test Close Up	



## **ASFE PUBLICATION**

**IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORTS** 

# Important Information about Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

## While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

## **Read the Full Report**

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- · not prepared for the specific site explored, or
- · completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

 the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.* 

## **Subsurface Conditions Can Change**

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly— from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are Not Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical* engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

## A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.* 

## Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## **Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.* 

## **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction. operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from arowing in or on the structure involved.

#### Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



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