CONTRACT DOCUMENTS

FOR

CITY OF SEDONA
WASTEWATER DEPARTMENT

WASTEWATER RECLAMATION PLANT HEADWORKS BAR SCREEN REPLACEMENT PROJECT

2018-WW-02

TITLE **PAGE**

ADVERTISEMENT FOR BIDS
City of Sedona
Wastewater Department
108 Roadrunner Drive
Sedona, AZ 86336

Sealed bids for the construction of the **WWRP Headworks Bar Screen Replacement Project** will be received by the Wastewater Department, located at 7500 W. SR 89A, Sedona, Arizona, until **2:00 P.M. local time, September 13, 2017.** At that time, bids will be publicly opened and read aloud in the Wastewater Conference Room. Bidders are invited, but not required, to be present at the bid opening.

PROJECT: WWRP Headworks Bar Screen Replacement Project

DESCRIPTION: This project includes removal and replacement of the headworks bar screens, installation of a washer compactor with associated piping, including all mechanical, electrical and programming, and a bid alternate for a second washer compactor.

CONTRACT TIME: 250 calendar days after the Notice to Proceed.

LIQUIDATED DAMAGES: $570 per day beyond the 250 calendar day Contract Time.

MANDATORY PRE-BID MEETINGS: Failure to attend and sign attendance sheet at mandatory pre-bid meetings shall render a bid non-responsive.

Copies of the Contract Documents, may be downloaded from the City of Sedona's website at www.SedonaAz.gov under your Business, Doing Business, Bids & RFPs. If plan documents are downloaded, the City will not be responsible for providing up-to-date information through the website or other communication methods.

PRE-BID CONFERENCE: Pre-bid conference (**mandatory**) will be held on **September 6, 2017, at 2:00 pm. at the Sedona Wastewater Reclamation Plant,** 7500 W. SR 89A, Sedona AZ (between mile markers 365 and 366 between Sedona and Cottonwood).

Each bidder's proposal shall be made on forms furnished in the Contract Documents, and must be accompanied by a security consisting of a certified check, cashier's check, or bid bond in an amount of not less than ten percent (10%) of the amount of the total bid amount, and made payable to the CITY OF SEDONA, ARIZONA. In the event the successful Bidder within ten (10) calendar days after award of the Contract fails to enter into a Contract or fails to post payment and performance bonds satisfactory to the City insuring the faithful fulfillment of the Contract as required by law, the security deposit on this bid shall be forfeited to the City.

Contract Documents, with completed Bid Proposal, must be enclosed in a sealed envelope, addressed to:

HAND DELIVERED: City of Sedona
Wastewater Department
7500 W. SR 89A
Sedona, AZ 86336

U.S. MAIL: City of Sedona
Wastewater Department
102 Roadrunner Drive
Sedona, AZ 86336

AND MARKED: Bid Proposal for **WWRP Headworks Bar Screen Replacement Project**

AND RECEIVED: **At the Wastewater Department administrative office until 2:00 P.M. local time, September 13, 2017** (as determined by reference to www.time.gov ref Arizona area)

The successful Bidder will be required to furnish two (2) bonds. One (1) bond, to become effective upon award of the Contract, shall be a Performance Bond substantially in the form attached, and shall be in a sum of one hundred percent (100%) of the contract price including any additions to the Contract. The Bond shall be effective throughout the construction period, including a two (2) year warranty period. The successful Bidder shall also furnish a Labor and Material Payment Bond, substantially in the form attached, to become effective upon award. Said Labor and Material Bond shall be in the amount of one hundred percent (100%) of the Contract price.

The successful Bidder will be determined on the basis of the lowest responsive and responsible Proposal. The City of Sedona, Arizona reserves the right to reject any or all Proposals, to waive or not to waive any informalities, or irregularities in the Proposals received, and to accept a Proposal which in its judgment best serves the interests of the City.

All questions should be directed in writing to Roxanne Holland, PE, Wastewater Manager, 102 Roadrunner Drive, Sedona, Arizona 86336, or email RHolland@sedonaaz.gov.

FIRST ADVERTISEMENT: **August 30, 2017**
SECOND ADVERTISEMENT: **September 6, 2017**
RED ROCK NEWS

BY: _____
Roxanne Holland, PE
Wastewater Manager

INFORMATION FOR AND INSTRUCTIONS TO BIDDERS

The City of Sedona herein referred to as the "City" is defined as the City of Sedona, acting through its legally constituted officials, officers, and employees. The City may waive any informality or reject any or all bids. Any bid may be withdrawn prior to the scheduled time and date for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be opened. No Bidder may withdraw a bid within forty-five (45) days after the actual day of the opening thereof.

Bid prices shall include everything necessary for the completion of the work including but not limited to, materials, equipment, tools, other facilities, management, superintendents, labor, services, insurance, overhead, profit, and Federal, State, and Local taxes.

Each bid must be submitted on the Bid Proposal provided and must be signed by the Bidder or his duly authorized agent. All blank spaces for bid prices must be filled in, in ink or typewritten, IN BOTH WORDS AND NUMBERS where called for in the Bid Proposal. If there is a discrepancy between the price in words and the price in numbers, the price in words will govern.

In case of an error in the extension of the unit price and the total, the unit price shall govern. In the event that the product of a unit price and an estimated quantity does not equal the extended amount quoted, the unit price shall govern, and the correct product of the unit price and the estimated quantity shall be deemed to be the amount bid. If the sum of two (2) or more items in the bid schedule does not equal the total amounts quoted, the individual item amounts shall govern and the correct total shall be deemed to be the amount bid. The bid shall not contain recapitulations of the work to be done.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the Bidder, Bidder's address, and the name of the project for which the bid is submitted.

The City may by statements in the Special Provisions or other part of the specifications require submission of sealed Bid Documentation.

The City may make such investigations as City deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the City all such information and data for this purpose as the City may request. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein. Conditional bids will not be accepted.

Bidders must correctly prepare and submit the documents listed below with their bids:

1. Bid proposal
2. Bid Guaranty Bond
3. Certification of the Bidder's experience and qualification and statement of Bidder's qualifications
4. List of all proposed Subcontractors
5. Schedule of manufacturers and suppliers, major equipment and material items

6. Non-collusion affidavit
7. Certificate of insurability
8. Signed Addenda

Each bid must be accompanied by either a certified check made payable to the City of Sedona, a cashier's check made payable to the City of Sedona or a bid bond, duly executed by the Bidder as principal and having as surety thereon a surety company licensed to do business in Arizona, in the amount of ten percent (10%) of the bid. The City may retain such checks or bid bonds, of the three (3) apparent lowest Bidders, for a period of forty-five (45) days after the bid opening.

Simultaneously with the delivery of the executed Contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract, as specified in the General Conditions included herein. The surety on such bond or bonds or contract bonds must file with each bond a certified and effectively dated copy of their Power of Attorney.

Each Bidder shall have listed, on the form entitled “Proposed Subcontractors”, provided in the Proposal, the name, address, and description of the work of each Subcontractor to whom the Bidder proposes to sublet portions of the work in excess of one and one-half percent (1.5%) of the total amount of his Bid. For the purpose of this paragraph, a Subcontractor is defined as one who contracts with the Contractor to provide materials and labor, labor only, or who specially fabricates and installs a portion of the work or improvement according to drawings contained in the Contract Documents. Failure to list Subcontractors may render a Bid non-responsive and may be grounds for rejection of the Bid. Attention is called to the General Conditions Article 13, limiting the total amount of the work, which may be performed by Subcontractors. Alternate Subcontractors for the same work shall not be listed in the bid. However, substitute Subcontractors may be considered as long as they comply with the requirements of these Contract documents.

Subcontractors listed by the Bidder must be competent and experienced in the type of work which they are to perform. No Contractors shall be required to employ any Subcontractor, other person or organization against which he has reasonable objection.

As evidence of his competency to perform the work, Bidder shall complete and submit with his Bid the Bidder’s Statement of Qualifications which is bound in the Contract Documents. Low Bidders may be asked to furnish additional data to demonstrate competency. Bidders must be, at the time of bidding and throughout the period of the Contract, licensed as required by the State of Arizona, thoroughly competent, and capable of satisfactorily constructing the Project. Bidder shall certify that he is skilled and regularly engaged in the general class and type of work called for in the Contract Documents. Additionally, Bidders shall comply with all provisions of Arizona Revised Statutes, Title 32, Chapter 10. Further, the Bidder certifies that he is knowledgeable of the unusual and peculiar hazards associated with the general class and type of work required to construct the specific project within the terms given in the Contract Documents. Bidder shall be competent and skilled in the protective measures necessary for the safe performance of the construction work with respect to such unusual and peculiar hazards.

The selected Bidder, upon Bidder's failure or refusal to execute and deliver the Contract and

bonds required within ten (10) consecutive calendar days from and including the date Bidder received notice of the acceptance of his bid, shall forfeit to the City, for such failure or refusal, the security deposited with his bid.

Bidders are required prior to submitting a bid to inspect the site of the work and satisfy themselves by personal examination or by such other means as they may prefer, as to the location of the proposed work, and of the actual conditions.

Entrance by Bidders to the site of the work for purposes of making exploratory excavations shall be by special arrangement with the Wastewater Manager under conditions established by the City. If, during the course of such an examination, a Bidder finds facts or conditions which appear to be in conflict with the Contract Documents, the Bidder must notify the Wastewater Manager and may apply to the Wastewater Manager, in writing, for additional information and explanation before submitting its bid.

Any information provided by the Design Engineer, the City, or any City personnel is not intended to be a substitute for, or a supplement to the independent verification by the Bidder to the extent such independent investigation of site conditions is deemed necessary or desirable by the Bidder. Bidder acknowledges that he has not relied upon City, City personnel, or Design Engineer furnished information regarding site conditions in preparing and submitting a bid hereunder. The Plans show conditions as they are believed to exist, but it is not intended nor is it to be inferred that the conditions as shown therein constitute a representation by the City or any of its officers that such conditions actually exist, nor shall the City or any of its officers be liable for any loss sustained by the Contractor as a result of any variance between any conditions as shown on the Plans and the actual conditions revealed during the progress of the project, or otherwise.

Any subsurface investigations, which may have been conducted at the site of the work, and the corresponding report, may be examined at the City office. Soil investigations, if performed, were conducted for design purposes, and the data shown in the reports are for subsurface conditions found at the time and location of the investigation. The Contractor shall note that there will be no separate payment for rock excavation and **no blasting** is permitted at the site.

The City disclaims responsibility for the interpretation by Bidders of data, such as projecting or extrapolating from the test holes to other locations on the site of the work, soil bearing values and profiles, soil stability and the presence, level and extent of underground water for subsurface conditions during construction operations.

The lands upon which the work is to be performed, right of way for access thereto, and other lands designated for use by the Contractor in performing the work are identified in the Supplemental Conditions or Drawings.

Submission of a bid by the Bidder shall constitute acknowledgement that, if awarded the Contract, the Bidder has relied and is relying on his own examination of (1) the site of the work, (2) access to the site, and (3) all other data and matters requisite to the fulfillment of the work and on his own knowledge of existing facilities on and in the vicinity of the work to be constructed under the Contract.

The Bidders shall examine carefully the Plans and Specifications and the site of the proposed Project and shall solely judge for themselves the nature and location of the work to be done and all the conditions; and the submission of a Bid shall be deemed as conclusive evidence that a Bidder has made the necessary investigation and is prima facie evidence that he is satisfied with the conditions to be encountered, quantity and quality of the work or materials to be performed or furnished, and the requirements and provisions of the Plans and Specifications and the Contract Documents. The Bidder agrees that if he is awarded the Contract he will make no claim against the City, the Wastewater Manager, or any other City officials or City personnel based on ignorance or misunderstanding of any of the provisions of the Contract Documents, nor because of any unforeseen subsurface conditions except in the manner and under the circumstances as provided in the Contract Documents.

Each Bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful Bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his Contract. Insofar as possible, the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.

All applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction for the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any Bidder orally. Every proper request for such interpretation shall be made in writing, and to be given consideration must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the Contract Documents which, if issued, will be emailed to all prospective Bidders (at the respective addresses furnished for such purposes), not later than three (3) calendar days prior to the date fixed for the opening of bids. At any time prior to an announced bid opening time the City reserves the right to issue an addendum extending the bid opening time by one or more days. Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligations under his bid as submitted. All Addenda so issued shall become part of the Contract Documents. It shall be the responsibility of each Prospective Bidder to verify that each addendum has been received applicable to the project. Bidders are responsible to check the City website at www.sedonaaz.gov periodically to verify if new addenda have been posted and shall ensure a reliable and accurate email address is provided to the City to be added to the Plan Holder's List. In order to be added to the Plan Holder's List, a bidder shall either purchase plans from the City of Sedona, or submit a request from the email address intended to be used as the bidder's contact email address, to the project manager listed on page I-3.

Before submitting a Proposal, Bidders shall carefully examine the Plans, read the specifications and all other Contract Documents, visit the site of the project, and fully inform themselves as to all existing and local conditions and limitations. It is expressly stipulated that the drawings, Specifications and other Contract Documents set forth the requirements as to the nature of the work and do not purport to control the method of performing work except in those instances

where the nature of the completed work is dependent upon the method of performance.

Submission of a bid shall constitute acknowledgment, upon which the City may rely that the Bidder has thoroughly examined and is familiar with the Contract Documents. Failure or neglect of a Bidder to examine any of the Contract Documents shall in no way relieve him from any obligation with respect to his bid or to the Contract. No claim for additional compensation will be allowed which is based on a lack of knowledge of the work, or of the Contract Documents.

The quantities of the various classes of work to be done and material to be furnished under this Contract, which have been estimated as stated in the Proposal, are only approximate and are to be used solely for the purpose of comparing, on a consistent basis, the Proposals offered for the work under this Contract. The Contractor agrees that the City will not be held responsible if any of the quantities shall be found incorrect; except that in the event that the Contract price may be increased or decreased in accordance with Article 30 of the General Conditions through the issuance of the appropriate change orders to reflect the actual quantities of all items constructed, installed or incorporated in the work, the Contractor will not make any further claim for damages or for loss of profits because of a difference between the quantities of the various classes of work as estimated and the work actually done. If any error, omission, or misstatement is found to occur in the estimated quantities, the same shall not invalidate the Contract or release the Contractor from the execution and completion of the whole or any part of the work in accordance with the Specifications and the Plans herein mentioned, and for the prices herein agreed upon and fixed therefore, or excuse him from any of his obligations or liabilities hereunder, or entitle him to any damages or compensation except as may be provided in this Contract.

The successful Bidder, upon award of a Contract, shall commence work on the date specified in the "Notice to Proceed" and shall complete all work in accordance with the time schedule specified. Should the Contractor fail to complete all work in the allotted time period, liquidated damages shall be assessed as specified.

The City invites bids on the forms included as part of this Document to be submitted at such time and place as is stated in the Advertisement for Bids. All blanks in the Bid Proposal must be appropriately filled in with typewriter or ink. **Bidders are instructed not to turn in Bid Proposals that have been separated from the bound Contract Documents. It is the sole responsibility of the Bidder to see that the bid is received in proper time at the time and place stipulated in the Advertisement For Bids**. Any bids received after the scheduled closing time for receipt of bids will be returned to the Bidder unopened.

The bid must be signed in the name of the Bidder and must bear the signature in long hand of the person or persons duly authorized to sign the bid. Changes in or additions to the bid forms, recapitulations of the work bid upon, alternative proposals or any other modifications of the bid which are not specifically called for in the Contract Documents may be subject to City's rejection of the bid as not being responsive to the advertisements. No oral telephone modifications or telegraphic modifications of any bid submitted will be considered.

The bid submitted must not contain erasures, corrections or changes from the printed forms as completed in typewriter or ink, unless such erasures, corrections or changes are authenticated

by affixing in the margin immediately opposite the erasure, correction or change, the full signature of the person who signed the bid or the signature of such other person as may be authorized by the Bidder to make erasures, corrections or changes in the bid, and said authorization must be evidenced by written confirmation, executed by the person authorized to sign the initial bid, attached to the bid at the time of submittal.

If the bid is made by an individual, his or her name, signature, and post office address must be shown; if made by a firm or partnership, the name and post office of the firm or partnership, a list of the partners, and the signature of at least one of the general partners must be shown; if made by a corporation, the bid shall show the name of the state under the laws of which the corporation is chartered, the name and post office address of the corporation, and the title of the person who signs on behalf of the corporation. All signatures must be made in long hand. If a corporation makes the bid, a certified copy of the By-laws or resolution of the board of directors of the corporation shall be furnished showing the authority of the officer signing the bid to execute contracts on behalf of the corporation. If the bid is made by a joint venture, a representative of each of the joint venture firms shall sign the bid. Additionally, the bid shall include a copy of the resolution or agreement empowering the representative to execute the bid and bind the firm to the joint venture.

The City reserves the right to pre-qualify all bids, post-qualify all bids, or reject all bids, not to make an award or accept the Proposal deemed most advantageous and in the best interest of the City. The City shall enter into a Contract with the lowest responsible responsive bidder whose proposal is satisfactory. A written Notice of Award will be sent to the successful Bidder(s).

OR APPROVED EQUAL CLAUSE -- Manufacturers or suppliers of materials and equipment may request that alternatives to specified products be considered equal and that inclusion of such alternatives be permitted in the bids. Such request must be made in writing and received by the Wastewater Manager at least five (5) calendar days prior to the date bids are to be received. Granting a request that an alternative product be considered equal to those specified may be made only by the issuance of an Addendum by the City. Denial of the request during bidding does not waive the manufacturer’s or supplier's right to offer the alternative product to the Contractor after Award of the Contract. After Award of Contract, the offer will be considered as a substitution as provided under Article 6 of the General Conditions and will be considered only if the Engineer believes the offer of substitution is equal to or superior in quality to the specified product.

PREPARATION OF BID

A. City reserves the right to reject any or all Bids, to waive any or all informalities, and the right to disregard all nonconforming, non-responsive or conditional Bids.

B. City reserves the right to reject any Bid not accompanied by specified documentation and Bid security.

C. City reserves the right to reject any Bid if it shows any omissions, alterations of form, additions not called for, conditions or qualifications, or irregularities of any

kind.

D. City reserves the right to reject any Bid that, in his sole discretion, is considered to be unreasonable as to the amount Bid for any lump sum or unit price item.

E. A Bidder may withdraw his Bid before the time fixed for the opening of Bids by communicating his purpose in writing to the City. Upon receipt of such written notice, the unopened Bid will be returned to the Bidder.

F. The withdrawal of a Bid does not prejudice the right of a Bidder to file a new Bid, so long as the new Bid is submitted in conformance with the Information for and Instructions to Bidders prior to the closing time indicated for Bids in the Advertisement for Proposals.

G. No Bidder may withdraw his Bid for forty-five (45) days after the time established for receiving Bids or before the Award and execution of the Contract unless the Award is delayed for a period exceeding forty-five (45) calendar days. The Award of the Contract to one party does not constitute a waiver of this condition.

H. In evaluating Bids, City will consider the qualifications of Bidders; whether or not the Bids comply with the prescribed requirements; the alternatives, if any; the time or times for completion as stated in the Bid Form; and the lump sum and unit prices, if requested in the Bid Form.

I. City may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work for which the identity of Subcontractors and other persons and organizations must be submitted.

J. City may conduct such investigation deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors and other persons and organizations to do the work in accordance with the Contract Documents. City reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to City's satisfaction.

K. Modification of a Bid already received will be considered only if the modification is received prior to the time established for receiving Bids. Modifications shall be made in writing, executed, and submitted in the same form and manner as the original Bid. The communication should not reveal the Bid Price, but should provide the addition or subtraction or other modifications so that the final price or terms will not be shown until the sealed Bids are opened.

CONTRACT

THIS CONTRACT, made and entered into this ____ day of _____, 2017 by and between the City of Sedona, Arizona, hereinafter called the "Owner", and **Click here to enter text.**, hereinafter called the "Contractor."

WITNESSETH:

WHEREAS, the City has caused Contract Documents to be prepared for the construction of the **WWRP Headworks Bar Screen Replacement Project (the "Project"),** City of Sedona, Arizona, as described therein; and

WHEREAS, the Contractor has offered to perform the proposed work in accordance with the terms of the Contract; and

WHEREAS, the Contractor, as will appear by reference to the minutes of the proceedings of the City Council was duly awarded the work.

NOW, THEREFORE, the parties hereto hereby stipulate, covenant and agree as follows:

1. The Contractor promises and agrees to and with the City that it shall perform everything required to be performed and shall provide and furnish all the labor, materials, necessary tools, expendable equipment, and all utility and transportation services required to perform and complete in a workmanlike manner all of the work required in connection with construction of **the Project** all in strict accordance with the Specifications and Drawings, including any and all Addenda, and in strict compliance with the Contractor's Proposal and all other Contract Documents, which are a part of the Contract; and the Contractor shall do everything required by this Contract and the other documents constituting a part thereof.

2. The Contractor agrees to perform all of the work described above in accordance with the Contract Documents and comply with the terms therein for the initial estimated Contract price of **$Click here to enter text.**, subject to increase or decrease in accordance with the Contract Documents, and the Bid Schedule set forth therein; and the City agrees to pay the Contract Prices in accordance with the Bid Schedule for the performance of the work described herein in accordance with the Contract Documents.

3. The Contractor and the City agree that the terms, conditions, and covenants of the Con- tract are set forth in the Contract Documents and the Plans and Technical Specifications, and the Drawings numbered 1 through 12, all defined as the Contract Documents, and by this reference made a part hereof as if fully set forth herein.

4. The Contractor and the City agree that each will be bound by all terms and conditions of all of the Plans and Technical Specifications, and Contract Documents, as if the same were fully set forth herein, and hereby incorporate all of the foregoing into this Agreement.

5. The Contractor shall abide by all the laws of the United States of America, State of Arizona, Coconino/Yavapai Counties, and the City of Sedona, including a requirement that Contractor obtain an annual Sedona Business License for every year that they do business with Sedona or within the City limits.

6. The Contractor shall carry Workers' Compensation Insurance and require all Subcontractors

to carry Workers' Compensation Insurance as required by the Law of the State of Arizona, and all other insurance as set forth in the General Conditions.

7. Contractor, its agents, employees, and subcontractors, shall not discriminate in any employment policy or practice. "Discrimination" means to exclude individuals from an opportunity or participation in any activity or to accord different or unequal treatment in the context of a similar situation to similarly situated individuals because of race, color, gender, gender identity, sexual orientation, religion, national origin or ancestry, marital status, familial status, age, disability, or veteran status. (Ordinance 2015-10 (2015).

8. Work under this Contract shall commence on the date specified in the written Notice to Proceed from the City to the Contractor. Upon receipt of said Notice, the Contractor shall diligently and continuously prosecute and complete all work under this Contract within the time specified on page A-2.

9. The Contract Document consist of the following component parts, all of which are a part of this Contract whether herein set out verbatim, or attached hereto:

   Advertisement for Bids
   Information for and Instructions to Bidders
   Bid Proposal and Bid Guaranty Bond
   Contract (this document)
   Change Orders
   Addenda
   Performance Bond, Labor and Material Payment Bond
   Special Conditions
   General Conditions
   Technical Specifications
   Notice of Award
   Notice to Proceed
   Plans and Drawings
   Design Reports
   Standard Specifications
   Insurance Certificates

The above named documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, the order of precedence is as follows:

1. Change Orders
2. Contract (this document), including addenda
3. Payment and Performance Bonds
4. Advertisement for Bids
5. Information for and Instructions to Bidders
6. Notice of Award
7. Notice to Proceed
8. Special Conditions
9. Bid Proposal
10. Technical Specifications

11. Plans and Drawings
12. General Conditions
13. Bid Guaranty Bond
14. Standard Specifications

In the event there is a conflict between any of the above listed documents, the provision of the document with the lower numerical value shall govern those documents with a higher numerical value. Within a category, the last in time is first in precedence.

The Contractor shall not take advantage of any apparent error or omission in the Plans or Specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Owner. The City will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Plans and Specifications.

10. As part of the inducement for City to enter into this Agreement, Contractor makes the following representations:

    A. Contractor has familiarized himself with the nature and extent of the Contract Documents, work, locality, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress, or performance of the work.

    B. Contractor has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or those reports that otherwise may affect cost, progress or performance of the work, which were utilized by Design Engineer in the preparation of the Drawings and Specifications and which have been identified in the Contract Documents.

    C. Contractor has made or caused to be made examinations, investigations and tests, and studies of such reports and related data as he deems necessary for the performance of the work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by Contractor for such purposes.

    D. Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

    E. **Contractor has given the Wastewater Manager written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents** and the written resolution thereof by Wastewater Manager is acceptable to Contractor.

    F. Contractor has attended mandatory pre-bid meetings and walk-throughs.

11. A. No assignment by a party hereto of any rights under or interest 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.

B. City and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, and its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

C. Pursuant to Arizona Revised Statutes Section 38-511, the provisions of which are incorporated by reference as if fully set forth herein, all parties are hereby given notice that this Agreement is subject to cancellation by the City if any person significantly involved in initiating, negotiating, securing, drafting, or creating the Contract or Contract Documents on behalf of the City is, at any time while the Contract or Contract Document or any extension thereof is in effect, an employee or agent of any other party to the Contract or Contract Documents in any capacity or a consultant to any other party to the Contract or Contract Documents with respect to the subject matter of the Contract or Contract Documents.

12. During the performance of this Agreement, Contractor may also be under contract with the City for performance of work on other projects. A breach in the performance of any of Contractor's obligations under this Agreement shall constitute a breach of Contractor's obligations under any other agreement with the City and the breach by Contractor under other agreement with the City shall also constitute a breach of Contractor's obligations under this Agreement. The City may offset any amounts owed by Contractor under any such other agreement from any amounts owed to Contractor under this Agreement.

13. The Contract Documents constitute the entire Agreement between the parties.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement which shall be deemed an original on the date first above written.

CITY: City of Sedona, Arizona

BY: _____

NAME: _____

TITLE: _____

(SEAL)
ATTEST:
BY: _____

NAME: _____

CONTRACTOR:

BY: _____

NAME: _____

TITLE: _____

(SEAL)
ATTEST:
BY: _____

NAME: _____

APPROVED AS TO LEGAL FORM:

BY:_____
(City Attorney)
DATE:_____

STATUTORY BID BOND

PURSUANT TO TITLE 34, CHAPTER 2, ARTICLE 1
OF THE ARIZONA REVISED STATUTES

(This bond must not be less than ten percent (10%) of the bid amount)

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned _____, (hereinafter "Principal"), as Principal, and _____, a corporation organized and existing under the laws of the State of _____, with its principal offices in the City of _____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, the State of Arizona, (hereinafter "Obligee"), in the amount of _____ _____(Dollars) ($_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

WWRP Headworks Bar Screen Replacement Project

NOW, THEREFORE, if the Obligee accepts the proposal of the Principal and the Principal enters into a contract with the Obligee in accordance with the terms of the proposal and gives the bonds and certificates of insurance as specified in the Contract Documents with good and sufficient surety for the faithful performance of the contract and for the prompt payment of labor and materials furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give the bonds and certificates of insurance, if the Principal pays to the Obligee the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise, it remains in full force and effect provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

Witness our hands this _____ day of _____, 2017.

_____

PRINCIPAL Seal

By:_____

Title:_____

_____

AGENCY OF RECORD

_____

SURETY Seal

_____

AGENCY ADDRESS

(Attach Power of Attorney form)

STATUTORY BID BOND

(Check to accompany bid)

(Note: The following form shall be used when a check accompanies bid)

Accompanying this proposal is a Cashiers check payable to the order of the City of Sedona hereinafter referred to as "City," for **WWRP Headworks Bar Screen Replacement Project** in the amount of _____Dollars ($_____), this amount being ten percent (10%) of the total amount of the Bid. The proceeds of this check shall become the property of said City provided this proposal shall be accepted by said City through action of its legally constituted contracting authorities and the undersigned shall fail to execute a contract and furnish the required Performance and Payment Bonds and proof of insurance coverage within the stipulated time; otherwise, the check shall be returned to the undersigned. The proceeds of this check shall also become the property of the City if the undersigned shall withdraw his bid within the period of forty-five (45) days after the date set for the opening thereof, unless otherwise required by law, and notwithstanding the award of the Contract to another Bidder.

_____

_____

_____

Bidder

(NOTE: If the Bidder desires to use a bond instead of a check, the Bid Bond Form on the previous two pages shall be executed -- the sum of this bond shall not be less than ten percent (10%) of the total amount of this Bid.)

STATUTORY PERFORMANCE BOND

PURSUANT TO TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES

(This Bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That,_____ (hereinafter "Principal"), as Principal, and _____ _____, a corporation organized and existing under the laws of the State of _____with its principal office in the City of _____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, State of Arizona, (hereinafter "Obligee") in the amount of _____ _____ (Dollars) ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the _____, dated the _____ day of _____, 2017 to _____ _____ _____ _____ which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms conditions and agreements of all duly authorized modifications of the Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this _____ day of _____, 2017.

_____

PRINCIPAL Seal

By:_____

Title:_____

AGENCY OF RECORD

_____

_____

AGENCY ADDRESS

_____

SURETY Seal

By:_____

(Attach Power of Attorney form)

STATUTORY PAYMENT BOND

PURSUANT TO
TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES

(This Bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter "Principal"), as Principal, and _____, a corporation organized and existing under the laws of the State of _____ with its principal office in the City of_____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, State of Arizona (hereinafter "Obligee") in the amount of _____(Dollars) ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee dated the _____ day of _____, 2017, _____
_____
_____
_____
_____
which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, of the Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this _____ day of _____, 2017.

_____

PRINCIPAL Seal

By:_____

Title:_____

AGENCY OF RECORD

_____

_____

AGENCY ADDRESS

_____

SURETY Seal

By:_____

(Attach Power of Attorney form)

DO NOT DETACH AND SUBMIT SEPARATE FROM OTHER CONTRACT DOCUMENTS

BID PROPOSAL

City of Sedona:

The undersigned Bidder, having examined the specifications, drawings and all other documents contained in the Contract Documents, attended all mandatory pre-bid meetings, and having examined the site where the work is being performed, and having familiarized himself with any local conditions affecting the work and having knowledge of the cost of work at the place where the work is to be done, hereby proposes to execute and perform the formal Contract set forth in these Contract Documents, of which this Proposal forms a part, and will do the work therein described on the terms and conditions therein set forth; and furnish all required labor, materials, tools, equipment, transportation and services for said work, and pay all taxes and other incidental costs, all in strict conformity with the drawings and specifications forming a part of the Contract Documents for the Unit Prices entered based on the Bidding Schedule included herein, said prices to only be amended or altered in accordance with the Contract Documents.

It is understood that any listed quantities of work to be done at unit prices are **approximate** only, and are intended to serve as a guide in evaluating bids.

It is further agreed that any quantities of work to be done at unit prices and material to be furnished may be increased or decreased as may be considered necessary, in the opinion of the City, to complete the work fully as planned and contemplated and that all quantities of work, whether increased or decreased, are to be performed at the unit prices set forth in the Bid Schedule, except as otherwise provided for in the Contract Documents.

It is further agreed that payments may be increased to cover additional work ordered by the City, but not shown on the Plans or required by the Specifications in accordance with General Condition No. 47. Similarly, payments may decrease if work is deleted or changed.

By submitting a bid, the Bidder acknowledges the understanding that the bid process is solely intended to serve the public interest in achieving the highest quality of services and goods at the lowest price, and that no right, interest, or expectation shall vest or inure to the benefit of Bidders as a result of any reliance or participation in the process.

In submitting this Proposal, it is understood that the right is reserved by the City to reject any or all Proposals and waive informalities or irregularities in Proposals. The City also reserves the right to delay the award of a contract for a period not to exceed forty-five (45) days from the date of the opening of bids.

The undersigned Bidder further agrees, if awarded the contract for the work included in this Proposal, to begin and to complete and deliver the work contemplated in accordance with all the conditions set forth in the Contract Documents.

The undersigned Bidder has carefully checked the figures inserted by him and understands that they are the Bidder's sole responsibility, and the City will not be responsible for any errors or omissions on the part of the undersigned Bidder in preparing this Proposal although City may check and correct mathematical accuracy in evaluation of the bids.

The undersigned Bidder certifies that this Proposal is genuine, not collusive, or made in the interest or behalf of any person not named as provided in the Information for and Instructions to Bidders, and that the undersigned has not, directly, or indirectly, induced or solicited any other Bidder, or induced any other person, firm, or corporation to refrain from submitting a proposal, and the undersigned has not in any manner sought by collusion to secure for himself an advantage over any other Bidder.

Attached is a certified check without endorsement and with conditions payable to the City of Sedona in the sum of ten percent (10%) of the total bid drawn on a bank which is a member of Federal Reserve System or which is a member of the Federal Deposit Insurance Corporation, or a cashier's check for ten percent (10%) of the total bid or a Bid Bond written by an approved surety company for ten percent (10%) of the total bid.

The undersigned submits a bid bond pursuant to Section 34-201, Arizona Revised Statutes, payable to the City, equal to ten percent (10%) of the total amount of this proposal, and agrees that said bid bond shall be given as a guarantee that the Bidder will enter into the Contract within the time herein stated if the award is made to him by the City. In case of the Bidder's refusal or failure to do so within ten (10) days of Notice of the Award of Contract, or within five (5) days after receiving notice from the City of the rejection of any objections to the Notice of Award, the bond will be forfeited.

The Bidder grants the City the right to hold the lowest three (3) Proposals received, together with the accompanying bid securities, for a period of forty-five (45) days after the date of opening of said Proposals.

The undersigned Bidder further grants the City the right to award this Contract on the basis of any possible combinations of Base Bid and add/deduct alternate(s) (if any) that best suits the City's needs.

Bidder agrees that the City has determined that a reasonable time for the **WWRP Headworks Bar Screen Replacement Project** is the contract time stated in the Advertisement for Bids and issued addendum. The Bidder agrees that this proposal is submitted on this basis, subject to provisions contained in the Contract Documents relating to extensions of time, and agrees to plan and prosecute the work with such diligence that the work shall be completed within the time specified.

Bidder agrees that the bid includes the following items which have been completed in full by the Bidder:

(a) Bid or Proposal
(b) Bid Schedule

(c) Bid Guaranty Bond

(d) Certification of the Bidder's experience and qualifications and statement of Bidder's Qualifications
(e) List of all proposed Subcontractors
(f) Schedule of manufacturers and suppliers, major equipment and material items
(g) Non-collusion Affidavit
(h) Certificate of Insurability
(i) Signed Addenda

Bidder agrees that the City assumes no responsibility for any understanding or representation made by any of its Council members, officers or agents during or prior to the bidding and execution of the Contract, unless (1) such understanding or representations are expressly stated in the Contract or Addenda thereto, or (2) the Contract expressly provides that responsibility therefore is assumed by the City, or (3) said understanding or representation is contained in the information supplied to Bidders by the City or the City Engineer, or as information distributed pursuant to the Information for and Instructions to Bidders. The Bidder further understands that only the Mayor and Council of the City through action taken at a properly noticed meeting, can waive any term or condition or requirement of this Contract or of the bid.

Bidder agrees that all terms set forth in the Information for and Instructions to Bidders as well as all other Contract Documents shall be binding upon the Bidder if a Notice of Award is issued in favor of said Bidder by the City.

Bidder agrees that all major equipment and suppliers shall be set forth herein on the attached "Schedule of Manufacturers and Suppliers, Major Equipment and Material Items",

Bidder understands that this project is to be constructed in compliance with all City, State and Federal laws, rules and regulations, which are applicable to the project and the Contractor and all work performed hereunder.

In making this proposal, the undersigned incorporates and acknowledges all definitions set forth in the Contract Documents.

The undersigned hereby submits this proposal and the accompanying Bid Schedule as its proposal to construct the improvements described in the Contract Documents.

The name and location of the place of business of each Subcontractor who will perform work or labor or render service to the general Contractor in or about the construction of the work or improvements in an amount in excess of one and one-half percent (1.5%) of the general Contractor's total Bid, and the portion of the work which will be done by each Subcontractor is set forth in the Proposed Subcontractor list attached hereto.

Bidder has received all Addenda before submission of Bid, and has examined the same and has included them in the Contract Documents prior to submitting the Bid and has submitted the Bid based upon them.

The Bonding Company which will supply the required Performance and Payment bond is:

_____

Bid Schedule

City of Sedona – WWRP Headworks Bar Screen Replacement Project
Project # 2018-WW-02

ITEM NO.	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE	EXTENDED TOTAL
BASE BID					
1	MOBILIZATION	1	LS		
2	DEMOBILIZATION	1	LS		
3	SITE DEMOLITION	1	LS		
4	SITE WORK (CONCRETE, GRADING, UTILITY TIE-INS, ETC.)	1	LS		
5	HYDRO-DYNE SYSTEM (EQUIPMENT ONLY)	1	LS	$329,800	$329,800
6	HYDRO-DYNE SYSTEM MECHANICAL/STRUCTURAL APPURTENANCES	1	LS		
7	HYDRO-DYNE SYSTEM INSTALLATION MECHANICAL/STRUCTURAL	1	LS		
8	HYDRO-DYNE SYSTEM ELECTRICAL & INSTRUMENTATION APPURTENANCES	1	LS		
9	HYDRO-DYNE SYSTEM INSTALLATION ELECTRICAL & INSTRUMENTATION	1	LS		
10	HYDRO-DYNE SYSTEM PROGRAMMING (by Alliance Service & Control Specialists, Inc.)	1	LS	$5,500	$5,500
11	CHANNEL LINER	1	LS		
12	BYPASS MOPO	1	LS		
				TOTAL BASE BID	
BID ALTERNATES					
13	BOLLARDS	3	EA		
14	WHITETIP SHARK WASHING COMPACTOR (EQUIPMENT ONLY)	1	LS	$38,360	$38,360
15	WHITETIP SHARK WASHING COMPACTOR MECHANICAL/STRUCTURAL APPURTENANCES	1	LS		
16	WHITETIP SHARK WASHING COMPACTOR INSTALLATION MECHANICAL/STRUCTURAL	1	LS		
17	WHITETIP SHARK WASHING COMPACTOR ELECTRICAL & INSTRUMENTATION APPURTENANCES	1	LS		
18	WHITETIP SHARK WASHING COMPACTOR INSTALLATION ELECTRICAL & INSTRUMENTATION	1	LS		
19	WHITETIP SHARK WASHING COMPACTOR PROGRAMMING	1	LS	$1,500	$1,500

CIP: COMPLETE IN PLACE

Owner reserves the right to vary the quantities shown at their discretion. The contractor will accept the quantities if no corrections are made at the conclusion of the pre-bid meeting. All facilities incidental to the item are included in the unit price estimate. Bid Prices submitted include all local, state and federal taxes.

UNIT PRICES SHALL BE USED WHEN EXTENSION OF UNIT PRICES AND TOTAL AMOUNT CONFLICT. WRITTEN UNIT PRICES SHALL BE USED WHEN WRITTEN AND NUMBERICAL UNIT PRICES CONFLICT. BID PRICES SUBMITTED INCLUDE ALL LOCAL, STATE AND FEDERAL TAXES.

The City of Sedona reserves the right to reject all bids, or to award only the base bid, or to award a bid based upon the total of the Base Bid plus additive alternate(s) as selected for award from the additive alternate bid schedule, if additive alternate bid schedule is applicable.

The undersigned is licensed in accordance with the Laws of the State of Arizona:

License Number _____ Class _____

NOW: In compliance with the Notice Inviting Bids and all the provisions hereinbefore and after stipulated, the undersigned, with full cognizance thereof, hereby proposes to perform the Work for the prices set forth in the preceding Schedule(s) upon which award of contract is made.

Individual Contractor

Name:_____

Address:_____

Partnership

Name:_____

Business Address: _____

_____

By: _____, Partner

Other Partners: _____

_____

Corporation

Name:_____

Business Address: _____

_____

By:_____

_____, President

_____, Secretary

Organized under the Laws of the State of _____

Date: _____ Contractor: _____

_____

(SEAL) By: _____

_____

_____

The undersigned Bidder acknowledges receipt of the following addendum:

Addendum #	Dated	Initial
_____	_____	_____
_____	_____	_____

_____

Signature of Bidder

PROPOSED SUBCONTRACTORS

The following information gives the name, business address, and portion of work (description of work to be done) for each Subcontractor that will be used in the work if the Bidder is awarded the Contract. No Subcontractor doing work in excess of one and one-half percent (1.5%) of the total amount of the bid and who is not listed shall be used without the written approval of the City, which shall not be unreasonably withheld. (Additional supporting data may be attached to this page. Each page shall be sequentially numbered and headed "Proposed Subcontractors" and shall be signed.) Substitutions of Subcontractors may be made by the Bidder as long as all Subcontractors used meet all requirements for all Subcontractors and all subcontract agreements meet all requirements set forth in the Contract Documents. The total value of subcontracted work shall not exceed fifty percent (50%) of the contract work as bid. The Bidder shall perform 50% or more of the contract work using Bidder's organization, unless stated otherwise in the specifications. The subcontractor shall have the license required for the work performed. The subcontractor will be required to have a current City of Sedona Business License for the duration of the contract.

Subcontractor Name	Business Address	Description of Work

_____

Signature of Bidder

SCHEDULE OF MANUFACTURERS AND SUPPLIERS; MAJOR EQUIPMENT AND MATERIAL ITEMS

The Bidder proposes that the named items of major equipment and materials required for work will be supplied by the manufacturers or suppliers set forth below as written in by the Bidder. Substitutions will be allowed in accordance with the Contract Documents:

Item	Manufacturer or Supplier

WORKMEN'S COMPENSATION INSURANCE
CERTIFICATE

I am aware of the provisions of Arizona Law, which require every employer to be insured against liability for workmen's compensation in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work of this Contract.

Date: _____

By: _____

NON-COLLUSION AFFIDAVIT

TO BE EXECUTED BY EACH AWARDEE OF A PRINCIPAL CONTRACT IN THE
STATE OF ARIZONA }
} ss
COUNTY OF }

_____, being first duly sworn, deposes and says:

1. That he is _____ (sole owner, a partner, president, secretary, etc.) of_____ _____, the party making the foregoing Bid.

2. That such Bid is not made in the interest of or on behalf of any undisclosed person, partnership, company association, organization, or corporation.

3. That such Bid is genuine and not collusive or sham.

4. That said bidder has not directly induced or solicited any other Bidder to put in a false or sham Bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham Bid, or that anyone shall refrain from bidding.

5. That said Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid Price of said Bidder or of any other Bidder, nor to fix any overhead, profit, or cost element of such Bid Price, nor of that of any other Bidder, nor to secure any advantage against the public body awarding the Contract or anyone interested in the proposed Contract.

6. That all statements contained in such Bid are true.

7. That said Bidder has not, directly or indirectly, submitted his Bid Price or any breakdown thereof, nor the contents thereof, nor divulged information or data relative thereto, nor paid and will not pay any fee in connection therewith to any corporation, partnership, company, association, organization, bid depository, nor to any member or agent thereof, nor to any other individual except to such person or persons as have a partnership or other financial interest with said Bidder in his general business.

NON-COLLUSION AFFIDAVIT
(Continued)

_____
Name of Business

_____
By

_____
Title

Subscribed and sworn to before me this _____ day of _____, 2017.

My Commission expires: _____

_____
(Notary Public)

STATEMENT OF BIDDER'S QUALIFICATIONS

If bidder is a corporation, answer the following:

(a) Date of incorporation; _____
(b) State of incorporation; _____
(c) President's name; _____
(d) Vice President's name(s); _____
(e) Secretary's or Clerk's name; _____
(f) Treasurer's name; _____

If bidder is a partnership, answer the following:

(a) Date of organization _____

(b) Name and address of all partners. State whether it is a general or limited partnership: _____

_____

If other than a corporation or partnership, describe the organization and name principals:

_____

_____

_____

_____

Major Types of Work Done by Company: _____

_____

Principal Office: _____

Telephone Number: _____

Contractor's Bank and Local Contact: _____

EXPERIENCE QUESTIONNAIRE

1. How many years has your organization been in business as a contractor under your present business name?

   _____

2. How many years' experience in the proposed type and size of construction work has your organization had:

   (a) As a general contractor? _____

   (b) As a subcontractor? _____

3. Are you licensed as a General Engineering contractor, or any other title?

   _____

   If "yes", in what city, county and state? _____

   What class license and number? _____

4. List the most recent projects your organization has had in construction of work similar in type and size to the work proposed herein:

Contract Amount	Class of Work	When Completed	Name, Address and Telephone No. of City

5. Has any construction contract to which you have been a party been terminated by the owner; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety extended any monies in connection with the contract for which they furnished a bond on your behalf? If

the answer to any portion of this question is “yes”, please furnish details of all such occurrences including the name of the owner, architect or engineer, and surety, name and date of project.

o YES o NO

6. Has any officer or partner of your organization ever been an officer or partner of another organization that had any construction contract terminated by the owner; terminated work on a project prior to its completion for any reason; had any surety which issued a performance bond complete the work in its own name or finance such completion; or had any surety expend any monies in connection with the contract for which they furnished a bond? If the answer to any portion of this question is “yes”, please furnish details of all such occurrences including name of owner, architect or engineer, and surety, name and date of project.

   o YES o NO

7. What is the wastewater facilities construction experience of the principal individuals of your organization?

Individual's Name	Yrs Exp with this Company	Present Position or Office	Years of Construction Experience	Magnitude & Type of Work	In What Capacity

8. How many headworks replacement projects has your company, or the sub-contractor responsible for this work, completed in the past 10-years? (This does not include an individual’s experience, separate from the company’s experience; an individual’s experience should be listed in their resume, if provided. **List a minimum of 6 projects.**)

NO.	Project Name	Owner	Contact	Contact Phone	Amount
1					
2					
3					

4					
5					
6					

9. How many municipal projects, has your company completed in the past 10-years? (This does not include an individual's experience, separate from the company's experience; an individual's experience should be listed in their resume, if provided. **List a minimum of 6 projects.**)

NO.	Project Name	Owner	Contact	Contact Phone	Amount
1					
2					
3					
4					
5					
6					

Wastewater Department
Mail: 102 Roadrunner Drive Sedona, AZ 86336
Site: 7500 W. SR 89A Sedona, AZ 86336
(928) 204-2234 · Fax: (928) 204-7137

PAST PERFORMANCE QUESTIONNAIRE

To:_____ Phone:_____

Email:_____

Subject: Past Performance Survey of : _____
Name of Company Being Surveyed

_____
Name of Key Personnel

The City of Sedona collects past performance information (on firms and key personnel) to assist in procuring/awarding projects based on value. The firm/individual listed above is requesting reference for a past project they have completed. It would greatly be appreciated if you would take a few moments to complete the survey and return it to the City of Sedona.

Rate each of the criteria on a scale of 1 to 10, with 10 representing that you were very satisfied (and would hire the firm/individual again) and 1 representing that you were very unsatisfied (and would never hire the firm/individual again). Please rate each of the criteria to the best of your knowledge. If you do not have sufficient knowledge of past performance in a particular area, please leave it blank.

Client Name:_____ Date Completed:_____

Project Name:_____

No.	CRITERIA	UNIT	RATING
1	Ability to meet customer expectations for quality of work performed	(1-10)	
2	Ability to manage costs	(1-10)	
3	Ability to maintain project schedule	(1-10)	
4	Comfort level in hiring the firm / individual again	(1-10)	
5	Leadership ability of personnel assigned to the project	(1-10)	
6	Ability to Communicate Effectively	(1-10)	

_____ _____
Printed Name of Evaluator Signature of Evaluator

Thank you for your time and effort in assisting the City of Sedona in this important endeavor.

Please email or mail the completed survey by February 13, 2017 to:

Rholland@sedonaaz.gov or
Attn: Roxanne Holland, P.E.
City of Sedona
102 Roadrunner Drive
Sedona, AZ 86336

BIDDER'S AFFIDAVIT

The undersigned, as_____
(President, Officer of Corporation, Member of Firm) of the prospective bidder, hereby certifies that the foregoing information is, to the best of his/her knowledge and belief, true and accurate as of the _____ day of _____, 2017. Contractor, by his signature hereon, authorized the obtaining of reference information and hereby releases the party providing such information and the City of Sedona from any and all liability to Contractor as a result of such reference information being provided. Contractor further waives any right to receive copies if information so provided.

Corporate Seal
(If Corporation)

Contractor

BY:_____
Position (must be President, Officer of Corporation or

NOTARY

STATE OF _____)
)ss
COUNTY OF_____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2017, by _____
as _____For the _____.

WITNESS my hand and official seal.

My commission expires: _____.

_____
Notary Public

CONTRACTOR'S FINANCIAL STATEMENT

1. Submit the most recent financial statements, including the Balance Sheet, Income Statement, sources and uses of funds, notes to the financial statement, and the auditor's opinion, that cover the most recent twelve (12) month period. These statements must have been audited by a Certified Public Accountant. However, if the prospective bidder has previously performed satisfactory work according to the City of Sedona's Engineering Department, unaudited financial statements may be allowed.

   Financial statements must be submitted on an accrual basis, in a form which clearly indicates the bidder's assets, liabilities, and net worth.

2. Also submit the most recent unaudited financial statements subsequent to number 1 above.

(Financial statements shall be required of and submitted by the apparent low bidder within two (2) days after the bid opening)

CERTIFICATE OF INSURABILITY

I hereby certify that as Bidder to the City of Sedona, Arizona, _____project, I am fully aware of the requirements of the City insurance requirements for contractors and that by submitting this bid proposal, assure the City that I am able to produce the required minimum insurance coverage should I be selected to be the successful Bidder.

Should I be selected to be the successful Bidder and then become unable to produce the insurance coverage within ten (10) days of receipt of the Notice of Award, I understand that my bid will be rejected and that I will forfeit my bid bond.

BY:_____ Date_____

Title:_____

SPECIAL CONDITIONS

General

Work shall be in accordance with Uniform Standard Specifications for Public Works Construction, distributed by Maricopa Association of Governments, 2012 edition (MAG), except to the extent that these specifications specify other procedures, processes, forms, materials, details, or other direction regarding the work, and as required to comply with local ordinances and regulations.

Whenever the term County is used it shall be held to mean the City of Sedona. Whenever the term County Engineer is used it shall be held to refer to the City Engineer.

Electrical work shall be subject to inspection by the City of Sedona Building Safety Division and compliance with its requirements.

General Provisions

The General Conditions and Specifications shall be considered as immediately following the Special Conditions in Order of Precedence and are part of the Contract documents.

1. Work Hours/Schedule

The regular working hours for this contract shall be from 7:00 AM to 5:30 PM Monday through Friday. Work will not be allowed on City of Sedona holidays regardless of the weekday. Work hours shall include clean up time. The City operates on a four-day workweek; only work not requiring immediate inspection, by the City, may be performed during the Friday work hours. Other than these work hours, all other parts of General Conditions Section 9 "Schedule of Construction" shall remain intact. The contractor shall provide the Wastewater Manager with a written work schedule projecting out at least two work weeks. Permission to work non-regular work hours shall be subject to approval by the Wastewater Manager or designee and the provisions of General Conditions, Section 39.

The schedule, required by Section 9 and 31.G.3 of the General Conditions, is amended as follows. The schedule shall be updated at each progress meeting, which will occur weekly. This schedule update shall include a detailed two week look ahead; it shall indicate work requiring inspection. The schedule shall be submitted in an electronic format compatible with Microsoft Project Standard 2007, and hard copy format.

The City of Sedona has the following holiday schedule:

New Year's Day, January 1st
Martin Luther King/Civil Rights Day, 3rd Monday of January
President's Day, 3rd Monday in February
Memorial Day, Last Monday in May
Independence Day, July 4th

Labor Day, 1st Monday in September
Veteran's Day, November 11th
Thanksgiving Day, 4th Thursday in November AND the Friday after Thanksgiving Day
Christmas Day, December 25th.

2. Order of Precedence

In the event that there is a discrepancy between specifications of these contract documents, the order of precedence is defined on page C-12 – C-13 of these contract documents. Where conflict appears between the General Conditions and the Technical Specifications, the General Conditions shall prevail.

3. Start of Construction

Construction shall not begin until the Contractor has at a minimum provided the following:

- Storm Water Pollution Control Plan provisions are in place
- The contractor shall have a City of Sedona NOI for storm water pollution prevention
- Survey stakes and marks have been placed in the field to accommodate at least two weeks construction work and survey notes have been provided to the City as per the project specifications
- Equipment Rate Submittal as required by Section 47.D.3 of the General Conditions
- A complete project schedule as required by the General Conditions

This provision shall not require that the City of Sedona refrain from issuing a notice to proceed or require an extension of time to accommodate Contractor compliance with it.

4. Project Control

- The horizontal and vertical control for this project is shown on the civil drawings
- The benchmarks for this project are indicated on the civil drawings
- The Contractor shall be responsible for all survey on the project **see Section 15 of the General Conditions.**

5. Submittals

In addition to the submittals called for in the Technical Specifications and General Conditions, additional submittals are required for the following items: pipe, concrete mix design, asphalt mix design, metal fabrications, and equipment rental rates for all equipment to be utilized for the project (as required by Section 47.D.3 of the General Conditions).

6. Various items of Work

The Contractor shall provide the City reasonable and timely notice in writing prior to exceeding quantities established in the Bid Schedule. Failure to notify the City in a timely manner prior to exceeding the contractual quantities identified in the Bid Schedule shall be sufficient reason for the City to deny such claim.

Roadway specifications shall conform (or comport with City Code Sections…) to City Code Sections 12.05.110 and 12.05.120.

Clearing and grubbing shall be subject to MAG specification Section 201 and full compensation shall be considered as provided in bid item "Mobilization". No separate payment shall be made for trees.

It is the contractor's responsibility to comply with the ADA, specifically the requirements of ADAAG, even if the project plans show an item to not meet the requirements of ADAAG.

The City of Sedona reserves the right to request a schedule of values for any of the lump sum bid items.

All guarantees shall be per Section 51 of the General Conditions.

If it is determined that import or export of earthen material in excess of 40 cubic yards (combined total) is needed, a Haul Plan shall be provided to the City Engineer. At least 5 city working days prior to the placement of fill or excavated material from a grading project within the city on other properties located within the city, Engineering Services shall be notified in writing of the intent to place the material on other property. This requirement shall apply when the total amount of material placed on other properties within the city exceeds 40 cubic yards or if the other property on which the fill is to be placed is located within 0.75 miles of Oak Creek, or lies within a city designated flood plain. The City Engineer may approve or deny permission to place such material.

The contractor shall provide copies of all required testing to the Wastewater Department.

The City reserves the right to require that payment requests be submitted in a format it approves.

The City may require information as necessary to verify proper work eligibility of persons, subcontractor, or others providing labor, equipment, material or services to this project. This may include but is not limited to social security numbers, driver's license numbers, and evidence of age or citizenship.

7. Permits

The Contractor shall be responsible for obtaining permits bearing on the work and adhere to provisions of said permits.

8. Utility Relocation

It shall be the responsibility of the Contractor to arrange and coordinate the relocation of any utilities found to be in conflict with the work. Utility relocation costs not identified as a bid item in the contract will be the City's responsibility.

9. Local Drainage

The Contractor shall reconstruct roadways, driveways, sidewalks, ditches and other surfaces at elevations that will ensure the drainage is improved or unchanged from the existing pre-construction conditions.

The Contractor shall manage any upstream flows during construction to maintain continuous conveyance and historic flow patterns through the project area.

10. Required Inspection

Work requiring inspection includes the following: testing, asphalt preparation and placement, cleanup, rebar inspection, traffic control setup and removal, trench bedding placement and backfill compaction, pipe placement, and concrete formwork prior to pouring concrete.

11. Project Progress Payments

Payment of up to 20% of stored materials or equipment shall be made, upon request of the Contractor, pursuant to the requirements in General Conditions Section 31.C.

12. Subcontractors

General Conditions Section 13.C. shall be revised to allow subcontractors to collectively perform no more than sixty-five percent (65%) of the value of the total work required. The Contractor shall self-perform thirty-five percent (35%) of the total contract work.

Wastewater Department
Mail: 102 Roadrunner Drive Sedona, AZ 86336
Site: 7500 W. SR 89A Sedona, AZ 86336
(928) 204-2234 · Fax: (928) 204-7137

NOTICE OF AWARD

Date

Contractor Name
Street or PO Box
City, State Zip

Attention:

SUBJECT: NOTICE OF AWARD - WWRP HEADWORKS BAR SCREEN REPLACEMENT PROJECT

The City of Sedona has duly considered the bid submitted by _____, for the **WWRP Headworks Bar Screen Replacement Project** and it appears that your proposal for performing the work is fair, equitable, and in the City's best interest. The bid price includes a total amount of **$_____** for the base bid and bid alternate(s). Said bid is hereby accepted at the prices contained therein, and in accordance with all provisions set forth in the Contract Documents.

In accordance with the terms of the Contract Documents, you are required to execute the formal Contract and furnish the required Performance and Payment Bonds within ten (10) consecutive calendar days from and including the date of receipt of this Notice.

In addition, you are requested to furnish at the same time, the required Owner's protective liability and property damage insurance policy, and certificates of insurance evidencing compliance with the other requirements for insurance stated in the Contract Documents. Your certificate of insurance shall be accompanied by an endorsement and a statement that the Certificate of Insurance meets the entire requirements of the specifications, or shall state and describe specific exclusions. In addition, your certificate of insurance must list any additionally insured as required by the specifications.

The Bid Bond submitted with your proposal will be retained until the Contract has been executed and the required Performance and Payment Bonds have been furnished and approved. In the event that you should fail to execute the Contract or furnish the Performance and Payment Bonds within the time limit specified, the City, at its discretion, may cash the Bid Bond and proceed with steps that are in the City's best interest.

Please complete and return the enclosed W-9 form. In addition, companies engaging in business in or for the City of Sedona are required to obtain a yearly business license ($25/year). For additional information or questions on how to apply for a new business license or renew your existing business license, please contact the Finance Department at (928) 204-7185 or email businesslicense@SedonaAZ.gov. An application can be downloaded from our website,

http://www.sedonaaz.gov/Sedonacms/Modules/ShowDocument.aspx?documentid=21919.

Please include the following when returning signed documents:

- ☐ 1 Original Signed & Attested Contract
- ☐ 1 Original Israel Boycott
- ☐ Completed W-9
- ☐ Insurance and Bonds
- ☐ Signed Notice of Award

The original documents will be kept on file at the City Clerk's office. Scanned copies will be returned to you upon full execution.

CITY OF SEDONA, ARIZONA

Sincerely,

_____
Roxanne Holland, PE
Wastewater Manager

RECEIVED AND ACCEPTED:

Contractor

By:_____

Date:_____

Enclosures: 1. Contract
2. W-9

RMH/rw
cc: City Manager (e-copy)
Director of Public Works/City Engineer (e-copy)
File: BSR – NTP – 410

Wastewater Department
Mail: 102 Roadrunner Drive Sedona, AZ 86336
Site: 7500 W. SR 89A Sedona, AZ 86336
(928) 204-2234 · Fax: (928) 204-7137

NOTICE TO PROCEED

Date

Contractor Name.
Street or PO Box
City, State Zip

Attention:

Subject: **NOTICE TO PROCEED - WWRP HEADWORKS BAR SCREEN REPLACEMENT PROJECT**

You are hereby authorized to proceed with work effective _____, 2017 and fully complete all work within _____ consecutive days from this date. The completion date for this Project is therefore _____, 2017. Liquidated damages of **$ 570 per day** are applicable for each day past _____, 2017 for which work on this Project is not complete, unless an adjustment is authorized by a change order. Please acknowledge your receipt of this letter and agreement with the terms stated by signing in the space provided and returning to the City for our files.

CITY OF SEDONA, ARIZONA

BY:_____
Roxanne Holland, P.E.
Wastewater Manager

Date:_____

Receipt
Acknowledged

By:_____

Date:_____

JAD/dkp
cc: Director of Public Works/City Engineer (e-copy)
Chief Public Works Inspector (e-copy)
Contractor, Contractor Company (e-copy)
Consultant, Consultant Company (e-copy)
File: BSR – NTP - 410

City of Sedona Wastewater Department
Mail: 102 Roadrunner Drive Sedona, AZ 86336
Site: 7500 W. SR 89A Sedona, AZ 86336
(928) 204-2234 Fax: (928) 204-7137

Wastewater Department
Change Order

This change order is not effective unless signed by the City Manager of the City of Sedona or his properly designated representative. Section 47 of the Contract General Conditions shall apply.

****

THIS CHANGE ORDER CONSTITUTES FULL, FINAL AND COMPLETE COMPENSATION TO THE CONTRACTOR FOR ALL COSTS, EXPENSES, OVERHEAD, PROFIT, AND ANY DAMAGES OF EVERY KIND THAT THE CONTRACTOR MAY INCUR IN CONNECTION WITH THE WORK DESCRIBED IN THIS CHANGE ORDER, INCLUDING ANY IMPACT ON THE DESCRIBED WORK OR ON ANY OTHER WORK UNDER THE CONTRACT, ANY CHANGES IN THE SEQUENCES OF ANY WORK, ANY DELAY TO ANY WORK, ANY DISRUPTION OF ANY WORK, ANY RESCHEDULING OF ANY WORK, AND ANY OTHER EFFECT ON ANY OF THE WORK UNDER THIS CONTRACT. BY THE EXECUTION OF THIS CHANGE ORDER, THE CONTRACTOR ACCEPTS THE CONTRACT PRICE CHANGE AND THE CONTRACT COMPLETION DATE CHANGE, IF ANY, AND EXPRESSLY WAIVES ANY CLAIMS FOR ANY ADDITIONAL COMPENSATION, DAMAGES OR TIME EXTENSIONS, IN CONNECTION WITH THE DESCRIBED WORK.

****

CHANGE ORDER NUMBER	**DATE:**
PROJECT:	**WWRP HEADWORKS BARSCREEN REPLACEMENT PROJECT**
CONTRACTOR NAME:	
REASON FOR CHANGE:	

Plan Sheet #'s affected by this change:	n/a			
Specification Sections upon which Change Order is based:	GC 47-49			
Change requested by (check one):		City		Contractor		Both
Contract time adjustment:		Calendar Days				

This contract change order

	increases the maximum estimated contract compensation per GC Section 47 contract adjustment as follows:
	decreases the maximum estimated contract compensation per GC Section 47 contract adjustment as follows:

$0.00	**+**	**$0.00**	**+**	**$0.00**	**+**	**$0.00**	**=**	**$0.00**
Method A	**+**	**Method B**	**+**	**Method C**	**+**	**Method D**	**=**	**Total Cost Adjustment**

Contract Compensation:		**Contract Time:**	
Original Contract Amount	$0.00	Original Contract Time (days)	250
This Change Order	$0.00	This Change Order (days)	0
All Previous Change Orders	$0.00	All Previous Change Orders (days)	
Total Maximum Compensation	$0.00	Total Maximum Contract Time (days)	250

CONTRACTOR ACCEPTANCE	**CITY OF SEDONA - WASTEWATER DEPARTMENT APPROVED**
BY: _____	BY: _____
DATE: _____	DATE: _____

CITY OF SEDONA - CITY MANAGER APPROVAL
BY: _____
DATE: _____

Attach a more complete description of the change and supporting documentation to this form.

SUNRISE ENGINEERING

City of Sedona

Wastewater Reclamation Plant Headworks Bar Screen Replacement

Re-Bid

Technical Specifications

SEI Project No. 05623 August 14, 2017

RE-BID
TECHNICAL SPECIFICATIONS

For the

City of Sedona
Wastewater Reclamation Plant Headworks

Bar Screen Replacement

Prepared For:
City of Sedona
102 Roadrunner Drive
Sedona, Arizona 86336
928.204.7111
www.sedonaaz.gov

Prepared By:
Sunrise Engineering, Inc.
2152 South Vineyard, Suite 123
Mesa, AZ 85210
480.768.8600
www.sunrise-eng.com

SUNRISE ENGINEERING

Registered Professional Engineer (Environmental)
CERTIFICATE NO. 52848
TYSON L. GLOCK
Date Signed 8/19/17
ARIZONA U.S.A.

EXPIRES 9/30/17

Section No. of Pages

TABLE OF CONTENTS
FOR
TECHNICAL SPECIFICATIONS

00700.1 GENERAL SPECIFICATIONS/PROJECT REQUIREMENTS

All items of work and associated construction requirements are adequately described and defined in the Uniform Standard Specifications for Public Works Construction sponsored and distributed by the Maricopa Association of Governments (MAG) along with the MAG Uniform Standard Details, latest revisions, and City of Sedona (Sedona) Specifications or Standards and within these special provisions. Copies of the Standard Specifications may be obtained from the Maricopa Association of Governments, 1820 W. Washington Street, Phoenix, AZ 85007 (602) 254-6308.

The information written into these special provisions will:

1. Describe any special or unusual conditions.
2. Explain details of the work not covered in the MAG Specifications and Standard Details.
3. Relate certain work to specific bid items or payment quantities.

00700.2 MAG SPECIFICATIONS (2015) PART 100 – GENERAL CONDITIONS

The order of precedence from Section 104.1 shall be deleted in its entirety and shall be per the contract.

00700.2.1 DEFINITIONS

In addition to the definitions already listed in MAG, the following terms shall have meanings indicated which shall be applicable to both the singular and plural thereof:

ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings, and specifications, by additions, deletions, clarifications, or corrections.

BID - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

BONDS - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the Contractor and its surety in accordance with the Contract Documents.

CONTRACT PRICE - The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

CONTRACT TIME - The number of calendar days stated in the Contract Documents for the completion of the Work.

DRAWINGS - The part of the Contract Documents which show the characteristics and scope of the Work to be performed and which have been prepared or approved by the Engineer.

PROJECT – Synonymous with The Work, i.e., the total construction to be provided under the Contract Documents which may be the whole or a part as indicated elsewhere in the Contract Documents.

RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the Owner who is assigned to the Project site or any part thereof.

SAMPLES - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

SUPPLIER - Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

END OF SECTION

01019.1 DESCRIPTION

Measurement and payment for all pay items in the proposal shall conform to section 109 of the MAG Uniform Standard Specifications for Public Works Construction (MAG Specifications) latest edition, City of Sedona (Sedona) General Conditions and standards as specified in these Technical Specifications. In the event of a conflict between these Technical Special Provisions and the requirements of the plans, detail drawings, or the MAG Specifications, these Technical Special Provisions shall prevail. In the event of a conflict between the Technical Special Provisions and the Sedona's General Conditions, the General Conditions shall prevail.

Payment of the contract items shall be compensation in full for furnishing all overhead, labor, material, tools, equipment, and appurtenances necessary to complete the work in a good, neat, and satisfactory manner as indicated on the plans, or as specified, with all necessary connections and appurtenances for the satisfactory use of and/or operation of said item. No additional payment will be made for work related to each item unless specifically noted or specified. Measurement will be in place for the completed work with no allowance for waste.

01019.2 BID FORM DESCRIPTION

Bid form description shall be per the General Conditions.

01019.3 BID ITEMS

The measurement and payments for Section 01019.4 shall govern in the case of a conflict with measurement and payment of any subsequent sections.

01019.3.1 Mobilization

Mobilization shall be per Section 02000 and include all aspects of the section including visual records and service connection documentation. Additional requirements for mobilization are located in the General Conditions.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.2 Demobilization

Demobilization shall be per the General Conditions, Special Conditions, and Section 02000 and include all aspects demobilizing, disposal of debris, and cleanup of the site to bring the site back to the preconstruction condition or better.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.3 Site Demolition

All site demolition shall be per Section 02500, 02520 and 02900 and shall include all materials, equipment and labor for the removal of existing headworks screens, FRP plate, control panels, electrical components, concrete slab, and concrete curb as depicted on sheet 3 (TOPO Drawing) of the plans.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.4 Site Work

Site work shall be per Section 02015, 02020, 02510, 02520, and Division 03000 and include all subsurface investigation, clearing and grubbing, testing, concrete cutting and concrete work

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.5 Hydro-Dyne System (Equipment Only)

The Hydro-Dyne system equipment has been sole sourced and shall include the screens, sluice, washer compactor, control panels, freeze protection for the Hydro-Dyne Equipment, Hydroranger and ultrasonic sensors, channel level switches, solenoid valves, and all other appurtenances included in Section 11250. All equipment, testing, and startup services necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

01019.3.5.1 Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.6 Hydro-Dyne System Mechanical/Structural Appurtenances

The Hydro-Dyne System appurtenances shall include piping, valves, trench work, pipe support, pipe insulation, pipe crossing ramp, and all other appurtenances not provided with the Hydro-Dyne System equipment. All materials, equipment, testing and startup services necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

01019.3.6.1 Piping shall be per Section Sections 15110, and 15230, with trench work per Section 02200.

01019.3.6.2 Valving shall be per Section 15230 and the drawings.

01019.3.6.3 Pipe insulation, insulation shielding, and pipe crossing ramp shall be per the drawings.

01019.3.6.4 Pipe supports shall be per the drawings and Section 05010.

01019.3.6.5 Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.7 Hydro-Dyne System Installation Mechanical/Structural

The Contractor is responsible for installing the Hydro-Dyne System equipment and all appurtenances. This includes screens, sluice, washer compactor, piping, valves, trench work, pipe support, pipe insulation, pipe crossing ramp, and all other appurtenances. All materials, equipment, labor, testing, and any other appurtenances necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

01019.3.7.1 The screen, sluice, washer compacter, and control panels shall be per Section 11250.

01019.3.7.2 Piping shall be per Section Sections 02222, 02226, 15110, and 15230, with trench work per Section 02200.

01019.3.7.3 Valving shall be per Section 15230 and the drawings.

01019.3.7.4 Pipe insulation, insulation shielding, and pipe crossing ramp shall be per the drawings.

01019.3.7.5 Pipe supports shall be per the drawings and Section 05010.

01019.3.7.6 Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.8 Hydro-Dyne System Electrical & Instrumentation Appurtenances

The Hydro-Dyne System electrical & instrumentation appurtenances shall include conduits, wiring, liquid level float (see Key Note 8 on DWG E3), three (3) disconnect switches and all other appurtenances not included with the Hydro-Dyne System equipment. Appurtenances shall be per Division 16 and Section 17315. All materials, equipment, testing and startup services necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.9 Hydro-Dyne System Installation Electrical & Instrumentation

The Contractor is responsible for installing the electrical and instrumentation for the Hydro-Dyne System and all appurtenances. This includes the screens, sluice, washer compactor, control panels, Hydroranger, liquid level sensors and floats, disconnect switches, conduit, wiring and all other appurtenances. All materials, equipment, labor, testing, and any other appurtenances necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.10 Hydro-Dyne System Programming

The Hydro-Dyne Programming shall be per Section 11250 and include SCADA programming for both screens and a washing compactor. All materials, equipment, labor, testing, and any other appurtenances necessary to provide SCADA commination for the screens and washer compactor system shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.11 Bid Alternate Bollards

The bid alternate bollards shall be per Section 05570 and include the painted, removable bollards as shown in the drawings.

Measurement and payment shall be made for each complete in place bollard as indicated in the Contract Documents and Specifications.

01019.3.12 Bid Alternate Whitetip Shark Washing Compactor (Equipment Only)

The bid alternate Whitetip Shark Washing Compactor shall include the washing compactor, freeze protection, required control panel upgrades, disconnect switch, conduit, wiring, and all other appurtenances necessary to provide a fully functional washing compactor as shown in the drawings. Equipment shall be per Section 11250. All equipment, testing, and startup services necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.13 Bid Alternate Whitetip Shark Washing Compactor Mechanical/Structural Appurtenances

The Whitetip Shark Washing Compactor appurtenances shall include piping, valves, pipe support, pipe insulation, and all other appurtenances not provided with the washing compactor equipment. All materials, equipment, testing and startup services necessary to provide fully functional washer compactor as shown in the drawings shall be included.

01019.3.13.1 Piping shall be per Section Sections 15110, and 15230.

01019.3.13.2 Valving shall be per Section 15230 and the drawings.

01019.3.13.3 Pipe insulation and insulation shielding shall be per the drawings.

01019.3.13.4 Pipe supports shall be per the drawings and Section 05010.

01019.3.13.5 Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.14 Bid Alternate Whitetip Shark Washing Compactor Installation Mechanical/Structural

The Contractor is responsible for installing the Whitetip Shark Washing Compactor equipment and all appurtenances. This includes the washer compactor, piping, valves, pipe support, pipe insulation, and all other appurtenances. All materials, equipment, labor, testing, and any other appurtenances necessary to provide fully functional screens and washer compactor system as shown in the drawings shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.15 Bid Alternate Whitetip Shark Washing Compactor Electrical & Instrumentation Appurtenances

The Whitetip Shark Washing Compactor electrical & instrumentation appurtenances shall include conduits, wiring, disconnect switch, and all other appurtenances not included with the washing compactor equipment. Appurtenances shall be per Division 16. All materials, equipment, testing and startup services necessary to provide a fully functional washer compactor as shown in the drawings shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.16 Bid Alternate Whitetip Shark Washing Compactor Installation Electrical & Instrumentation

The Contractor is responsible for installing the electrical and instrumentation for the Whitetip Shark Washing Compactor and all appurtenances. This includes the washer compactor, upgrades to the control panel, disconnect switch, conduit, wiring and all other appurtenances. All materials, equipment, labor, testing, and any other appurtenances necessary to provide a fully functional washer compactor as shown in the drawings shall be included

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

01019.3.17 Bid Alternate Whitetip Shark Washing Compactor Programming

The bid alternate programming shall be per 11250 and include SCADA programming for a washing compactor. All materials, equipment, labor, testing, and any other appurtenances necessary to provide a fully functional washer compactor SCADA communication shall be included.

Measurement and payment shall be made at the contract lump sum price and shall be full compensation for the item complete in place as indicated in the Contract Documents and Specifications.

END OF SECTION

01030.1 DESCRIPTION

This section covers project meetings including the pre-construction meeting and other progress and/or work coordination meetings conducted to provide communication and awareness to all parties associated with the Contract.

01030.2 PRE-CONSTRUCTION CONFERENCE

Prior to the commencement of work at the site, a pre-construction conference will be held at a mutually agreed time and place to be arranged by the Engineer. The Engineer shall also provide notification to all parties expected to attend the meeting. Attendees will include the following:

- Engineer
- Project Inspector
- Owner/Owner's Representative
- Contractor/Contractor's Representative/ Subcontractors as appropriate
- Governmental Representatives as appropriate (State, County, Municipal, etc.)
- Manufacturer/Supplier Representatives/Adjoining Contractors, as appropriate.
- Utility Service Representatives as appropriate.

Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

01030.2.1 Unless previously submitted to the Engineer, the Contractor shall bring to the conference one copy each of the following:

- Contract construction schedule in accordance with the General Conditions.
- Procurement schedule of major equipment and materials and items requiring long lead-time.
- Shop Drawings, samples or substitution proposals for items proposed as substitutions or "or equal" items.
- Schedule of work that includes the anticipated monthly payment amounts during the contract.
- A Schedule of Values of work to be paid for as lump sum items where partial payment is anticipated.

Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

01030.2.2 The purpose of the 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 agenda may include but not be limited to the following items:

- Contractor's Work Schedule.
- Transmittal, review, distribution and approval of Contractor's submittals.
- Processing of applications for payment.
- Maintaining records and documents.
- Critical work sequencing.
- Field decisions and Change Orders.
- Use of project site, office and storage areas, security, housekeeping, and Owner's needs.
- Major equipment deliveries and priorities.
- Interpretation of Drawings and Specifications.
- Contractor's responsibilities for safety, first-aid and sanitation.

Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

01030.2.3 The Engineer will preside at the pre-construction conference and will arrange for keeping minutes and distributing them to all attendees to the meeting.

01030.3 PROGRESS/COORDINATION MEETINGS

01030.3.1 The Contractor shall conduct regular on-site progress and coordination meetings at least weekly and at other times as requested by Engineer or as required by progress of the work. The Contractor, Engineer, and all Subcontractors active on the site shall be represented at each meeting. The Contractor may, at its discretion, request attendance by representatives of its suppliers, manufacturers, and other Subcontractors. The Contractor shall be responsible for providing written notification to those deemed necessary for attendance at least 36 hours prior to the time set for the meeting.

01030.3.2 The Contractor shall preside at the meetings and maintain a file of minutes of the proceedings. The purpose of the meetings will be to review the progress of the work, maintain coordination of effort, discuss changes in scheduling, and resolve other problems which may develop.

01030.3.3 Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

01090.1 DESCRIPTION

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

01090.1.1 DEFINITIONS OF ABBREVIATIONS AND ACRONYMS

AAR	Association of American Railroads
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
ADC	Air Diffusion Council
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute, Inc.
APWA	American Public Works Association
ARI	Air Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BLM	Bureau of Land Management (U.S. Department of Interior)
CDA	Copper Development Association
CEMA	Conveyor Equipment Manufacturer's Association
CGA	Compressed Gas Association
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CS	Commercial Standard of NBS (U.S. Dept. of Commerce)
CTI	Cooling Tower Institute
DIP	Ductile Iron Pipe
EIA	Electronic Industries Association
EPA	U. S. Environmental Protection Agency
ETL	Electrical Test Laboratories
FEMA	Federal Emergency Management Administration
FERC	Federal Energy Regulatory Commission
FS	Forest Service (U.S. Department of Agriculture)
FWS	Fish and Wildlife Service
GI	Galvanized Iron
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials

ID	Inside Diameter
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IMC	International Mechanical Code
IME	Institute of Makers of Explosives
IPC	International Plumbing Code
ISA	Instrument Society of America
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturer's Association
MOPO	Maintenance of Plant Operation
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFGC	National Fuel Gas Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NRCS	Natural Resources Conservation Service (U.S. Department of Agriculture) (formerly SCS)
NSF	National Sanitation Foundation
OD	Outside Diameter
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PDI	Plumbing and Drainage Institute
PE	Polyethylene
PVC	Polyvinyl Chloride
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPWC	Standard Specification for Public Works Construction
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
UPRR	Union Pacific Railroad
USDARD	Rural Development (U.S. Department of Agriculture) (formerly Farmers Home Administration)
WCRSI	Western Concrete Reinforcing Steel Institute
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association
WWRP	Wastewater Reclamation Plant

01090.2 REFERENCED WORKS, CODES AND STANDARDS

Whenever references to specifications, codes, standards and other publications are made to these Specifications, the following rules shall apply:

01090.2.1 TITLES OF SECTIONS AND PARAGRAPHS

Titles of sections and/or paragraphs shown in these Specifications are for convenience of reference only, and do not form a part of the Specification.

01090.2.2 APPLICABLE PUBLICATIONS

Whenever references in these specifications are made to published specifications, codes, standards, or other requirements, it shall be understood that unless a date is specified, only the latest edition of these specifications, codes, and/or standards 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.

01090.2.3 SPECIALISTS AND SPECIAL 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 direction shall be recognized as special requirements and is 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" and qualified for the assignment of the work. Nevertheless, the final responsibility for fulfilling this assignment remains with the Contractor.

01090.2.4 BUILDING CODES

Reference herein to "Building Code" shall mean the Uniform Building Code issued by the International Conference of Building Officials (ICBO). The latest edition of the code as approved and used by the local agency as of the date of award, as adopted by the agency having jurisdiction, shall apply to the work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

01090.2.5 OSHA

01090.2.5.1 OSHA REGULATIONS - 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.

01090.2.5.2 OSHA STANDARDS - References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards of the U.S. Code of Federal Regulations, including all changes and amendments thereto.

01090.2.6 DOT STANDARDS/SPECIFICATIONS

References to "State DOT Specifications" or "State DOT Requirements" shall mean the Specifications for Excavation on State Highway Right-of-Way and/or Standard Specifications for Road and Bridge Construction, including all amendments thereto, issued by the State agency responsible for highways wherein the Contract is located and any other written requirements or provisions issued by that agency which are contained in these Contract Documents.

01090.2.7 FEDERAL PIPELINE SAFETY STANDARDS

Reference to "Federal Pipeline Safety Standards" shall mean Title 29, Parts 191 and 192, Federal Pipeline Safety Minimum Standards, U.S. Code of Federal Regulations including all changes and amendments thereto.

01090.2.8 STATE GAS PIPELINE SAFETY STANDARDS

References to "State Gas Pipeline Safety Standards" shall mean the appropriate section/s of the legal code or regulations adopted in the State wherein the work is located, including all changes and amendments thereto.

01090.3 STANDARDS IMPOSED BY OTHER AGENCIES OR ORGANIZATIONS

01090.3.1 PROPERTY BELONGING TO OTHER AGENCIES OR ORGANIZATIONS

Construction may occur on property owned or administered by agencies or organizations other than the Owner, such as federal and/or state departments of transportation, the U. S. Forest Service, the U. S. Bureau of Land Management, the U.S. Fish and Wildlife, counties, canal companies, irrigation companies, utility companies, other federal and state agencies, municipal governments, etc. Work which is to take place on such property may be required to be in accordance with special construction requirements of that agency or organization as well as these specifications.

01090.3.2 ADDITIONAL INFORMATION AND SPECIFICATIONS

Information will be provided on the plans to indicate areas of the Work which fall on property owned or administered by agencies and organizations other than the Owner. Specifications from agencies which are affected by the work will be provided in the Appendix to the Contract Documents. Those specifications provided in the Appendix shall be considered part of the Contract Documents and the Contractor shall include sufficient compensation in its bid to cover the work required for compliance thereto.

01090.4 CONFLICTS

In case of conflict between codes, reference standards, Drawings and the other Contract Document, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to bidding (pre bid), or ordering and providing any materials or labor required therefrom (post bid). The Contractor shall assume the most stringent requirements apply when preparing bids for this Contract.

CONTRACT CLOSEOUT — SECTION 01200

01200.1 DESCRIPTION

The purpose of this section is to clarify certain aspects of the Project and the Contract that must be taken into consideration and completed before final acceptance of the Work can be given. These items include cleanup, demonstration of acceptable performance of equipment and facilities furnished and installed, submittals, payment for all work completed, issuance of final acceptance documentation, accepted repair and restoration of work and materials found defective during the warranty period. Specific instructions are provided herein for completion of the Work in such a manner that it will be fully acceptable and that the Contractor will be eligible for receipt of final payment.

01200.1.1 RELATED WORK AND REFERENCED SECTIONS

Not used.

01200.1.2 SUBMITTALS

Section 01300 - Submittals
See paragraph 01200.3.5 below.

01200.1.3 DEFINITIONS

Not used.

01200.2 MATERIALS

Not used.

01200.3 CONSTRUCTION REQUIREMENTS

01200.3.1 CLEANUP

The Owner will not give final acceptance of the Work until the Contractor has satisfactorily complied with the finishing and cleanup requirements contained in these Contract Documents and with any applicable local regulations. The Contractor shall accomplish the cleanup operations so as to leave the work site in an orderly, acceptable, and presentable condition.

01200.3.2 REPAIR AND RESTORATION

All major and minor damage to improvements and finished surfaces resulting from the Contractor's performance of the Work, whether to materials and equipment located on the project site or to those constructed under this Contract, shall be repaired to an original, or like-new, condition before final acceptance will be provided by the Engineer and Owner. Where damage to surfaces or materials can not be sufficiently repaired or restored, in the opinion of the Engineer, the Contractor may be required to replace the entire surface covering or structural member to achieve an original or like-new condition of the surface or material.

01200.3.3 TESTING

All performance and operational testing of facilities and equipment required by the Contract Documents, together with any required supportive documentation, shall be completed by the Contractor and approved by the Engineer prior to final acceptance of the Work.

01200.3.4 ACCEPTANCE FROM PROPERTY OWNER

The Contractor shall obtain a written release from each property owner on whose property work has been required by these Contract Documents. Such release shall indicate the property Owner's approval of the restoration and/or replacement of all disturbed improvements, surfaces and structures. Any request made to the Contractor by a private property owner, and determined to be unreasonable in the opinion of the Engineer, may be waived by the Owner.

01200.3.5 SUBMITTAL OF MANUFACTURER'S DOCUMENTATION

All guarantees and warranties, operation and maintenance manuals or brochures, or other materials furnished to the Contractor by the manufacturer for any equipment or material used for the Work shall be delivered to the Owner in protective 3-ring binders. Two (2) hard copies and one (1) pdf are required. Retainage held to the Contractor in accordance with the General Conditions of the Contract Documents will not be released until such documentation is submitted. See Section 01300 for more detail regarding O&M manuals.

01200.3.6 FINAL ACCEPTANCE

01200.3.6.1 CONTRACTOR'S STATEMENT OF COMPLETION - When the Contractor has completed the Work under this contract, including all of the Contractor's testing and clean-up, the Contractor shall inform the Engineer in writing that the Work has been completed and request a final inspection by the Engineer. The Engineer will then conduct a final inspection with the Owner and representatives of the pertinent funding and regulatory agencies. If items are found by the Engineer to be incomplete or not in compliance with the contract requirements, the Engineer will inform the Contractor of such items. After the Contractor has completed these items, the procedure shall then be the same as described above for the Contractor's statement of completion and request a final inspection.

01200.3.6.2 NOTICE OF FINAL ACCEPTANCE - After the Engineer has determined that all work required under the Contract Documents has been completed and that all of the considerations specified herein above are satisfactorily concluded, the Engineer will recommend to the Owner, in writing, that final acceptance of the entire Work under this contract be made as of the date of the Engineer's final inspection. The Owner and Engineer will then indicate formal approval and acceptance of the Work by issuing the "Notice of Final Acceptance" form.

01200.3.6.3 NO PARTIAL ACCEPTANCE - Unless otherwise required by Special Provisions, partial acceptance of any portion of the Work will not be made. While Substantial Completion notice can be issued in accordance with the General Conditions to allow use of completed work for its intended purpose, no acceptance other than the final acceptance of all completed work will be made. No inspection or approval or Notice of Substantial Completion pertaining to specific parts of the work shall be construed as final acceptance of any part until written final acceptance of all work is issued.

01200.3.6.3 Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

01200.4 METHOD OF MEASUREMENT

Not used.

01200.5 BASIS OF PAYMENT

Not used.

01300.1 DESCRIPTION

The Contractor shall submit to the Engineer, for review, a proposed schedule of shop drawings, materials information, samples, operations and maintenance manuals, equipment information, procedures, and construction photography records. The submittals of shop drawings and product data shall conform to section 105.2 of the MAG Specifications with the following exceptions.

Paper copies of submittals for approval are not required. Contractor to submit information in PDF form. Response to submittal will also be provided by PDF. This does not apply to final O&M manuals. Final O&M manuals shall be submitted according to Section 01300.3 of these Specifications.

Submittals will be stamped with either "Approved", "Approved as Noted" or "Not Approved".

01300.2. SHOP DRAWINGS AND MATERIAL SUBMITTALS

In addition to MAG 105.2 the following conditions apply to shop drawings and material submittals. Any conflict between MAG and these specifications shall be brought to the attention of the Engineer for final decision.

01300.2.1 ENGINEER APPROVAL - When the shop drawings are approved by the Engineer, A pdf copy will be returned to the Contractor marked "Approved", "Not Approved", "Approved as Noted", or similar notification. If changes or corrections are necessary, a pdf will be returned to the Contractor with such changes or corrections indicated by a brief statement, and the Contractor shall correct and resubmit the drawings, as a pdf, to the Engineer.

Fabrication work shall not commence until the Engineer has reviewed the pertinent shop drawing/s and returned copies to the Contractor marked either "Approved" or "Approved - Except as Noted". Corrections indicated on such submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.

Approval of shop drawings will not be required for reinforcing steel that is detailed by the Contractor in accordance with the Plans and Specifications. Any change from the Plans and Specifications made by the Contractor in any aspect of the Work shall be approved by the Owner and the Engineer in a written Change Order prior to any work being altered from that already approved for construction.

01300.2.2 SPECIFICATION VERIFICATION

Each submittal shall include a specification section which provides the relevant specification section, including relevant addendum updates.

a) Indicate in the left margin, next to each pertinent paragraph, either compliance with a check (√) or deviation with a consecutive number (1, 2,3).

b) Provide a list of all numbered deviations with a clear explanation and reason for the deviation.

001300.2.3 MATERIALS INFORMATION SUBMITTALS

In keeping with 01300.2.1 above, the Contractor shall assemble and submit each manufacturer's catalog cuts and materials information sheets pertaining to materials and equipment to be furnished and installed in the Work. Preliminary submittals shall be submitted as pdf for review. The Contractor shall submit two (2) original hard copies. Hard copies shall be enclosed in 3-ring binders. Failure to submit all materials information may result in the Contractor's partial payments to be withheld until submittals are complete. Photocopies of the catalog cuts and information sheets will not be acceptable as submittals without prior authorization from Engineer.

01300.2.4 CONTRACTOR LIABILITY

The Contractor shall assume all responsibility and risk for any re-work or other costs resulting from errors in Contractor submittals. The Contractor shall be responsible for showing accurate dimensions and details of connections required to ensure the function of the equipment and/or component of the Work being illustrated.

01300.3 OPERATIONS AND MAINTENANCE MANUALS

01300.4.1 STRUCTURE OF OPERATIONS AND MAINTENANCE MANUALS

The Contractor shall provide preliminary Operations and Maintenance (O&M) manuals in pdf format for review. The Contractor shall furnish two (2) identical sets of the Final O&M 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 O&M manuals. Additionally, a bookmarked PDF copy of all O&M manuals must be provided to the owner. Final completion will not be issued until the bookmarked PDF copy of all the O&M manuals have been received and approved by the Engineer and the Owner.

01300.4.2 CONTENTS

The Contractor shall include in the Operations and Maintenance Manuals the following information for each item of mechanical, electrical, and instrumentation equipment:

- Care and maintenance of all finished exposed surfaces.
- Complete operating instructions, including location of controls, special tools or other equipment required, related instrumentation, and other equipment needed for operation.

- Preventive maintenance procedures and schedules.
- Complete parts lists, by generic title, identification number, and catalog number, complete, with exploded views of each assembly.
- Disassembly and reassembly instructions.
- Name and location of nearest supplier and spare parts warehouse.
- Name and location of manufacturer.
- Recommended start-up, testing and troubleshooting procedures.
- Prints of the record drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of these specifications.

01300.4.3 SCHEDULE OF DELIVERY

Operations and Maintenance manuals shall be submitted in final form to the owner before seventy-five (75) percent of the Work is completed. Any discrepancies found by the owner and Engineer in the Operations and Maintenance manuals shall be corrected by the Contractor prior to final acceptance of the project.

01300.5 SCHEDULE OF VALUES

At the time of the pre-construction conference, the Contractor shall submit a Schedule of Values of the Work measured as lump sum bid items. On the Schedule, those items shall be subdivided into component parts in sufficient detail as to form a basis for determining progress payments during construction. Quantities, and/or prices, shown on the Schedule shall equal the total contract price for each lump sum item. Information provided on the Schedule will be reviewed and approved by the Engineer when found acceptable. That information will then be incorporated into the data used for preparing the Application for Payment by the Engineer.

01300.6 CONTRACT CONSTRUCTION SCHEDULE

A construction schedule, prepared in accordance with requirements of the General Conditions, shall be submitted to the Engineer at the pre-construction conference. Unless required otherwise in Special Provisions, such schedule shall show the anticipated time of completion, approximate start dates of identifiable segments of the Work, and anticipated value of the work expected to be completed in monthly time periods within the contract period.

01300.7 PROCUREMENT SCHEDULE

At the time of the pre-construction meeting (see Section 01030), the Contractor shall submit a procurement schedule to the Engineer. This plan shall include all equipment and materials required for the Work included in the Contract that are not readily available and will require off-site manufacture and lead time which can affect the progress of the Work. The plan shall show at least the following information:

- Equipment/Material Name
- Anticipated amount of time for ordering, manufacturing, and shipping to Work site.
- Anticipated dates for ordering, receiving and installing.

01300.8 CONSTRUCTION PHOTOGRAPHY RECORDS

When required in the Contract Documents and prior to commencement of any of the Work, the Contractor shall prepare colored CD photography records of all areas of the Contract work site and provide copies of such records to the Engineer. Such records shall become the property of the owner and may be used for determining the condition of work site/s and degree of restoration required for completion of the Work (see also Section 2000).

END OF SECTION

01400.1 DESCRIPTION

This section covers quality control of all work and activities on the part of the Owner, the Engineer, and the Contractor, to ensure compliance with these Specifications and the requirements of the Contract.

01400.2 CONTROL OF WORK

All workmanship incorporated in the Work covered by the Contract shall conform to section 105 of the MAG Specifications.

01400.3 CONTROL OF MATERIALS

All materials and equipment incorporated in the Work shall be as specified in section 106 of the MAG Specifications.

END OF SECTION

CHARACTER OF WORKERS, METHODS AND EQUIPMENT — SECTION 01500

01500.1 DESCRIPTION

Covers requirements for aptness, competency, quality, and quantity in the labor, equipment, tools, and materials supplied by the Contractor for execution of the Work.

01500.2 REQUIREMENTS

In order to bring the Work to completion in the manner and on the time schedule required by the Contract Documents, the Contractor shall provide sufficient labor and equipment with adequate training and capability as follows:

- The Contractor shall employ sufficient labor and equipment with adequate training and capability for executing the Work to full completion in the manner and time required by these Specifications.

- All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have appropriate training and sufficient experience in such work, in the opinion of the Engineer, to perform all work properly and satisfactorily.

- Any person employed by the Contractor or by any Subcontractor who, in the opinion of the Engineer, does not perform their work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or Subcontractor employing such person. Such person(s) shall not be employed again in any portion of the Work without the approval of the Engineer. When such action is considered, and if requested by that employee, a hearing attended by the employee, Engineer, and Contractor shall be conducted before final dismissal action is taken.

- Should the Contractor fail to remove such person or persons as required above or fail to furnish suitable and sufficient personnel for the proper execution of the Work, the Engineer may suspend the Work by written notice until such order is complied with.

- All equipment, which is proposed to be used on the Work, shall be of sufficient size and in such mechanical condition, in the opinion of the Engineer, as to produce a satisfactory quality of Work. Equipment used on any portion of the Work shall be fitted with appropriate protective devices in accordance with OSHA and other applicable safety regulations such that no injury to employees, the Work, or to adjacent property will result from its use.

- When the specific methods and equipment to be used by the Contractor in accomplishing the Work are not described in the Contract Documents, the Contractor is free to use any methods or equipment that will accomplish the Work in conformity with the requirements of this Contract.

01510.1 DESCRIPTION

This section covers measures and instructions for prevention of damage to existing structures and utilities, whether above ground or underground, during execution of the Work of the Contract. The protection of existing improvements shall conform to section 107 of the MAG Specifications and the following Sections.

01510.2 PROTECTION OF EXISTING UTILITIES

01510.2.1 INTEGRITY OF UTILITIES

The Contractor shall be responsible for safeguarding and maintaining the integrity of all conflicting utilities. This responsibility includes securing the assistance of available utility location services in the area in which the Work is being performed. The Engineer has attempted to show the location of all utilities anticipated to conflict with the Work. However, when a conflicting utility line is discovered that was not shown on the plans, the Contractor shall contact the utility's owner and notify the Engineer immediately for resolution of the conflict. When realignment or relocation of the Work, or relocation of the conflicting utility is deemed necessary, the Engineer shall give direction in writing for the Contractor to proceed. Work resulting from such direction may be treated as a changed condition, and appropriate authorization and payment will be made in accordance with the General Conditions.

01510.2.2 LOCATING UTILITIES

It shall be the responsibility of the Contractor to locate and expose or identify all existing utilities, both underground and overhead, for the purpose of preventing damage to them. The Contractor shall notify all concerned utility offices at least 48 hours in advance of construction operations in which a utility agency's facilities may be involved. This shall include, but not be limited to, irrigation water, culinary water, telephone, gas, and electric.

01510.2.3 CHANGES TO UTILITIES

The Contractor shall be responsible for any and all changes to, or re-connections to, public utility facilities encountered or interrupted during execution of the Work, and all costs related thereto shall be borne by the Contractor. The Contractor shall negotiate with, and pay, the respective utility agency for work it must do in connection with moving, repairing, or restoring its utility(s). The Contractor shall further make all necessary notifications, scheduling, coordination, and management of details related to any such interference. The potential or projected cost of any public utility interference shall be included in the Contractor's price covering the major Contract Item to which the interference or changes are attributable.

01510.2.4 MAINTENANCE OF SERVICE

01510.2.4.1 CONTINUOUS SERVICE - Unless otherwise required in the Contract Documents, all utilities, both underground and overhead, shall be maintained in continuous service throughout the entire contract period. The Contractor shall be responsible and liable for any damages to or interruption of service caused by the construction.

01510.2.4.2 ACCIDENTAL INTERRUPTION OF SERVICE - In the event of interruption of other utility services as a result of accidental breakage, the Contractor shall promptly notify the appropriate responsible authority. The Contractor shall then cooperate with that authority in restoration of service as soon as possible, and shall bear all cost of repair. In no case shall interruption of any water or other utility service be allowed outside working hours unless the Engineer has issued prior authorization. When changeover of service connections to new utility lines becomes necessary, interruptions of individual services for periods of up to 8 hours will be allowed providing 24 hour advance notice has been given to affected users.

01510.2.4.3 TEMPORARY INTERRUPTION AND RELOCATION - If the Contractor desires to temporarily or permanently relocate or shut down any utility or appurtenance, the Contractor shall make the necessary arrangements and agreements with the owner or operator of the respective utility and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. Shutdown and relocation and/or reconstruction shall be subject to inspection and approval by the Engineer and the owner of the utility.

01510.3 PROTECTION OF PROPERTY AND EXISTING STRUCTURES

01510.3.1 REMOVAL OR RELOCATION OF PROPERTY - All property removed or relocated by the Work shall be reconstructed in its original or new location as soon as possible. Restoration of existing property or facilities shall be to a condition as good or better than its original condition.

01510.3.2 DAMAGE TO PROPERTY - All property damaged by the Contractor, whether inside or outside the limits of easements provided by the Owner, shall be the responsibility of the Contractor. All such damages shall be repaired with like material and restored to its original condition, or better. Such repair or restoration shall be accomplished at the Contractor's expense without additional compensation from the Owner.

01510.4 PROTECTION OF PAVED SURFACES

To avoid unnecessary damage to paved surfaces, tracked equipment shall use rubber cleats or paving pads when operating on or crossing all existing paved surfaces unless authorized otherwise in writing by the Engineer.

01510.5 RIGHTS-OF-WAY AND EASEMENTS

01510.5.1 MINIMAL DISTURBANCE OF RIGHTS-OF-WAY - When construction easements have been obtained by the Owner, the Contractor shall take appropriate measures to minimize disturbances to surface improvements within the easements.

The Contractor shall obtain a signed release from each property owner, approving restoration work in the construction easements across its respective property/s.

01510.5.2 CONSTRUCTION AREAS - The Contractor shall confine construction operations to the area within the dedicated rights-of-way for public thoroughfares, or within areas for which construction easements have been obtained, unless the Contractor has made separate special agreements with the affected property owners in advance.

01510.5.3 PROPERTY OWNER NOTIFICATION - The Contractor shall give at least 48 hours advance notification of commencement of construction to property owners having land on which construction will take place. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No one shall be cut off from access to their property for a period exceeding eight (8) hours unless the Contractor has made special arrangements with the affected persons. The Contractor shall grade all disturbed surfaces required for motor vehicle traffic at least daily unless directed otherwise in the Contract Documents or in writing by the Engineer.

END OF SECTION

01520.1 DESCRIPTION

This Section includes requirements that shall be followed by the Contractor, to protect the environment, while performing work under this contract. The Contractor shall also comply with any applicable additional requirements made by federal, state, or local government agencies.

01520.1.1 RELATED WORK AND REFERENCED SECTIONS

Most current version of MAG Standard Specifications.

01520.1.2 SUBMITTALS

Section 01300 – Submittals.

01520.1.3 DEFINITIONS

Not used.

01520.2 MATERIALS

Not used.

01520.3 CONSTRUCTION REQUIREMENTS

01520.3.1 EXPLOSIVES AND BLASTING

The use of explosives on the work will not be permitted unless approved otherwise in the Contract Documents or in writing by the Engineer.

01520.3.2 DUST ABATEMENT

01520.3.2.1 CONTROL MEASURES - The Contractor shall furnish all labor, equipment, water and means required to provide effective dust control and abatement measures. Control measures shall be applied as often as necessary and wherever directed in writing by the Engineer, to prevent construction operations from producing dust in amounts that may be damaging to property, vegetation, or animals, or detrimental to persons within reasonable proximity of the work site. Dust Control shall conform to section 104.1.4 of the MAG specifications.

01520.3.2.2 HAUL ROUTES AND WORK SITES - The Contractor shall identify haul routes or material handling areas, outside of the Work site, whereon dust may be generated, and shall exercise appropriate measures to abate any dust problem caused by its operation. Such dust abatement measures shall be taken immediately when observed or when required in writing by the Engineer.

01520.3.3 STORM AND GROUND WATER

01520.3.3.1 PERMITS REQUIRED – A storm water NPDES permit may be required. The Contractor is responsible to obtain such permit and comply with the conditions thereof. This includes preparation of a SWPPP (Storm Water Pollution Prevention Plan) and filing a NOI (Notice of Intent) with ADEQ (Arizona Department of Environmental Quality).

01520.3.3.2 CONTROL MEASURES - The Contractor shall provide and maintain, at all times during construction, ample means and devices to promptly remove all water entering the Work, whether the water is surface or ground water. Water removed by the Contractor shall be directed into ponds or areas separated from live streams or drainage ways, to keep sediment from entering live water.

01520.3.3.3 DRAINAGE PATTERNS - In excavation, fill, and grading operations, the Contractor shall take care, to disturb the existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water onto private property or into streets or drainage ways inadequate for the increased flow.

01520.3.3.4 FORDING OF WATERWAYS - Fording of live streams or any body of live water to accomplish the Work shall not be permitted. Mechanized equipment also shall not be operated in live water to accomplish the Work unless authorized in writing by the Engineer, or in the Contract Documents.

01520.3.3.5 FILLING OF WATERWAYS - The Engineer will not approve the filling of any ditches, washes, drainage ways, streams, wetlands, or other surface waters by the Contractor to accomplish the Work unless specific instructions are included in the Contract Documents which will provide for how the affected drainages or surface waters are to be treated.

01520.3.4 NOISE ABATEMENT

In or near inhabited areas, particularly residential areas, the Contractor's operations shall be performed in a manner to prevent noise from becoming a nuisance or problem. Particular consideration shall be given to noise generated by repair and service activities during the night hours. Noise abatement shall conform to section 107.6.2 of the MAG specifications.

01520.3.5 CHEMICALS

All chemicals and/or petroleum based products used during project construction or furnished for project shall be handled, applied and disposed of in strict accordance with the printed instructions of the manufacturer and shall conform to section 106 of the MAG specifications.

01520.3.6 WASTE AND SURPLUS MATERIALS DISPOSAL

01520.3.6.1 CLEAN WORK SITE - The Contractor shall keep the work site, haul roads and other areas of use in a neat, clean condition, free from any accumulation of surplus materials. It shall be the responsibility of the Contractor, at its own expense, to remove and legally dispose of all surplus materials resulting from all Work activities performed in accordance with the Contract Documents.

01520.3.6.2 SURPLUS MATERIAL - Surplus material includes, but is not limited to, salvaged materials and equipment that otherwise would have been abandoned in place, rocks too large to be used as backfill, wood and other organic or unsuitable materials, trash, rubbish, and waste products of any nature, and any other debris generated by the Work.

01520.3.6.3 REGULATORY COMPLIANCE - Disposal of surplus materials shall be accomplished in accordance with all local codes, laws, ordinances, and all applicable safety laws (particularly to the requirements of Part 1926 of the OSHA Safety and Health Standards for Construction) in affect at the approved disposal site. In no case shall it be acceptable for any surplus material to be disposed of in streams, marshes or wetlands.

01520.3.6.4 APPROVAL OF DISPOSAL - The Engineer will not approve any disposal operation, which creates an unsightly and/or unsanitary nuisance. The Contractor shall maintain disposal sites in a reasonable condition of appearance during construction. When designated and/or public disposal sites are unavailable, written approval must be obtained from the Engineer to dispose of any surplus materials on any other site. All disposal sites are subject to approval by the Engineer. The Contractor shall secure permission and all permits required for use of any dumpsite not previously arranged and designated by the Owner. The Contractor shall retain copies, and provide copies upon request, of all disposal permits and/or agreements obtained for the Contract Work.

01520.3.6.5 SCHEDULED REMOVAL - The Contractor shall establish regular intervals of collection and disposal of surplus materials during construction. Stockpiling of surplus materials for later disposal will not be approved or allowed.

01520.3.7 OPEN BURNING

Open burning of materials may be allowed only in strict accordance with all regulations in effect for the area at which the burning would be performed, and the Contractor shall obtain any necessary permits from the appropriate governing entity prior to the start of burning. The Contractor shall not allow fire to spread beyond the material intended for burning. No accumulation of residue from burning shall remain on or adjacent to the construction site, without written approval of the Engineer.

01520.3.8 SANITATION

01520.3.8.1 TOILETS - The Contractor shall provide fixed or portable chemical toilets for employee use in conformance with the requirements of Part 1926 of the OSHA

Standards for Construction and when public toilets are not available or within fifteen (15) minutes walking distance of the Work site.

01520.3.8.2 COLLECTION OF WASTES - The Contractor shall be responsible for daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor shall be disposed of away from the site in accordance with all laws and regulations pertaining thereto.

01520.3.9 HAZARDOUS MATERIAL

01520.3.9.1 REGULATORY COMPLIANCE - Disposition of any hazardous material or toxic or hazardous waste shall be made in accordance with the requirements and regulations administered by the State agency wherein the Work site is located.

01520.3.9.2 ABNORMAL CONDITONS - Abnormal conditions include, but are not limited to, the following: buried barrels with liquid or solid contents; buried or above ground tanks with liquid contents; obnoxious odors; excessively hot earth; stained and discolored soils; smoke; unidentifiable powders, sludge, pellets; or any other similar condition.

01520.3.9.3 DISCOVERY AND NOTIFICATION - If any abnormal conditions are encountered during construction, which indicate the presence of a hazardous material, toxic, or hazardous waste, the Contractor shall immediately suspend work in the area of the discovery and notify the Engineer and treat the situation with extreme caution. The Contractor's operation in the area of discovery shall not resume until so directed by the Engineer; however, the Contractor shall continue working in other areas of the project, unless otherwise directed by the Engineer.

01520.3.9.4 DISPOSAL - When it becomes necessary for the Contractor to dispose of discovered materials, the work may be considered a change and administered in accordance with the General Conditions. Should the disposition of discovered waste material require special procedures or handling by certified personnel, the Contractor will make all such arrangements. When it becomes necessary to obtain permits for transporting or handling discovered material, the Owner will obtain the permits.

01520.3.9.5 SPILLS AND NOTIFICATION - In the event of spills of petroleum-based products or hazardous wastes by the Contractor, the Contractor shall immediately notify the Engineer. The Contractor shall also notify the appropriate State environmental enforcement agency, unless the spill consists of less than one (1) gallon of petroleum based products. In no case will notification be made later than 24 hours after the discovery of the spill. In addition, written notification shall also be made within 5 calendar days of the discovery.

01520.3.9.6 COST OF CLEANUP - <u>All costs</u> for cleanup and disposal of hazardous materials due to spills, inappropriate handling, or negligence of the Contractor shall be borne by the Contractor.

01520.3.10 ENVIRONMENTAL COMPLIANCE

01520.3.10.1 REGULATORY COMPLIANCE - The Contractor shall comply with the applicable requirements of the National Historic Preservation Act as it relates to the preservation of ALL environmental resources. Clearance for protection of environmental resources located within the designated Work site is the responsibility of the Owner and such clearance has been obtained for the Contract, unless provided for otherwise in the Contract Documents.

01520.3.10.2 DISCOVERY OF HISTORIC/ARCHEOLOGICAL OBJECTS – The Contractor shall observe the following:

- DISCOVERY AND NOTIFICATION - If a suspected or unsuspected historic, archeological, or paleontological item, feature, or site is encountered, construction operations shall be immediately stopped in the vicinity of the discovery and the Engineer shall be notified of the nature and exact location of the findings. The Contractor shall not damage the discovered objects and shall provide written confirmation of the discovery to the Engineer within two (2) calendar days.

- RESTRICTION OF CONSTRUCTION - Should operations in the vicinity of a discovery be restricted, the Engineer will keep the Contractor informed concerning the status of the restriction. The Contractor should be aware that the time necessary for the Owner to negotiate the handling of the discovered is variable and is dependent on the nature and condition of the circumstances. It is possible that a delay of as much as three weeks in the vicinity of the discovery can be expected. The Engineer will inform the Contractor when the restriction is terminated. Changes required to accommodate delay or Work resulting from the discovery will be authorized in accordance with the General Conditions.

01520.3.11 OPERATIONS OUTSIDE OF THE PROJECT SITE

In the event the Contractor chooses to use any site or means of obtaining resources beyond those provided as part of the Contract, the Contractor shall retain the services of a qualified, certified environmental consultant to produce a research design or plan for obtaining any and all necessary environmental clearances for such use. The Contractor shall provide the plan to the Engineer for review and approval, as required, following which the plan shall be implemented. The Contractor shall submit evidence of environmental clearances and compliance before commencing any activities within the extended use area. At a minimum, clearances will include those listed below. Additional clearances may be required as necessary.

01520.3.11.1 CULTURAL RESOURCES (Archeological and Historic) - Clearance may require consultation with the State Historic Preservation Office.

01520.3.11.2 THREATENED AND ENDANGERED SPECIES - Compliance may require written clearance from the U.S. Fish and Wildlife Service.

01529.3.11.3 FLOOD PLAINS – May require consultation with the Federal Emergency Management Agency (FEMA) or corresponding state agency.

01520.3.11.4 WETLANDS AND OTHER BODIES OF WATER – May require consultation with the Army Corps of Engineers and/or appropriate state agency.

The Contractor is cautioned that obtaining environmental clearances can be costly and time consuming.

01520.4 METHOD OF MEASUREMENT

No separate measurement shall be made for environmental controls. Measurement for this item is included as part of another bid item.

01520.5 BASIS OF PAYMENT

No payment shall be made for environmental control. The environmental control shall be considered incidental to the project.

02000.1 DESCRIPTION

This section describes various tasks associated with project execution and close out. Mobilization shall include: preparatory work and materials necessary for obtaining clearances for the Work; moving personnel, equipment, supplies and incidentals to and from the Project Site; quality control; clean-up; temporary utilities and quarters; permits, bonds and insurance; dust abatement, storm water control, and noise abatement; waste and rubbish disposal and control; sanitation; and project close-out operations.

02000.1.1 RELATED WORK AND REFERENCED SECTIONS

Contract Closeout Section 107.2 of MAG Standard Specifications
Section 01510 - Protection of Existing Property
Section 01520 - Environmental Controls
Section 02005 - Traffic Control

Additional requirements are located in the General Conditions. If there is a conflict the General Conditions shall supersede this section.

02000.1.2 SUBMITTALS

02000.1.2.1 VISUAL RECORDS - The Contractor shall furnish at least one copy of all visual records, as described below in 02000.3.2, to the Owner.

02000.1.2.2 SERVICE CONNECTION LOCATION AND DOCUMENTATION – When service connections are included in the scope of work the Contractor shall deliver all signed tie-sheets (see 02000.3.3 below) to the Engineer not less than forty-eight hours prior to when the service connection is to be installed.

02000.1.3 DEFINITIONS

DVD Record - Photography on DVDs of areas potentially liable for disturbance as a result of the Work required by this Contract.

Service Connection Interview & Documentation - Interviews with potential system users and the documentation of location data for service connections to the respective property from utility lines being installed under this Contract.

Tie Sheets - Forms provided by the Engineer for use in documenting the location of service connection/s of system users.

Service Connection - Piping extending from the main utility line to the property line, or designated connecting point, of any user of the system.

02000.2 MATERIALS

02000.2.1 VISUAL RECORD

Records shall be made on professional quality, standard DVD format recording. DVD's shall be provided with protective covers and shall be labeled to indicate the area covered by the photography.

02000.3 CONSTRUCTION REQUIREMENTS

02000.3.1 VISUAL RECORDS

Prior to any disturbance of the area, the Contractor shall produce a DVD photography of all areas, including but not limited to right-of-ways, streets and roadways, haul-roads and access routes, storage areas, construction sites, and buildings or structures, which will be, or may be, affected by the Work. Such photography will be of a quality to allow accurate determination of location, size, and condition of existing features and improvements taken prior to any occupancy or execution of Work by the Contractor. Additionally, video for each street shall be separated into different chapters, which should each be accessible from the startup menu. Coverage should be taken while the camera is stationary, not from a moving vehicle or other means. DVD's are subject to approval by the engineer and owner. Construction may not begin until the engineer has approved the visual record.

02000.3.2 SERVICE CONNECTION LOCATION AND DOCUMENTATION

Unless called for differently, the Contractor shall contact and interview the owners of all properties indicated on the Drawings and obtain from them sufficient information for location of workable service connections for each property. The Contractor shall document those locations on the tie sheets and obtain a confirmation signature from the connection owner.

02000.4 METHOD OF MEASUREMENT

02000.4.1 MOBILIZATION

Mobilization shall be measured by the lump sum.

02000.4.3 VISUAL RECORDS

Pre-Construction Photography shall be measured by the lump sum.

02000.4.4 SERVICE CONNECTION DOCUMENTATION

Service Connection Documentation shall be measured by the lump sum.

02000.5 BASIS OF PAYMENT

02000.5.1 Payment for Mobilization shall conform to Section 109 of MAG Standard Specifications.

02005.1 DESCRIPTION

This section covers furnishing and maintaining all traffic control devices, flaggers and pilot vehicles necessary for protection of the Work, the workers and the traveling public in accordance with these Contract Documents. The requirements of this section are not intended to supersede, but shall supplement, the provisions contained in the "Manual of Uniform Traffic Control Devices" issued by the U.S. Department of Transportation, and any other applicable state or local traffic control regulations. Traffic Control shall conform to Section 401 of MAG Standard Specifications.

02005.1.1 RELATED WORK AND REFERENCED SECTIONS

02005.2 METHOD OF MEASUREMENT

02005.2.1 Method of Measurement shall conform to Section 401 of MAG Standard Specifications.

02005.3 BASIS OF PAYMENT

02005.3.1 Basis of Payment shall conform to Section 401 of MAG Standard Specifications.

END OF SECTION

02015.1 DESCRIPTION

This section covers the removal of vegetation, debris, and other obstacles from the defined rights-of-way and limits of the project area and/or construction work site. Clearing and Grubbing shall conform to Section 201 of MAG Standard Specifications.

02015.1.2 RELATED WORK

Section 01510 - Protection of Existing Improvements
Section 02200 - Trench Excavation and Backfill
Section 02500 - Removal and Replacement of Surface Improvements

02015.4 METHOD OF MEASUREMENT

02015.4.1 Method of Measurement shall conform to Section 201 of MAG Standard Specifications.

02015.5 BASIS OF PAYMENT

Basis of Payment shall conform to Section 201 of MAG Standard Specifications.

02020.1 DESCRIPTION

Furnish and provide labor and equipment for investigation of existing miscellaneous pipelines, wires or cables, and other miscellaneous sub-surface features as required by the Engineer. Surface Investigation shall conform to MAG Standard Specifications.

02020.1.1 RELATED WORK

Section 01510 - Protection of Existing Improvements

02020.1.2 SUBMITTALS

Not used.

02020.1.3 DEFINITIIONS

Not used.

02020.2 MATERIALS

The Contractor shall provide a backhoe and qualified operator; laborer with hand shovel: appropriate fuel and lubricants, necessary equipment servicing materials; and appropriate equipment for transporting the backhoe to perform the investigation. The backhoe shall be a rubber tired CASE 580 backhoe, or an approved unit of equivalent or greater size and capacity, having accumulated not more than 5,000 hours operating time.

02020.3 CONSTRUCTION REQUIREMENTS

02020.3.1 EXPOSURE BY EXCAVATION

When directed by the Engineer, the Contractor shall excavate and expose miscellaneous pipelines, structural features, soil materials and other underground features which may be present at the work site. The location and extent of exposure shall be determined on site by the Engineer. Designation of such areas shall be made in writing, usually in the form of a Work Order, by the Engineer.

02020.3.2 REPLACEMENT OF EXCAVATED MATERIALS

Work required hereunder shall include replacement of excavated materials sufficiently to restore the site to a safe condition as determined by the Engineer. Full restoration of materials such as pavement, concrete slabwork, sod, etc., in the investigated area will be accomplished in accordance with the Contract Documents and as directed by the Engineer.

02020.4 METHOD OF MEASUREMENT

02020.4.1 MEASUREMENT BY HOURS OF WORK

Measurement of subsurface investigation shall be made by counting the actual number of hours of work completed by the machine and operator to investigate miscellaneous underground features as required by the Engineer. No allowance of time will be made for transporting the backhoe to and from the job site when the backhoe is located on the site of the Contract.

02020.4.2 MEASUREMENT FOR OTHER ITEMS OF WORK

When restoration of the excavated area requires provision of pavement, concrete slabwork, sod, etc., separate measurement will be made for those materials in accordance with the respective requirement(s) for measurement of that item in the Contract Documents.

02020.5 BASIS OF PAYMENT

The accepted quantity of work will be paid for at the contract unit price of:

PAYMENT ITEM	**UNIT**
Subsurface Investigation	Hour

When provision of designated materials is required for restoration of the excavation, payment for such materials shall be made in accordance with the respective provisions of the Contract documents.

END OF SECTION

02105.1 DESCRIPTION

This section covers obtaining permission, permits, clearances, etc.; as necessary to develop source(s), purchasing or manufacturing, loading, hauling, placing and compacting earthwork materials described herein, as shown on the Drawings and/or required by these Specifications. Earthwork Materials shall conform to MAG Standard Specifications.

02105.1.1 RELATED WORK

Section 02200 - Trench Excavation and Backfill

02105.1.2 SUBMITTALS

When the Bid Schedule indicates quantities of materials described in this section in excess of 50 cubic yards or 50 tons, or when requested otherwise by the Engineer, the Contractor shall provide test results from a certified independent laboratory which has sampled and performed the prescribed test(s) for those materials.

02105.1.3 DEFINITIONS

Granular Material - Material for which the sum of plasticity index (AASHTO T-90) and the percent of material passing a No. 200 sieve (AASHTO T-27) shall not exceed 23.

Silt - Material which passes the No. 200 (AASHTO T-11) sieve and has a plasticity index not greater than 10.

Clay - Material which passes the No. 200 sieve and has a plasticity index greater than 10.

Bedding - Materials placed immediately around and adjacent to pipe installed in trenches.

Borrow - Material obtained from a source away from the site on which installed and/or excavated and used to supplement insufficient quantities of material required.

02105.2 MATERIALS

02105.2.1 ON-SITE TRENCH OR STRUCTURAL BACKFILL

On-site trench or structural backfill consists of material excavated during trenching or foundation excavation which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than 6-inches. Material may be required to be processed or transported along the excavation.

02105.2.2 IMPORTED TRENCH OR STRUCTURAL BACKFILL

Imported trench or structural backfill consists of granular material obtained from sources indicated on the Drawings, designated in the Special Provisions or approved by the Engineer. Borrow materials shall be free of cinders, ashes, wood, vegetative matter, frozen or other deleterious matter with a maximum particle size not greater than 6-inches. Pit Run Borrow may be used as backfill in trenches, excavations for structures, in roadway subgrades, or as otherwise shown on the plans or called for by the Engineer. Material may be processed or may be pit run.

02105.2.3 ON-SITE PIPE BEDDING

On-site pipe bedding consists of material excavated during the trenching operation which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than that shown below in Table 1. Material may be required to be processed or transported along the trenching operation.

02105.2.4 IMPORTED PIPE BEDDING

Imported pipe bedding consists of granular material excavated from an approved borrow source which is free of cinders, ashes, wood, vegetation, frozen or other deleterious material or rocks with a maximum particle size not greater than that shown in Table 1 below. Material may be processed or may be pit run.

Table 1 - MAXIMUM PARTICLE SIZE FOR PIPE BEDDING

Pipe	Size
Corrugated Metal and Welded Steel Polyethylene, Galvanized Steel and PVC Ductile Iron, Cast Iron, Concrete, and HDPE	1” 1” 2”

02105.2.5 SAND

Sand shall be graded granular material which passes a 3/8-inch sieve, with not more than 10 percent passing the No. 200 sieve (AASHTO T-27) and free from cinders, ashes, wood, vegetation, frozen or other deleterious material.

02105.2.6 UNTREATED BASE COURSE

Untreated base course consists of processed natural gravel and crushed rock with an approved soil binder without any deleterious materials, tested in accordance with AASHTO T-27 and T-11 which meets the gradation requirements in Table 2 below.

Table 2 - PARTICLE SIZE FOR UNTREATED BASE COURSE

Sieve Size	Percent Passing
1-inch	100

½-inch	70-90
#4	40-60
#16	20-40
#200	5-12

02105.2.7 BITUMINOUS SURFACING

Plant mix bituminous material, with maximum particle size not greater than 3/4-inch, meeting the requirements of Section 02511 of these Specifications.

02105.2.8 DRAIN GRAVEL

Drain gravel consists of washed natural gravel or crushed rock, with a maximum particle size of 1-inch, with not more than 40 percent passing the No. 4 sieve, with 100 percent being retained on the No. 10 sieve, and without any deleterious material.

02105.2.9 RIPRAP

Riprap materials shall be per MAG 220.

02105.2.10 SUBGRADE GRANULAR FILL

Subgrade granular fill consists of well graded granular soils with a maximum of 50 percent passing the No. 4 sieve and a maximum of 20 percent passing the No. 200 sieve and no materials greater than 4-inches in diameter.

02105.2.11 1" MINUS DECOMPOSED GRANITE

1" decomposed granite material shall be per MAG 795.

02105.3 CONSTRUCTION REQUIREMENTS

02105.3.1 LOCAL GOVERNMENT SPECIFICATIONS

Differences may exist between the requirements of these Specifications for sitework materials such as backfill, bedding, untreated base course and bituminous surface course, and those of local government entities. Such differences may affect Contract prices; therefore, when Contract Work falls within the boundaries of any local government, the Contractor shall make himself aware of that entity's specifications for those materials. If differences exist between those specifications and these, unless otherwise approved by the Engineer, the more stringent ones shall apply.

02105.3.2 BORROW AND DISPOSAL SITES

The Contractor shall, at its own expense, secure all necessary access and borrow sites for acquisition or removal and to dispose of excess backfill or waste materials, unless otherwise shown on the Drawings.

02105.3.3 ON-SITE MATERIALS

Unless otherwise shown on the Drawings or directed by the Engineer, on-site pipe bedding and trench backfill will be used for installation of all pipe. In areas where suitable on-site material is not available, other material, which meets these Specifications, will be used when shown on the Drawings, provided for in these Contract Documents or approved by the Engineer.

02105.3.4 SCALES

When ton weight is to be used to determine quantities of earthwork materials used, the Contractor shall provide his own scales or access to other scales at his own cost. Scales shall be certified accurate. Include certification in submittals.

02105.3.5 RIPRAP

The placement of riprap shall be per MAG 220.

02105.4 METHOD OF MEASUREMENT

02105.4.1 NO MEASUREMENT

On-Site Pipe Bedding and On-site Trench or Structural Backfill will be considered part of the items for piping or excavation associated with structures included in the Bid Schedule and no separate measurement for these materials will be made.

02105.4.2 SEPARATE MEASUREMENT

02105.4.2.1 IMPORTED MATERIALS – Quantities of imported pipe bedding and imported trench or structural backfill shall be determined by measuring the lineal feet (lineal feet of trench requiring imported materials) of imported material in place and accepted. This measurement shall include furnishing all necessary materials and equipment, labor, hauling, placement, compaction, and testing to produce an acceptable trench fill.

No allowance will be made for bedding and backfill materials required to fill voids caused by trenching operations, which exceed the dimensions shown on the Drawings.

02105.4.2.2 SAND – Quantities of sand shall be determined in cubic yards in place, calculated by multiplying the measured length of trench by the measured depth of bedding by the pay width shown on the Drawings, or as directed by the Engineer in the field.

No allowance will be made for materials required to fill voids caused by trenching operations, which exceed the dimensions shown on the Drawings.

02105.4.2.3 UNTREATED BASE COURSE - Quantities of untreated base course shall be determined in cubic yards in place, calculated by multiplying the measured length by neat line dimension shown on the drawings. If no neat lines are shown on the drawings, then the cubic yard calculations shall be determined by actual measurements in the field in place.

02105.4.2.4 BITUMINOUS SURFACING – Quantities of the respective compacted thickness of bituminous surfacing shall be determined in square yards by multiplying the length of material in place and accepted by the pay width shown on the Drawings, or as directed by the Engineer in the field.

02105.4.2.5 DRAIN GRAVEL - Quantities of drain gravel shall be determined in cubic yards calculated by multiplying the measured length by the measured depth of bedding in place by the pay width shown on the Drawings, or as directed by the Engineer in the field.

02105.4.2.6 RIPRAP – Riprap measurements shall be lump sum and included all riprap, filter fabric, grading and site preparation in order to place the riprap.

02105.4.2.7 SUBGRADE GRANULAR FILL - Quantities of subgrade granular fill shall be determined in cubic yards by multiplying the measured length by the measured breadth by the measured depth of material in place and accepted.

02105.4.2.8 DECOMPOSED GRANITE - Quantities of decomposed granite shall be determined in square yards by multiplying the measured length by the measured breadth of material in place and accepted.

02105.5 BASIS OF PAYMENT

The accepted quantity shall be paid for at the contract unit price for:

PAYMENT ITEM	UNIT
Imported Trench or Structural Backfill	Lineal Foot
Imported Pipe Bedding	Lineal Foot
Sand	Cubic Yard
Untreated Base Course	Cubic Yard
Bituminous Surfacing (Thickness)	Square Yard
Drain Gravel	Cubic Yard
Riprap	Lump Sum
Subgrade Granular Fill	Cubic Yard
(size) Decomposed Granite (Thickness)	Square Yard

END OF SECTION

02200.1 DESCRIPTION

This section covers furnishing of equipment, labor, and materials to clear, excavate, backfill and compact trenches for utilities. Excavation and backfill for piping appurtenances such as manholes, inlets, transition structures, junction structures, vaults, thrust blocks, valve boxes, catch basins, etc., shall be included, as also shall be restoration of the disturbed ground surface in accordance with the Contract Documents. Trench Excavation, and Backfill shall conform to Section 601 of MAG Standard Specifications.

02200.1.1 RELATED WORK

Section 01300 - Submittals
Section 02005 – Traffic Control
Section 01510 - Protection of Existing Improvement
Section 02015 - Clearing and Grubbing
Section 02105 - Earthwork Materials
Section 02500 - Removal and Replacement of Surface Improvements
Section 02204 – Water for Construction

02200.1.2 SUBMITTALS

02200.1.2.1 MOISTURE DENSITY TESTING AND GRADATION DETERMINATIONS - A documentation system shall be maintained by the Contractor to record results from all moisture/density testing and gradation determinations. Records of these tests shall show the following information as a minimum:

- Date of test.
- Type of test.
- Name of person performing test.
- Location of sample taken.
- Results of test and comparison with specified value required for compliance.

Upon completion of each gradation test or moisture/density test, a copy of the record for the respective test shall be delivered to the Engineer within one (1) working day following the completion.

02200.1.2.2 COMPLIANCE TESTING - Documentation shall also be made, in field diaries, of all compliance tests performed by the Contractor. Documentation shall be made available to the Engineer upon request.

02200.3 CONSTRUCTION REQUIREMENTS

02200.3.1 PERMITS

For work which is to take place within state and/or federal road and highway rights-of-way, the Contractor shall be responsible for obtaining all required encroachment and construction permits prior to beginning any work within the rights-of-way.

All work in any city, town or county public right-of-way will also require an approved excavation permit from that entity. The Contractor shall be responsible for obtaining all required encroachment and construction permits prior to beginning any work within the rights-of-way.

02200.3.16 SAMPLING AND TESTING

02200.3.16.1 TESTING BY INDEPENDENT LABORATORY - As directed by the Engineer, the Contractor shall provide for all sampling and testing through a qualified, independent testing laboratory at the Contractor's own expense.

02200.3.16.2 SCHEDULE OF SAMPLING AND TESTING - The following schedule of sampling and testing provides minimum requirements, to assure compliance with all materials and compaction requirements described herein. The number of samples and tests shown shall be considered minimum, and field conditions may necessitate additional sampling and testing to be required by the Engineer.

GRADATION DETERMINATION (AASHTO T-27 and T-11)

Trench Location	Testing Required
Materials imported or manufactured at a site determined by this contract	One test per site or source
On-site excavated materials along trenches.	One test per geographical area where material composition and gradation visually appears consistent.

MOISTURE/DENSITY RELATIONSHIP (Proctor)
(AASHTO T-99 or T-180 Method D)

Trench Location	Testing Required
Materials imported or manufactured at a site determined by this Contract.	One test per site unless the material visually appears to change.
On-site excavated materials along trenches.	One test per geographical area where material composition visually appears consistent.

COMPACTION COMPLIANCE TESTING REQUIREMENTS
(AASHTO T-191 or Portable Nuclear Gauges)

Trench Location	Testing Required
Street crossing with gravel or bituminous surfacing.	One test per lift for each crossing.
Parallel to centerline of bituminous or gravel surfaced streets or roadways.	One test per lift for each 500-feet of trench length.
Along unsurfaced roads or in cultivated or landscaped areas.	One test per lift for each 1,000-feet of trench length with at least one test per area.
Under or adjacent to manholes, wetwells, enclosures, boxes, etc.	None, unless geological conditions are inconsistent and requested by the Engineer.

NOTE: The term "test" shall mean a single test with acceptable results, equal to or better than specified minimums. In the event compaction test results fall below the required minimum density; the Contractor shall re-compact and test the material until a test with acceptable results is obtained. Any test failure shall result in additional tests as required by the Engineer, at no cost to the Owner, to ensure that overall project quality objectives are met.

02200.4 METHOD OF MEASUREMENT

Method of Measurement shall conform to Section 601 of MAG Standard Specifications.

02200.5 BASIS OF PAYMENT

Basis of Payment shall conform to Section 601 of MAG Standard Specifications.

END OF SECTION

02204.1 DESCRIPTION

Furnish and apply water for: dust control, pre-wetting, mixing or compacting earth materials for road, site, and/or trench construction, and for other needs associated with the Work. Water for Construction shall conform to section 104.1.3 of the MAG Standard Specifications.

02204.1.1 RELATED WORK

Section 01520 - Environmental Control
Section 02105 - Earthwork Materials
Section 02200 - Trench Excavation and Backfill

02204.1.2 SUBMITTALS

Not used.

02204.1.3 DEFINITIONS

Not used.

02204.2 MATERIALS

Water shall be free of dirt and silt or any substances injurious to plant life. A separate supply of potable water shall be provided for drinking when it becomes necessary to provide water for workers.

02204.3 CONSTRUCTION REQUIREMENTS

Water provided for construction shall be obtained from a source approved by the Engineer and sufficient to provide for the anticipated needs of the contract.

Water hauling equipment shall have watertight tanks of known capacity and shall be equipped with a pressure pump and spray system with the capability of applying the whole load uniformly. The spray system shall have a positive shut-off control. The water tank shall have a minimum capacity of 1,000 U.S. Gallons, and the capacity shall be clearly marked on the tank. The Contractor may be required to verify the tank capacity.

A water meter may be used for water dispensing, providing its measurement can be verified.

02204.4 METHOD OF MEASUREMENT

Unless indicated otherwise in the Bid Schedule, no separate measurement will be made for water used for pre-wetting, mixing, or compaction of earth materials or for dust control.

When shown in the Bid Schedule, water shall be measured to the nearest 1/10th of 1000 gallons in calibrated tanks or tanks with approved metering devices that indicate volume in 100-gallon quantities.

02204.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price for:

PAYMENT ITEM	UNIT
Water	M Gallons (1,000 US Gallons)

END OF SECTION

02222.1 DESCRIPTION

This section covers furnishing and installation of pipe and fittings of the type, class and size designated for the water system defined on the Drawings, in these Specifications, and elsewhere in the Contract Documents. Water Line Pipe Installation shall conform to Section 610 of MAG Standard Specifications.

02222.2 RELATED WORK

Section 02105 - Earthwork Materials
Section 02200 - Trench Excavation and Backfill
Section 15110 - Pipe and Piping Systems
Section 15230 - Waterline Valves and Hydrants

02222.3 METHOD OF MEASUREMENT

Method of Measurement shall conform to Section 610 of MAG Standard Specifications.

02222.4 BASIS OF PAYMENT

Basis of Payment shall conform to Section 610 of MAG Standard Specifications.

No separate payment will be made for fittings unless called for on the Bid Schedule.

END OF SECTION

02226.1 DESCRIPTION

Includes furnishing all labor, equipment and materials required to install pipe, dispose of unsuitable materials, perform trench backfilling and compaction in conformance with Section 618 of MAG Standard Specifications.

02226.1.1 RELATED WORK

Section 02105 - Earthwork Materials
Section 02200 - Trench Excavation and Backfill

02226.2 MATERIALS

Drainage materials for the washer compactor shall match the existing 4" drain line that it ties into if approved by the Engineer. If not approved, the Engineer will provide an alternative pipe material. This overrides the list of approved materials in Section 618 of MAG Standard Specifications.

02226.3 METHOD OF MEASUREMENT

02226.3.1 Method of Measurement shall conform to Section 618 of MAG Standard Specifications.

02226.4 BASIS OF PAYMENT

02226.4.1 Basis of Payment shall conform to Section 618 of MAG Standard Specifications.

END OF SECTION

02500.1 DESCRIPTION

This work includes removal and restoration of existing features, public or private, including but not limited to asphalt or concrete pavement, concrete structures, curb and gutter, sidewalk, gravel surfacing, driveways, crosswalks, landscaping, field crops, irrigation ditches, fences, culverts, buried or exposed utilities, abandoned utilities, small utility buildings and the disposal of resulting waste materials and debris. This also includes items listed in the plans for removal. Pavement Matching and Surface Replacement shall conform to Section 336 of MAG Standard Specifications. Removal of Existing Improvements shall conform to Section 350 of MAG Standard Specifications.

02500.1.1 RELATED WORK

Section 01510 - Protection of Existing Properties
Section 02015 - Clearing and Grubbing
Section 02200 - Trench Excavation and Backfill
Section 02520 - Pavement Cutting
Section 336 of MAG Standard Specifications
Section 350 of MAG Standard Specifications

02500.2 METHOD OF MEASUREMENT

02500.2.1 Method of Measurement for Pavement Matching and Surface Replacement shall conform to Section 336 of MAG Standard Specifications.

025002.2 Method of Measurement for Removal of Existing Improvements shall conform to Section 350 of MAG Standard Specifications.

02500.3 BASIS OF PAYMENT

02500.3.1 Basis of Payment for Pavement Matching and Surface Replacement shall conform to Section 336 of MAG Standard Specifications.

025002.2 Basis of Payment for Removal of Existing Improvements shall conform to Section 350 of MAG Standard Specifications.

END OF SECTION

02510.1 DESCRIPTION

This section covers all sampling and testing of subgrade and pavement materials. The materials sampling and testing shall be done by an independent certified testing company and all testing reports shall be submitted to the Engineer within a reasonable time period. Roadway Materials Sampling and Testing shall conform to MAG Standard Specifications.

02510.1.1 RELATED WORK AND REFERENCED SECTIONS

MAG Standard Specifications
Section 01300 – Submittals
Section 01400 – Quality Control
Section 02200 – Trench Excavation and Backfill
Section 03050 – Portland Cement Concrete

02510.1.2 SUBMITTALS

All sampling and test reports shall be submitted in accordance with Section 01300.

02510.1.3 DEFINITIONS

Not Applicable

02510.2 MATERIALS

Not Applicable

02510.3 CONSTRUCTION REQUIREMENTS

02510.3.1 TESTING

The minimum testing requirements are as follows: All Materials sampling and testing shall be done by an independent certified testing company and all testing reports shall be submitted to the Engineer within a (2) two week time period or sooner.

02510.3.1.1 EMBANKMENT

- Maximum Laboratory Density — 1 test in each soil type
- Field Density and Moisture — 1 test per 2000 square yards

02510.3.1.2 BACKFILL

- Field Density and Moisture — 2 tests per culvert or structure (Refer to Section 02200 for Trench Excavation and Backfill Testing)

02510.3.1.3 UNTREATED BASE COURSE

• Sieve Analysis	1 test per production day
• Maximum Laboratory Density	1 test per 10,000 tons
• Field Density and Moisture	1 test per 2000 square yards

02510.3.1.4 ASPHALT CONCRETE PAVEMENT

• Mix design (ASTM 1559 and AASHTO T-283)	1 mix design for the project
• Asphalt temperature	As necessary to assure compliance
• Gradation and Asphalt Content	2 tests per production day
• Field Density	1 test per 1600 square yards
• Mix and Laydown Temperature	As necessary to assure compliance
• Thickness	1 test per 1600 square yards

02510.3.1.5 PORTLAND CEMENT CONCRETE

• Slump Test	1 test per load of concrete
• Air Test	1 test per load of concrete
• Strength Test	1 compressive strength per 50 cubic yards

02510.4 METHOD OF MEASUREMENT

Measurement for this pay item will be by the lump sum.

02510.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price:

PAY ITEM	UNIT
Materials Sampling and Testing	Lump Sum

END OF SECTION

02520.1 DESCRIPTION

This section covers cutting through designated sections of bituminous and/or concrete pavement surface with approved equipment in preparation for pavement removal. Pavement Saw Cutting shall conform to Section 336 of MAG Standard Specifications.

02520.1.1 RELATED WORK

Section 02200 - Trench Excavation and Backfill
Section 02500 - Removal and Replacement of Surface Improvements

02520.2 METHOD OF MEASUREMENT

02520.2.1 Method of Measurement for Pavement Saw Cutting shall conform to Section 336 of MAG Standard Specifications.

02520.3 BASIS OF PAYMENT

02520.3.1 Basis of Payment for Pavement Saw Cutting shall conform to Section 336 of MAG Standard Specifications.

END OF SECTION

02900 REMOVAL AND ABANDONMENT

02900.1 DESCRIPTION

This section is a specification regarding the demolition, removal or abandonment of existing equipment, structures, piping, fencing and appurtenances.

02900.1.1 REFERENCES

Section 01520 – Environmental Control
Section 02200 – Trench Excavation and Backfill
Section 03600 – Grout and Mortar
Section 05010 – Structural & Miscellaneous Metals

02900.1.2 Definitions

Not used.

02900.2 REMOVAL OF EQUIPMENT

02900.2.1 Non-Salvaged Equipment – Non-salvaged equipment shall be removed in a manner that produces the least amount of debris as practical. All debris created in the demolition process shall be removed. All removed equipment and debris shall be disposed of according to Section 01520. Care shall be taken to prevent debris from falling into the headworks channel.

02900.2.2 The existing screens shall be removed and disposed of in according with all local and federal regulations. Removal and disposal shall include both screens, control panels, and appurtenances associated with the screens. All above ground conduits shall be removed unless reuse is approved by the engineer.

02900.2.3 Screen removal shall occur in such a manner that one screen (either new or existing) is in operation at all times. One screen shall be removed and replaced to fully operational status before the second screen is removed. At no time shall a screen not be in operation during construction.

02900.3 REMOVAL/ABANDONMENT OF PIPING

Pipe removal/abandonment shall be in accordance with these Specifications and the Drawings. All above ground pipe to be abandoned shall be removed. All below ground piping shall be grouted and abandoned in place, unless the piping must be removed for construction of new piping or structures, or if piping is fully exposed during the course of construction and is easily removable. Removal and abandonment of piping includes all fittings, valves, restraints, and appurtenances. All removed piping, unless stated otherwise in the Drawings or by the Engineer shall be disposed of according to Section 01520.

02900.4 REMOVAL OF CONCRETE STRUCTURES AND PADS

All concrete structures and pads shall be removed according to the Drawings and these Specifications. Concrete shall be broken up and removed with appropriate equipment to complete the task in a timely manner. Dust shall be controlled during and after removal and debris barriers shall be set up if deemed necessary by the Contractor or Engineer to protect existing structures and workers. Concrete debris shall be neatly stockpiled and disposed of according to Section 0152.

02900.5 REMOVAL OF EXISTING FENCING

Fencing, posts, and concrete footings shall be removed according to the Drawings and these Specifications. The Contractor shall properly dispose of these items off-site at his expense. Care shall be taken to not damage fencing that is not removed as the new fencing will tie in with existing fencing where applicable.

02900.5 EARTHWORK

Upon completion of removal or abandonment activities soils shall match surrounding grades. Backfill and compaction shall be completed in accordance with the Drawings and these Specifications.

02900.6 REMOVAL/ABANDONMENT ACTIVITIES CLEANUP

Upon completion of removal or abandonment activities the areas shall be free of debris. Area shall match surrounding areas.

02900.7 METHOD OF MEASUREMENT

02900.7.1 The method of measurement shall be per Section 01019.4.

02900.7.2 DAMAGED ITEMS

Measurement of items damaged or removed as a result of the Contractor's negligence shall not be allowed and no payment will be made under this contract.

02900.8 BASIS OF PAYMENT

The basis of payment shall be per Section 01019.4.

03050.1 DESCRIPTION

This section contains requirements for Portland cement concrete materials and concrete mix designs. Portland Cement Concrete shall conform to Section 725 of MAG Standard Specifications.

03050.1.1 RELATED MATERIALS AND WORK

Section 01300 - Submittals
Section 03100 - Concrete Forming, Finishing and Curing
Section 03200 - Concrete Reinforcement
Section 03300 - Concrete Structures and Slabwork
Section 03600 - Grout and Mortar

03050.2 METHOD OF MEASUREMENT

03050.2.1 Method of Measurement shall conform to these Specifications as described in Section 03300.

03050.3 BASIS OF PAYMENT

03050.3.1 Basis of Payment shall conform to these Specifications as described in Section 03300.

END OF SECTION

03100.1 DESCRIPTION

Includes furnishing materials, accessories and labor required to form, finish and cure interior and exterior cast-in-place concrete. Concrete Forming, Finishing and Curing for Curb, Gutter, Sidewalk, Curb Ramps, Driveway and Alley Entrances shall conform to Section 340 of MAG Standard Specifications. Concrete Forming, Finishing and Curing for Concrete Structures shall conform to Section 505 of MAG Standard Specifications.

03100.1.1 RELATED WORK

Section 03050 - Portland Cement Concrete
Section 03200 - Concrete Reinforcement
Section 03300 - Concrete Structures and Slabwork
Section 03600 - Grout and Mortar

03100.2 METHOD OF MEASUREMENT

03100.2.1 Method of Measurement for Curb, Gutter, Sidewalk, Curb Ramps, Driveway and Alley Entrances shall conform to Section 340 of MAG Standard Specifications.

03100.2.2 Method of Measurement for Concrete Structures shall conform to Section 505 of MAG Standard Specifications.

03100.3 BASIS OF PAYMENT

03100.3.1 Basis of Payment for Curb, Gutter, Sidewalk, Curb Ramps, Driveway and Alley Entrances shall conform to Section 340 of MAG Standard Specifications. Reinforcing steel shall be considered incidental to this item.

03100.3.2 Basis of Payment for Concrete Structures shall conform to Section 505 of MAG Standard Specifications. Reinforcing steel shall be considered incidental to this item.

END OF SECTION

03200.1 DESCRIPTION

Includes steel bars, wire fabric and rod mats required for cast-in-place concrete, with the necessary support chairs, bolsters, bar support and spacers required for supporting the reinforcement. Concrete Reinforcement shall conform to Section 727 of MAG Standard Specifications.

03200.1.1 RELATED Work

Section 01300 - Submittals
Section 03050 - Portland Cement Concrete
Section 03300 - Concrete Structures and Slabwork

03200.1.2 SUBMITTALS

03200.1.2.1 MILL TEST CERTIFICATION - Manufacturer's mill test certificates of supplied concrete reinforcement, indicating physical and chemical analysis shall be submitted.

03200.1.2.2 WELDER CERTIFICATION - Each welder's certification data shall be submitted to and approved by the Engineer prior to performance of welding on the project.

03200.1.2.3 SHOP DRAWINGS - Shop Drawings shall be submitted and shall indicate the sizes, spacings, locations and quantities of reinforcing steel and wire fabric; bending and cutting schedules; any proposed splicing; and reinforcement support, spacing devices and stirrup spacing.

03200.1.2.4 BAR SUPPORT SAMPLES - The Contractor shall submit for the Engineer's approval, samples of all bar supports it proposes to use along with a written description of where each type of bar support would be used.

03200.1.3 DEFINITIONS

Not used.

03200.2 MATERIALS

03200.2.1 CONCRETE REINFORCEMENT MATERIALS

03200.2.1.1 STEEL REINFORCEMENT - Unless otherwise specified, reinforcing steel shall be grade 60 billet steel conforming with ASTM A-615, including supplementary requirements S1. All such reinforcing shall be deformed steel bars with deformations in accordance with ASTM A-615. Bars shall be either uncoated or coated as indicated. ASTM A-706 steel shall be used if welding is indicated or allowed. All reinforcement shall be supplied in the maximum lengths practical or as indicated, unless otherwise authorized by the Engineer.

03200.2.1.2 WIRE FABRIC - Welded steel wire fabric shall be in accordance with ASTM A-185 plain type. It shall be new stock and free of any rust when placed in the Work. Wire fabric may be supplied in flat sheets or coiled rolls, and may be either coated or uncoated as indicated.

03200.2.1.3 STIRRUPS - Stirrup steel shall be in accordance with ASTM A-82.

03200.2.1.4 SPIRAL REINFORCEMENT - Spiral reinforcement for columns or other components shall be cold drawn steel wire in accordance with ASTM A-82.

03200.2.1.5 DOWEL BARS - Plain dowel bars for expansion joints shall be in accordance with ASTM A-615, 60-ksi-yield grade steel. Dowel bars shall be epoxy coated in roadway pavements. Metal dowel cans shall be provided at one end of dowel to permit longitudinal movement of the dowel within the concrete section. The Contractor shall provide for movement equal to the joint width plus 0.5-inch. Load transfer bars shall be painted with 1 coat of paint conforming to AASHTO M-254 and coated 1/2 with grease.

03200.2.2 ACCESSORY MATERIALS

03200.2.2.1 TIE WIRE - Tie wire shall be 16-gauge minimum cold drawn plain steel wire, and shall be in accordance with ASTM A-82.

03200.2.2.2 REINFORCEMENT SUPPORTS - Unless otherwise required in the Drawings or these Specifications, reinforcement supports bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place shall be wire type bar supports complying with CRSI recommendations. Wood, brick, and other unacceptable materials will not be allowed.

03200.2.2.3 SUPPORTS EXPOSED TO VIEW - Where support legs are in contact with forms on concrete surfaces exposed to view, supports shall be stainless steel or shall be provided with either hot-dip galvanized or plastic protected legs.

03200.2.3 FABRICATION

03200.2.3.1 STANDARDS - Steel reinforcement shall be cut, bent and fabricated in accordance with ACI 315 and with approved machine methods, in either the shop or the field.

03200.2.3.2 BENDING - Bars shall be accurately formed to the dimensions shown on the Drawings or applicable bending schedule. Bending or straightening in the shop or the field shall be accomplished so that the steel is not damaged. All bars shall be cold bent. Bends for hooks on bars shall be made around a pin having a diameter not less than 6 times the minimum thickness of the bar. Kinked bars shall not be used. Bars with bends not indicated on Drawings or final Shop Drawings shall not be placed in the Work. Reinforcement bars shall not be bent after they are embedded in concrete.

03200.2.3.3 SPLICES - Reinforcing splices not indicated on the Drawings shall be approved by the Engineer, and shall be located at points of minimum stress. The location of splices shall be indicated on Shop Drawings. Welding of reinforcing bars, when authorized by the Engineer, shall be performed in accordance with AWS D1.4. All rebar which is welded shall be grade 60 ASTM A706 material.

03200.3 CONSTRUCTION REQUIREMENTS

03200.3.1 DELIVERY AND STORAGE

03200.3.1.1 DELIVERY - Deliver reinforcement to the job site bundled, tagged and marked. Use metal tags indicating bar size, lengths and other information corresponding to markings shown on placement diagrams.

03200.3.1.2 STORAGE - Take all means necessary to protect reinforcement materials before, during and after installation and to protect the installed work of other trades. Store all reinforcement materials in a manner to prevent excessive rusting and fouling with grease, dirt and other bond breaking coatings. Take all necessary precautions to maintain identification after bundles are broken. In the event of damage or errors, immediately make all repairs or replacements necessary and at no additional cost to the Owner.

03200.3.2 REINFORCEMENT ERECTION

03200.3.2.1 CLEAN AND SOUND MATERIALS - At the time of placement in the Work, reinforcement shall be free of loose mill scale, loose or excessive rust, paint, oil or grease, or other coating which may destroy its bond with the concrete. Bars with reduced cross-section due to rusting or other cause, even if all rust has been removed, shall not be allowed in the Work.

03200.3.2.2 CLEARANCE - Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers or other approved devices in accordance with "reinforcement support" paragraphs below. Placement and fastening of reinforcement in each section of the Work must be approved before concrete is placed.

03200.3.2.3 CLEAR DISTANCE - The clear distance between parallel bars shall not be less than one and one-half times the diameter of the bars, and shall in no case be less than 1 inch nor less than the maximum size of the coarse aggregate specified.

03200.3.2.4 MINIMUM COVER - Unless otherwise shown on the Drawings or approved by the Engineer, for all formed surfaces, the minimum concrete cover over the steel reinforcement shall be 1 1/2 inches for bars number 5 and smaller and 2 inches for bars number 6 through 18. The largest specified cover shall be used when different sized bars are encountered in the same face. No "bury" or "carrier" bars will be allowed unless specifically approved by the Engineer.

03200.3.2.5 CUTOUTS AND OPENINGS - Where reinforcing steel has to be cut to permit passage of pipe or to create openings with no detail available on the Drawings for extra reinforcement in such areas, the area of steel removed by the creation of the opening must be replaced by placement of at least double the area of the steel removed equally around the openings created. The steel shall be placed such that it extends 5 feet beyond the opening on each side, to provide for sufficient bond.

03200.3.2.6 METAL MESH - Sheets of metal mesh shall be bent as shown or required on the Drawings to fit the work. It shall be rolled or otherwise straightened to make a perfectly flat sheet before placement in the Work. Supports for metal mesh shall meet requirements for reinforcing bar supports.

Sheets of metal mesh shall be spliced in accordance with ACI 318 and shall be overlapped no less than 12 inches or one square plus 6 inches, whichever is greater, to maintain a uniform strength. The mesh shall be securely fastened at the ends, edges and at all supports to maintain clearances and overlaps.

03200.3.2.7 NOTICE TO OTHER TRADES - The Contractor shall ensure that all other crafts, sub-contractors, engineering support groups, and etc., whose work is related to concrete placement, are provided with ample notice and opportunity to introduce and finish required embedded items before concrete placement. All sleeves, inserts, anchors and any other embedded items shall be located and set in place prior to concrete placement. All voids in embedded items shall be temporarily filled to prevent entry of concrete.

03200.3.3 SPLICING

03200.3.3.1 ENGINEER APPROVAL - Except as shown on the Drawings, reinforcing steel shall not be spliced at any location without specific written approval of the Engineer. Splices in adjacent bars shall be staggered as directed by the Engineer.

03200.3.3.2 LAP SPLICES - Unless shown otherwise on the Drawings, or approved by the Engineer, bars up to and including number 11 shall be lap spliced in accordance with ACI 318 and shall be fastened together with steel wire. Unless shown otherwise on the Drawings, or approved by the Engineer, bars at a lap splice shall be in contact with each other, and in no case shall the lap be less than 40 diameters of the spliced bars.

Unless shown otherwise on the Drawings, or approved by the Engineer, where bars are to be lap spliced at joints in the concrete, all bars shall project from the concrete first placed for a minimum length equal to the lap splice length as indicated on the Drawings. All concrete or other deleterious coating shall be removed from dowels and other projecting bars by wire brushing or sand blasting before the bars are embedded in a subsequent concrete placement.

03200.3.3.3 WELDING - Reinforcing steel shall be welded only if shown on the Drawings, or approved in writing by the Engineer. All welding of reinforcing steel shall comply with AWS D1.4.

03200.3.3.4 EXPANSION JOINTS - Reinforcement, or other embedded metal items bonded to the concrete, shall not be permitted to extend continuously through any expansion joint, with the exception of dowels in floors bonded on only one side of joint.

03200.3.4 REINFORCMENT SUPPORT

03200.3.4.1 PLACEMENT - All reinforcement shall be supported and retained in place, true to indicated lines and grades, by the use of approved bar supports, sized to position the steel in the exact location required on the Drawings. Supports shall be spaced at intervals of not more than 5 feet on center in any direction, to prevent movement of the steel during concrete placement. Deck steel shall be tied down to beams or forms at regular intervals not exceeding 5 feet on center in any direction.

03200.3.4.2 CONCEALMENT - Supports shall be completely concealed in the concrete and shall not discolor or otherwise mar the surface of the concrete.

03200.3.4.3 SAND PLATES - Supports with sand plates or horizontal runners shall be used for slabs on grade where the base material will not support chair legs.

03200.3.5 QUALITY COMPLIANCE

Reinforcing materials found to be damaged or at variance with the requirements of the Drawings or these Specifications for size, quantity, strength, position, arrangement, or other attribute, shall result in rejection of the concrete Work if they are not brought into compliance.

03200.4 METHOD OF MEASUREMENT

03200.4.1 NO MEASUREMENT

Unless shown otherwise, concrete reinforcement shall be included with the concrete item within which it is installed and no separate measurement shall be made.

03200.4.2 SEPARATE MEASUREMENT

When shown as a separate item on the Bid Schedule, measurement of reinforcing steel will be, based on the theoretical or calculated number of pounds placed and accepted according to the requirements of the Drawings and these Specifications. Measurement shall exclude splice bars used to replace test samples. No deductions will be made for any bends except for hooks. The length of the bar to be added to out-to-out dimensions of hooked bars will be shown on the plans. The weight calculations shall be based upon the following table:

WEIGHT CALCULATIONS FOR REINFORCING STEEL

Size	Lbs. per Lineal Foot	Size	Lbs. Per Lineal Foot
1/3 inch	0.167	#8	2.670
#3	0.376	#9	3.400
#4	0.668	#10	4.303
#5	1.043	#11	5.313
#6	1.502	#14	7.650
#7	2.044	#18	13.600

03200.5 BASIS OF PAYMENT

03200.5.1 NO MEASUREMENT

Unless otherwise noted, reinforcing steel shall be considered incidental to the concrete item which it is installed and no separate payment shall be made. No allowance will be made for clips, wires or other material used for fastening reinforcement in place.

03200.5.2 SEPARATE MEASUREMENT

The accepted quantities of reinforcing steel will be paid for at the contract unit price. No allowance will be made for clips, wires or other material used for fastening reinforcement in place.

Payment will be made under:

PAY ITEM	UNIT
Reinforcing Steel	Pound

03300.1 DESCRIPTION

Covers concrete placement operations for cast-in-place structural building frames, slabs and other components. Concrete Structures and Slabwork shall conform to Section 505 of MAG Standard Specifications.

03300.1.1 RELATED WORK

Section 01300 - Submittals
Section 03050 - Portland Cement Concrete
Section 03100 - Concrete Forming, Finishing and Curing
Section 03200 - Concrete Reinforcement
Section 03600 - Grout and Mortar

03300.2 METHOD OF MEASUREMENT

03300.2.1 Method of Measurement for Concrete Structures and Slabwork shall conform to Section 505 of MAG Standard Specifications.

03300.3 BASIS OF PAYMENT

03300.3.1 Basis of Payment for Concrete Structures and Slabwork shall conform to Section 505 of MAG Standard Specifications. Reinforcing steel shall be considered incidental to this item.

END OF SECTION

03600.1 DESCRIPTION

This section covers furnishing materials and placing Portland cement grout, epoxy grout, and mortar for finishing concrete surfaces, leveling beds for structural steel plates, sealing joints between piping and structures, and sealing joints between construction components. Grout and Mortar shall conform to Section 776 of MAG Standard Specifications.

03600.1.1 RELATED WORK

Section 01300 – Submittals
Section 03100 - Concrete Forming Finishing, and Curing
Section 03300 - Concrete Structures and Slabwork

03600.2 METHOD OF MEASUREMENT

03600.2.1 NO MEASUREMENT

Grout for leveling of structural components, sealing joints and gaps, finishing concrete surfaces, and filling masonry cells for structures shall not be measured separately for payment.

Mortar used for installing brick or concrete masonry units, or for finishing concrete surfaces, shall not be measured separately for payment.

03600.2.2 SEPARATE MEASUREMENT

Grout installed under pressure for filling voids and pockets under footings and supporting sections and for sealing ground water movement shall be measured by the cubic foot of grout injected in place.

03600.5 BASIS OF PAYMENT

The accepted quantities shall be paid for at the contract unit price for:

PAY ITEM	UNIT
Grout *(Description)*	Cubic Foot

END OF SECTION

05010.1 GENERAL

This section of the Specifications covers metals and metal work required to furnish, fabricate, and to install the following nonexclusive list of items:

- Aluminum and miscellaneous nonferrous metals
- Anchors and anchor bolts
- Bolts
- Cast-iron frames and covers
- Grating and frames
- Ladders
- Louvers
- Manhole frames and covers
- Metal roof decking
- Miscellaneous metal items shown on the Plans or specified
- Miscellaneous structural steel
- Pipe handrails, pipe sleeves, inserts, and chains
- Platforms
- Sheet metalwork
- Special supports, hangers, and anchors
- Stairs and treads
- Steel lintels
- Supports for mechanical equipment
- Tread plates and frames

05010.1.2 RELATED WORK

Not used.

05010.1.3 SUBMITTALS

Certified copies, in duplicate, of mill tests or reports from a recognized commercial laboratory shall be furnished when requested as to the chemical, tensile, and bending properties of each shipment of structural metal or part thereof having common properties. All tests and analyses shall be made in accordance with the applicable ASTM Specification.

05010.1.4 DEFINITIONS

Not used.

05010.2 MATERIALS

05010.2.1 ALUMINUM

05010.2.1.1 SHEET ALUMINUM - Except as otherwise specified or indicated on the Plans, sheet aluminum shall be alloy 50050H14 conforming to the requirements of ASTM B 209 and shall be not less than 0.025 inch in thickness.

05010.2.1.2 STRUCTURAL ALUMINUM - Structural aluminum shall be 6061-T6, and extruded aluminum shall be 6063-T42.

Aluminum shapes and appurtenant materials shall conform to the requirements of ASTM B 221 and ASTM B 308 and shall be of aluminum alloy known commercially as 6061-T6. Materials not otherwise specified shall conform to the latest applicable Specifications of ASTM.

05010.2.1.3 BOLTS - All bolts for bolting aluminum shall be Type 304 or 316 stainless steel of sizes indicated on the Plans.

05010.2.2 STEEL

05010.2.2.1 SHEET STEEL - Galvanized sheet iron or steel shall conform to ASTM A 525, 1.25-ounce coating; black steel to ASTM A 569.

05010.2.2.2 STRUCTURAL STEEL – Structural steel shall be as follows:

- Unless otherwise specified, structural steel shall conform to ASTM A 36.
- Cast iron shall conform to ASTM A 48, Class 40B.
- Galvanized structural steel or iron shall be "hot dipped" galvanized after fabrication. Electro-galvanizing shall not be used unless specified otherwise.
- All structural steel shall be delivered free from mill scale, rust, or pitting.
- Items not galvanized or protected by a shop coat of paint shall be protected from the weather until erection and painting.

05010.2.2.3 STAINLESS STEEL - Stainless steel, unless specifically specified or indicated on the Plans otherwise, shall be Type 316 or Type 304, nonmagnetic.

05010.2.2.4 STEEL PIPE - Steel pipe shall conform to ANSI B 36.10, Table I.

05010.2.2.5 BOLTS - High tensile bolts shall conform to ASTM A 325.

05010.2.2.6 OTHER ITEMS

Other structural and miscellaneous metal items shall be as indicated on the Plans or as specified elsewhere.

05010.3 CONSTRUCTION (FABRICATION) REQUIREMENTS

05010.3.1 GENERAL

All structural or foundry items shall be carefully fabricated to true dimensions without warp or twist. Welded closures shall be neatly made; and where weld material interferes with fit or is unsightly in appearance, it shall be ground off smooth.

05010.3.1.1 INSTALLATION - Each structural item shall be installed true to level, plumb, alignment, and grade with all parts bearing or fitting the structure or equipment for which it is intended accurately and securely. It shall not be permitted to cock out of alignment, re-drill, reshape, or force to fit any fabricated item. It is the Contractor's responsibility to place anchor bolts or other anchoring devices accurately and to make any surfaces, which bear against structural items smooth and true to level to preclude the necessity of any springing, re-drilling, or reshaping.

05010.3.1.2 SPECIAL ALIGNMENT - Pipe railings, posts, and structural items needing a special alignment to preserve straight, level, even, smooth lines shall be rigidly supported and braced and kept braced until concrete, grout, or dry pack cement mortar has hardened for a period of not less than 48 hours.

05010.3.1.3 FIT - The Contractor shall be responsible for the correct fitting of all metalwork in the field. The Contractor shall take all measurements necessary to properly fit its work in the field, and it shall be governed by and be responsible for these measurements and the proper working out of all details.

05010.3.1.4 WELDING – General welding procedures are as follows (see also Subsections below):

- The Contractor shall notify the Engineer at least 24 hours before starting shop or field welding.
- A welding inspector may check the materials, the equipment, and the qualifications of the welders.
- The inspector may use gamma ray, magnetic particle, dye penetrant, trepanning, or any other aid to visual inspection which it may deem necessary to be assured of the adequacy of the welding.
- The costs of any tests and all re-tests on defective welds shall be borne by the Contractor. Cost in connection with qualifying welders shall also be borne by the Contractor.
- The cost of tests on sound welds will be borne by the Contractor.
- Welders doing unsatisfactory work shall be removed or may be required to pass qualification tests again.

05010.3.1.5 MISCELLANEOUS METALWORK - Where anchors, connections, or other details of miscellaneous metalwork are not definitely shown or specified, its material, size, form, attachment, and location shall conform to best practice.

05010.3.1.6 HAZARDOUS PROJECTIONS - Sharp or hazardous projections shall be rounded off and ground smooth.

05010.3.1.7 CHIPS AND DEBRIS - All chips and other debris lodged between contacting surfaces shall be removed before assembly.

05010.3.2 ALUMINUM

05010.3.2.1 STRUCTURAL ALUMINUM

The Contractor shall furnish and install all structural aluminum items in accordance with the Plans and as specified. It shall provide all supplementary parts necessary to complete each item even though such work is not definitely covered by the Plans and Specifications. Its size, form, attachment, and location shall be such as to conform to the best of current practice.

05010.3.2.2 LAYOUT ON ALUMINUM - Hole centers may be center punched and cutoff lines may be punched or scribed. Center punching and scribing shall not be used where such marks would remain visible on the surface of the fabricated material.

When critical dimensions exist, a temperature correction shall be applied in the layout as necessary. The coefficient of expansion shall be taken as 0.000013 per degree F.

05010.3.2.3 CUTTING AND DRILLING ALUMINUM – Aluminum may be cut and drilled as follows:

- Material 1/2 inch thick or less may be sheared, sawed, or cut with a router. Material more than 1/2 inch thick shall be sawed or routed.
- Cut edges shall be true, smooth, and free from excessive burrs or ragged breaks.
- Edges of plates carrying calculated stresses shall be planed to a depth of 1/4 inch. Sawn or routed edges will be acceptable when the finish is of equal quality to a planed edge.
- Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting.
- Rivet or bolt holes may be punched or drilled to finished size before assembly.
- The finished diameter of holes for unfinished bolts shall be not more than 1/16 inch larger than the nominal bolt diameter.
- All holes shall be cylindrical and perpendicular to the principal surface. Holes shall not be drifted in such a manner as to distort the metal.
- Flame cutting of aluminum alloys is not permitted.

05010.3.2.4 ALUMINUM FORMING AND ASSEMBLY - Structural aluminum material may not be heated except in forming operations where material may be heated to a temperature not exceeding 400 degrees F for a period not exceeding 30 minutes to facilitate bending. Such heating shall be done only when proper temperature controls and supervision are provided to insure that the limitations on temperature and time are carefully observed.

05010.3.2.5 WELDING ALUMINUM - This Specification shall apply to both field and shop welding operations. The general recommendations and regulations shown in the American Welding Society Specifications D1.1, "Structural Welding Code," apply to 6061-T6 structures. Detail requirements for welding aluminum alloy 6061-T6 are given as follows:

- Filler metal for welding shall be aluminum alloy welding rods conforming to the requirements of AWS A 5.10 and shall be AWS classification ER 4043, ER 5154, ER 5254, ER 5183, ER 5356, or ER 5556.
- The welding process and welding operators shall both meet a qualification tests. The method of qualification shall conform to the method described in the ASME Boiler and Pressure Vessel Code, Section IX, "Welding Qualifications," Part B. Aluminum alloy 6061-T6 shall be used for the qualification test plates. Operators shall be qualified on the basis on bend tests and a fillet weld soundness test.
- Dirt, grease, forming or machining lubricants, or any organic materials shall be removed from the areas to be welded by cleaning with a suitable solvent or by vapor degreasing. Additional operations to remove the oxide coating just prior to welding are required when the inert gas tungsten arc welding method is used. This may be done by etching or by scratch brushing. The oxide coating may not need to be removed if the welding is done with the automatic or semi-automatic inert gas shielded metal arc.

- Suitable edge preparation to assure 100 percent penetration in butt welds shall be used. Oxygen cutting shall not be used. Sawing, chipping, machining or shearing may be used.

- Any welding of aluminum shall be done using a nonconsumable tungsten electrode with filler metal in an inert gas atmosphere (TIG) or using a consumable filler metal electrode in an inert gas atmosphere (MIG). No welding process that requires the use of a welding flux shall be used unless prior approval has been obtained from the Engineer. Preheating for welding is permissible provided the temperature does not exceed 400° F for a total time of 30 minutes.

- Welding of any structure which is to be anodized shall be done using filler alloy rods that will not discolor when anodized. ER 5154, ER 5254, ER 5183, ER 5356, or ER 5556 filler alloy rods shall be used.

05010.3.2.6 PROTECTION OF ALUMINUM SURFACES - Aluminum surfaces to be placed in contact with wood, concrete, masonry, or dissimilar metals other than stainless steel shall be protected as specified in the appropriate sections of Division 9 – Finishes.

05010.3.2.7 BOLTING - Where aluminum comes in contact with steel it shall be bolted with stainless steel bolts and separated or isolated from the steel with neoprene gaskets or washers or as specified in Division 9.

05010.3.3 STEEL

05010.3.3.1 STRUCTURAL STEEL – The following shall apply:

- The Contractor shall furnish and install all structural steel items in accordance with the plans and as specified herein.

- The Contractor also shall provide all supplementary parts necessary to complete each item even though such work may not be specifically covered by the Plans and Specifications.

- Wherever applicable, all fabrication and erection of steel items shall conform to AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings" except as the same may be modified by applicable building codes, the General Conditions, and these Specifications.

05010.3.3.2 WELDING OF STEEL – Both the general recommendations and regulations shown in the American Welding Society Specifications D1.1, "Structural Welding Code," as well as the detail requirements in those specifications apply to welding of steel structures. Welding of steel shall adhere to the following:

- All welding of steel under this section shall be done by welders who have a current AWS certificate for the type of welding to be done by the welder.

- All welding of structural steel type ASTM A 36 shall be done using mild steel covered Arc Welding Electrodes conforming to ASTM A 233, Series E70, or shall be done using Electrodes and Fluxes for Submerged Arc Welding conforming to ASTM A 558, Classification F70-XXXXX, where XXXXX refers to any electrode referred to in ASTM A 558.

- Welding of stainless steels shall be done with electrodes and techniques as recommended in Welded Austenitic Chromium - Nickel Stainless Steels - Techniques and Properties as

published by the International Nickel Company, Inc., New York, New York. All welds shall be full penetration welds, unless specified otherwise.

05010.3.3.3 PROTECTION OF STEELWORK - The Contractor shall paint steel and miscellaneous ferrous metal items as specified in the appropriate sections of Division 9-Finishes.

05010.3.4 DUCTWORK

05010.3.4.1 DESIGN AND FABRICATION - Ducts shall be fabricated of aluminum or galvanized steel sheets with gauges of sheet metal, joint types, reinforcing, bracing, supporting, fabricating, installing, and other requirements in accordance with Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning Systems of the Sheet Metal and Air Conditioning Contractors National Association, Inc. Ducts shall be designed for the appropriate pressure type as shown in the above mentioned Duct Manual. Details on the Plans in some cases call for sheet metal thicknesses greater than called for in the Duct manual. Sheet metal shall conform to whichever requirement calls for the greater thickness. Aluminum ducting shall be not less than 0.063 inches thick.

05010.3.4.2 HANGERS - Ducts shall be supported on both sides at all changes in direction and at not greater than eight foot intervals by suitable hangers as specified herein or as detailed on the Plans. For galvanized ducting, hangers for ducts 12-inch by 24-inch or smaller shall be galvanized sheet metal straps not lighter than 18-gauge by one inch secured to the structure by one 5/16-inch bolt and to the duct by not less than two No. 10 sheet metal screws or 3/16-inch stove bolts. Hangers for ducts larger than 12-inch by 24-inch shall be galvanized steel straps or rods not less than 0.13 square inches in net cross section, secured to the structure by a Grinnell Figure 152, Size 2, concrete insert, or approved equal, and to a duct pocket or reinforcing angle by two 1/4-inch stove bolts. For aluminum ducting, supports shall be equivalent to supports for galvanized ducting except that all fasteners, fittings, and shafting shall be stainless steel.

05010.3.4.3 FLEXIBLE CONNECTIONS - Where blowers or equipment containing blowers or other machine elements, which may cause vibration, are connected to ducts or housing, such connections shall be by means of flexible connections. These flexible connections shall be airtight at the pressures encountered and be flame proof and water proof. The flexible material shall be equivalent to 14 ounce canvas.

05010.4 METHOD OF MEASUREMENT

No separate measurement shall be made for structural miscellaneous metals. Measurement for this item will be included as part of another bid item.

05010.5 BASIS OF PAYMENT

No payment shall be made for structural and miscellaneous metals. The structural and miscellaneous metals shall be considered incidental to the project.

END OF SECTION

05050.1 DESCRIPTION

This section covers a generic list of miscellaneous metals specifications.

05050.1.1 RELATED WORK

Not used.

05050.1.2 SUBMITTALS

Detailed fabrication shop drawings for prefabricated metal walkway systems, stairs, ladders, canopies, building structures and any other structural metal components shall be submitted and include structural calculations and be stamped by a state of Arizona professional engineer.

05050.1.3 DEFINITIONS

Not used.

05050.2 MATERIALS

05050.2.1 LADDERS AND METAL STAIRS

All ladders shall be safety ladders conforming to OSHA standards. All ladders and stairways supplied to the project shall be of one manufacturer. All stair and ladder wells shall be adequately guarded, and all stairs shall have handrails as specified or shown on the Plans.

Ladders shall be secured to the supporting surface by bent plate chips providing not less than 7 inches between the supporting surface and center of rungs. If exit from the ladder is forward, over the top rung, side rails shall be extended not less than 3-feet-3 inches above, and returned to the landing. If exit from the ladder is to the side, the ladder shall extend not less than 5-feet 6-inches above the landing and be rigidly secured at the top.

05050.2.2 ALUMINUM LADDERS

Aluminum ladders shall be made of 6063-T5-aluminum alloy, of welding construction. Rungs shall be not less than 1-inch square bar with 1/8-inch grooves in the top and redivided edges. Side rails shall be no lighter than 3 inches by 3/8 inches. Ladders shall be of the size, shape, location, and details indicated on the Plans. Ladders greater than 20 feet in height shall have standard ladder cages designed in accordance with State and OSHA requirements. All aluminum surfaces, which will be in contact with concrete, shall be coated as specified in Division 9.

05050.2.3 ALUMINUM STAIRWAYS

Aluminum stairways shall be fabricated and installed as shown on the Plans. Stairway stringers shall be fabricated of aluminum alloy 6061-T6. Treads shall be aluminum as specified below. Handrail shall be fabricated of aluminum pipe as specified under aluminum handrail.

Stair treads shall be aluminum of the sizes called for on the Plans, and shall be of the same type and make as called for under Section 05100. All fasteners shall be of Type 304 or 316 stainless steel.

Stair treads shall be furnished with cast abrasive type safety nosing.

05050.2.4 ARCHITECTURAL AND MISCELLANEOUS SHEET METAL

Sheet metal flashing and counterflashing shall be installed as indicated on the Plans. Galvanized steel or anodized aluminum flashing shall be used when indicated and specified on the Plans. Unless otherwise indicated flashing shall be 0.025-inches thick. The aluminum flashing shall receive a 215-R1 anodic finish after fabrication as indicated on the Plans. Exposed edges shall be folded back 1/2-inch to provide stiffness. Except as otherwise indicated and specified on the Plans, counterflash shall be provided over all base flashings.

Unless specifically noted, galvanized steel flashing shall be used in contact with structural steel and anodized aluminum flashing shall be used in contact with structural aluminum. This shall be done to protect against dissimilar metal action.

Surfaces to which sheet metal is to be applied shall be even, smooth, round, thoroughly clean and dry, and free from all defects that might affect the application. All cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades shall be performed under this section. All accessories or other items essential to the completeness of this sheet metal installation, though not specifically shown or specified, shall also be provided under this section. Nails, screws, and bolts shall be of the types best suited for the intended purpose and shall be of a composition that will not support galvanic action in the installation. Where sheet metal abuts into adjacent materials, the juncture shall be executed in a manner satisfactory to the Engineer.

Sheet metal items not covered elsewhere shall be as indicated on the Drawings and as required to provide a watertight installation. Formed sheet metal for metal covered work shall accurately reproduce the detail and design shown and profiles, bends, and intersections shall be sharp, even, and true.

05050.2.5 ALUMINUM SHEET METAL WORK

Except as otherwise specified or indicated on the Plans, sheet aluminum shall be alloy 5005-H14 conforming to the requirements of ASTM B 209 and shall be not less than 0.025 inch in thickness and extruded aluminum shall be 6063-T42.

05050.2.6 MISCELLANEOUS STRUCTURAL STEEL

Miscellaneous steel items not specified herein shall be as shown on the Plans or specified elsewhere and shall be fabricated and installed in accordance with the best practices of the trade.

05050.2.7 LINTELS

Lintels for masonry construction shall be structural steel beams or angles, fabricated as indicated on the Plans.

05050.2.8 SUBMERGED ASSEMBLY BOLTS

Assembly bolts for wood baffles, collectors, and other assemblies in areas where stainless steel anchor bolts would be required shall be stainless steel bolts Type 304 or 316.

05050.2.9 ANCHOR BOLTS AND INSERTS

Wherever feasible, anchor bolts shall be cast in place when concrete is placed.

All anchor bolts and concrete anchors embedded in concrete shall be accurately spaced with bolts truly normal to the surfaces from which they project. Type 304 or Type 316 stainless steel anchor bolts and nuts shall be used under these circumstances:

- Any time they are submerged in water.
- In the case of structures customarily containing water, placed in walls, ceilings, or overheads, even if above water level.
- In the dry side of water bearing walls.
- Where securing aluminum to steel or concrete.

Anchor bolts not required by above conditions to be of stainless steel, may be of carbon steel conforming to ASTM A 307 or ASTM A 36. Carbon steel anchor bolts in the following locations shall be hot-dip galvanized.

- Anchor bolts exposed to the weather.
- In electrical manholes or pull boxes.
- In tunnels, passageways, galleries, vaults, or rooms below grade or enclosed in part by water bearing walls.

In anchoring machinery bases subject to heavy vibration, two nuts shall be used, one serving as a locknut. In all cases where steel anchor bolts are used, a liberal coating of nonoxidizing wax shall be applied to the threads before screwing on nuts.

All bolts, when indicated for future use, shall be first coated thoroughly with nonoxidizing wax, followed by turning nuts down to the full depth of thread. Exposed thread shall then be neatly wrapped with a waterproof polyvinyl tape.

05050.2.10 INSTALLATION

Anchor bolts shall be embedded not less than 12 diameters. Where shown on the Plans, anchor bolts shall be set in metal sleeves having an inside diameter approximately 3 times the bolt diameter and not less than 12-bolt diameters in length. Sleeves shall be filled with grout when the machine or other equipment is grouted.

05050.2.11 CONCRETE ANCHORS

Concrete anchors, where indicated on the Plans or specified, shall mean drilled in place anchors with integral anchor bolts. Concrete anchors shall be Phillips "Wedge Anchors" with integral anchor bolts, or Expansion Products Company "Wej-It" concrete anchors with integral anchor bolts, or approved equal.

The material of each concrete anchor, including its integral anchor bolt, shall be the same material as would be required, under these Specifications, for anchor bolts in the same location that the concrete anchor is to be used.

Concrete anchors shall have the following minimum embedment lengths:

EMBEDMENT OF CONCRETE ANCHORS

Size	Embedment Length
3/8"	1-1/2"
½"	2-1/4"
5/8"	2-3/4"

Size	Embedment Length
¾"	3-1/4"

If Wej-It expansion anchors are used they shall have the following minimum embedment length:

WEJ-IT ANCHORS

Size	Embedment Length
¼"	1-1/2"
½"	5"
5/8"	5"
¾"	5"

Anchor bolts, of the same material and size as required for the specified concrete anchors, may be cast in the concrete in lieu of using concrete anchors. Embedment of bolts in concrete shall be not less than 12-bolt diameter plus a standard hook.

No cast iron, lead cinch, or slug-in anchors will be permitted for use.

05050.2.12 MISCELLANEOUS CAST IRON

All castings shall be tough, gray iron, free from cracks, holes, swells, and cold shuts, and be of workmanlike finish, and shall conform to the Standard Details and with the ASTM Specification Designation A 48, Class 40 B. The quality shall be such that a blow from a hammer will produce an indentation on a rectangular edge of the casting without flaking the metal. Before leaving the foundry, all castings shall be thoroughly cleaned and subjected to a hammer inspection, after which they shall receive a coating of coal-tar pitch varnish in such a manner as to form a firm, tenacious coating.

05050.2.13 MANHOLE FRAMES AND COVERS

Manhole frames and covers shall be made from a superior quality gray iron, conforming to the requirements of ASTM A 159, Class G3000, or ASTM A 48, Class 30-B. Frames and covers shall have horizontal and vertical bearing surfaces machined to fit neatly, and the cover shall bear firmly in the frame without rocking and shall be easily removable. Frames and covers shall be heavy-duty traffic type designed for H-20 loading and shall have a combined set weight of at least 265 pounds.

Frames shall have a clear inside opening of 24 inches diameter and shall be of the bottom flange type. Frame height shall be approximately 4½" and bottom flange outside diameter shall be approximately 32 inches.

Covers shall have a skid resistant grid pattern design as recommended ASTM publication STP326.

The elevations at which manhole frames and covers are to be set shall conform to the requirements set forth on the Plans, but in all cases shall be governed by the Engineer in the field. Where the cover is in existing pavement or in the traveled way of the existing road shoulder, it is to be placed flush with the existing surface. Where the structure is outside the limits of the traveled shoulder but not in the roadside ditch, it should be placed 1/10 foot or more above the existing ground surface. Where the manhole cover falls in the existing roadside ditch or right of way, it is to be placed approximately 1-1/2 feet above the existing ground surface or as directed by the Engineer. Manhole frames shall be set at the required grade and shall be securely attached to the top precast manhole shaft unit. After the frames are securely set in the place provided herein, covers shall be installed and all necessary cleaning and scraping of foreign materials from the frames and covers

shall be accomplished to ensure a fine satisfactory fit. All costs of setting and securing manhole frame and cover sets in place as herein provided, including all necessary concrete work shall be considered as included in applicable contract unit prices and no additional allowance will be made therefor.
Cast lettering on manhole covers shall be as shown on the Plans. Shop drawings of all manhole rings and covers shall be submitted to the Engineer.

05050.2.14 CAST IRON PRESSURE MANHOLE FRAME AND COVER

The Contractor shall furnish and install, ready for use as indicated on the Plans and as specified herein, rectangular pressure manholes and covers. Each pressure manhole shall have a clear opening of 18" X 30". The pressure plate shall be flat on top and shall not be less than 1/2 inch thick steel and fastened with 316 stainless steel studs and stainless steel nuts. A 1/8-inch thick neoprene gasket shall be supplied between the frame and pressure plate. Lifting shall be provided with a watertight pickhole. The frame shall be a seal-type with flanges at the base and at the top.

05050.2.15 MISCELLANEOUS ALUMINUM

Structural and other metal items fabricated from aluminum, not covered separately herein shall be fabricated in accordance with the best practices of the trade and shall be field assembled by riveting or bolting with no welding or flame cutting permitted except as approved by the Engineer.

05050.2.16 ALUMINUM STAIR NOSING

Stair nosings shall be installed on all treads of all concrete stairs including the top tread of the upper slab. Stair nosings shall be aluminum abrasive cast nosings with aluminum oxide granules integrally cast into the metal forming a permanent nonslip long wearing surface. The nosings shall be Type 101 Stair Tread by Wooster Products, Inc., Spruce Street, Wooster, Ohio 44691, Type A stair treads by American Abrasive Metals Company, or approved equal. The treads shall have integrally cast anchors. Stair nosings shall be cast in fresh concrete and shall be flush with the tread and riser faces. Stair nosing shall be coated with zinc chromate primer in accordance with the provisions of Division 9. Screws shall be 304 or 316 stainless steel.

05050.2.17 MANHOLE STEPS

Manhole steps shall consist of 3/4-inch diameter stainless steel or polyethylene rungs. Rungs shall extend 7-inches from the face of the wall to which they are anchored and shall have a minimum clear width of 16-inches. Rungs shall be designed such that the foot cannot slide off the end. Distance between rungs shall be 12-inches. Rungs shall be hook anchored into walls a minimum of 6-inches.

05050.3 CONSTRUCTION REQUIREMENTS

Not used.

05050.4 METHOD OF MEASUREMENT

No separate measurement shall be made for miscellaneous metals. Measurement for this item will be included as part of another bid item.

05050.5 BASIS OF PAYMENT

No payment shall be made for structural and miscellaneous metals. The structural and miscellaneous metals shall be considered incidental to the project.

05100.1 DESCRIPTION

05100.1.1 Includes furnishing and installing galvanized steel, extruded aluminum, or fiberglass bar grating for commercial or industrial floors and walk ways as shown on the Drawings an in accordance with the requirements described herein.

05100.1.2 RELATED WORK

Not used.

05100.1.3 SUBMITTALS

The Contractor shall provide complete information, which includes shop drawings for fabrication and erection of all work, parts lists, fabrication details, loading tables, anchor details, and manufacturer's installation instructions and details in accordance with the requirements of Section 01300.

With regard to 05100.2.6 – Slip Resistant Surfaces, below, evidence of compliance with the requirements stated there shall be furnished from the grating manufacturer to the Engineer at the time of delivery of the gratings to the Project site.

05100.1.4 DEFINITIONS

Not used.

05100.2 MATERIALS

05100.2.1 GENERAL GRATING REQUIREMENTS

Grating shall be of such bar size and spacing that, as determined by the manufacturer, the grating will support a uniform loading of 180 pounds per square foot on the entire area of the grating, using an extreme fiber stress of not more than 10,000 pounds per square inch. The maximum deflection under this loading will not be more than 1/240 of the clear span of the grating. The spacing of the main grating bars shall not be more than 1-1/8 inches clear between bars. Crossbars shall be at right angles to the main bearing bars, and center to center spacing shall not exceed 4¼ inches. Ends of grating and cutouts shall be banded. Grating shall be of the thickness shown on Drawings or as required by these Specifications. All grating supplied to the project shall be by one manufacturer.

05100.2.2 STEEL BAR GRATING

Shall be machine-welded, galvanized carbon steel bearing bars and cross bars. Bearing bars for steel grating shall be not less than 1-1/2 inches in depth, unless directed otherwise by the Engineer. Spacing of bearing bars and cross bars shall not be less than those required in 05100.1.1.1 above. Span length of the bearing bars shall be in accordance with the information shown on the Drawings. The grating shall in all cases, meet the load and deflection requirements of 05100.1.1.1.

05100.2.3 ALUMINUM GRATING

Shall be I-bar or rectangular bar type grating with bearing bars and cross bars locked together by a swaging process. Bearing bars for aluminum grating shall be not less than 2 inches in depth, unless shown otherwise on the Drawings, or unless directed otherwise by the Engineer. Spacing of bearing bars and crossbars shall be as required in 05100.1.1.1 above. Span length of the bearing bars shall be in accordance with the information shown on the Drawings. The grating shall in all cases, meet the load and deflection requirements of 05100.1.1.1.

Aluminum grating shall be supported on aluminum shelf angles cast in the concrete as indicated on the Drawings. Gratings, shelf angles, anchors, etc. shall be of 6061-T6 or 6063-T6 aluminum alloy, except that cross bars may be of 6063-T5 aluminum alloy. All surfaces of shelf angles, anchors, etc. to be in contract with concrete shall be coated as specified under Division 9.

05100.2.4 FIBERGLASS GRATING

Shall be constructed of fiberglass strands set in thermoset plastic in a one-piece mold. Glass content shall not exceed more than 35 per-cent by weight. The resin shall be an opaque, fire retardant polyester or vinyl material with a UL classification. The color and mesh pattern shall be indicted on the Drawings. Bearing bars for fiberglass grating shall be not less than 3 inches in depth, unless directed otherwise by the Engineer. Spacing of bearing bars and cross bars shall be the manufacturer's standards, but load capacity and deflection shall meet all requirements of 05100.1.1.1 above. Span length of the bearing bars shall be in accordance with the information shown on the Drawings.

05100.2.5 FLOOR PLATE

Shall be a commercial grade of hot-dipped, galvanized carbon steel or aluminum plating with a raised pattern of surface projections to resist slippage of foot traffic. The size, thickness, span length and pattern configuration shall be as shown on the Drawings but, in no case shall the thickness be less than ¼-inch.

05100.2.6 CAST IRON GRATING

Shall be cast gray iron meeting the requirements of ASTM 48-93, Class 35B of the type and configuration shown on the Drawings. Castings shall be of uniform quality and free from blow holes, smooth and cleaned by shot-blasting. The size, minimum weight, spacing and span length of the grating sections shall be in accordance with the requirements indicated on the Drawings. Gratings located in areas subject to vehicular traffic shall be capable of sustaining standard highway H-20 loads. Bearing surfaces between grating and supporting cast iron frames shall be machined to allow full contact between the grating and fence.

05100.2.7 SLIP RESISTANT SURFACES

When slip resistant surfaces are required by the Drawings or these Specifications, such surfaces shall conform to all applicable OSHA standards and to USDA/FDA requirements for the food and drug industry, when applicable.

05100.3 CONSTRUCTION REQUIREMENTS

05100.3.1 PREPARATION

The Contractor shall carefully prepare the supporting structure to provide a neat fit and unobstructed walking surface in accordance with the Drawings. A clearance of 1/4-inch shall be provided for grating sections to provide easy removal and minimal movement when tread on. Openings for piping or other obtrusions shall be reinforced to support bearing components of the grating.

05100.3.2 Gratings shall be furnished and installed with appropriate clips and/or fasteners as recommended by the grating manufacturer. Supporting frames for grating shall be fabricated from materials which will not contribute to the corrosion or deterioration of the grating and which will provide uniform support to the grating sections. Grating frames shall be designed to be removable and/or replaceable unless shown otherwise on the Drawings.

05100.3.3 Grating located in areas subject to foot and vehicular traffic shall have opening spaces sufficiently small as to not allow entrapment of bicycle or wheelchair wheels.

05100.3.4 Support for grating sections shall be constructed in full compliance with the recommendations of the grating manufacturer. Openings for piping or other obtrusions shall be properly reinforced to provide support of the bearing components of the grating section.

Except as otherwise specified or shown on the plans, grating shall be supported on shelf angles cast in the concrete as indicated on the plans. All surfaces of shelf angles, rebates, anchors, etc. to be in contact with concrete shall be coated as specified under Division 9.

05100.3.5 The clear opening space for grating section shall provide sufficient space for easy removal of sections; however, it shall not be oversized to allow excessive movement of the sections. Unless otherwise indicated, this clearance space shall be ¼-inch between grating sections and supporting frames. The top surfaces of grating sections adjacent to each other shall be in the same plane.

05100.4 METHOD OF MEASUREMENT

Separate measurement of the floor will not be made when the material is installed as a component of a building or structure listed in the Bid Schedule.

05100.5 BASIS OF PAYMENT

Separate payment will not be made for floor grating included in the measurement of a building or structure in which it is installed.

05570.1 DESCRIPTION

This section covers furnishing and installing galvanized iron or welded steel pipe posts filled and set in concrete at designated locations shown on the Drawings and in accordance with MAG Standard Detail No. 140.

05570.1.1 RELATED WORK

Not used.

05570.1.2 SUBMITTALS

Not used.

05570.1.3 DEFINITIONS

Not used.

05570.2 MATERIALS

Bollards shall be of the "Type 2 Removable" variety with 6" retroreflective engineer's tape per MAG Standard Detail No. 140. Height shall be 36" above the ground

05570.4 METHOD OF MEASUREMENT

05570.4.1 Separate measurement of the bollards will not be made when they are installed as a component of a building or structure listed in the Bid Schedule. Measurement of the posts will be included with the building or structure which it serves.

05570.4.2 When called for in the Bid Schedule Payment will be made per Bollards.

05570.5 BASIS OF PAYMENT

05570.5.1 Separate payment will not be made for bollards included in the measurement of a building or structure in which it is installed.

05570.5.2 The accepted quantities shall be paid for at the contract unit price for:

PAY ITEM	UNIT
Bollard	Each

END OF SECTION

09910.1 DESCRIPTION

The Contractor shall furnish all labor, materials and equipment necessary to paint all designated components of buildings, piping and equipment in accordance with these Specifications.

09910.1.1 RELATED WORK

Not used.

09910.1.2 SUBMITTALS

09910.1.2.1 DESCRIPTIVE LITERATURE - Descriptive literature identifying manufacturer, type, content, application recommendations, and color samples, shall be provided in accordance with Section 01300 of these Specifications.

09910.1.2.2 DATA FOR PAINT APPROVAL - Complete data on each type and kind of paint and primer shall be submitted to the Engineer for approval. Approval shall be received from the Engineer before the paint is delivered to the jobsite. This procedure must be followed whether or not the paint that the Contractor proposes to use is named in the Specifications. Approval data shall show where and for what uses each paint product is proposed. Information submitted on each proposed type and kind of paint shall include data to show that the paint meets the detailed requirements of these Specifications.

09910.1.2.3 SAMPLES - The Contractor shall prepare and submit sample colors for all items which require color selection by the Engineer. No color selection will be made until all samples of all paints have been submitted. After all samples of all paints have been submitted, the Engineer will prepare a color scheme using the submitted colors. Colors will not necessarily be standard colors with all suppliers. The manufacturer shall mix colors, to secure the desired color when it is not one of his standard colors.

09910.1.2.4 SAND BLAST PANELS - The Contractor, at the beginning of the Project, shall furnish one square foot steel panels sandblasted in accordance with the sandblasting specifications and coated with non-yellowing shellac or clear non-yellowing plastic coating. Panels shall be used as the standards for preparation of steel surfaces for the duration of the project.

09910.1.2.5 PAINT REMNANT - At the end of the project, the Contractor shall turn over to the Owner a gallon can of each type and color of paint, primer, thinner, or other coating used in the field painting. If the manufacturer packages the material concerned in gallon cans, then it shall be delivered in unopened labeled cans as it comes from the factory. If the manufacturer does not package the material in gallon cans, and in the case of special colors, the materials shall be delivered in new gallon containers, properly closed with typed labels indicating brand, type, color, etc. The manufacturers' literature describing the materials and giving directions for their use shall be furnished in three bound copies. A typewritten inventory list shall be furnished at the time of delivery.

09910.1.3 DEFINITIONS

Submerged Surfaces - In general, items shall be treated as submerged if they are to be at any time under water or are in structures that normally contain water. Unless specified otherwise, anything below the tops of the walls of such structures shall be considered as submerged.

09910.2 MATERIALS

09910.2.1 QUALITY CONTROL

This Specification is not intended to be exclusive or limit competition, but rather to set forth the minimum standards for quality and performance. The Owner reserves the right to reject substitutions if in his opinion, the proposed substitutions will not achieve comparable equipment installation and performance standards.

09910.2.2 COLOR

The Engineer will make color selection from color samples provided by the Contractor.

09910.2.3 PAINT SELECTION

All paint and coating systems shall include high quality materials, resistant to temperatures up to 130ºF, and sunlight exposure. Paints selected shall meet the manufacturer's recommendations and suitability standards for the specific application where it will be used.

09910.2.3.1 MINIMUM REQUIREMENTS - Minimum requirements for paint materials and their application shall be as shown in the tables below:

EXTERIOR PAINT APPLICATION TABLE

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Wood Siding, Trim, Doors	1	A-100 Exterior Alkyd Wood Primer	2.3
	2	A-100 Exterior Latex Flat House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 8 Exterior	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert- OR -	1.3
		System 2H-4 Alkyd by Tnemec	
	1	Tnemec Series 10-99W Undercoater	2.5
	2	2H-Color Hi-Build Tnemec Gloss	2.5
Porous Masonry (Block)	2	Tnemec Series 180 WB TnemeCrete	4-8
Concrete Walls, Above Grade	1	Loxon Ext. Masonry Acrylic Primer	3.1
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	2	Series 1029 Acrylic Latex Low Sheen by Tnemec	2.5
Metal (Aluminum)	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 3 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
	1	Tnemec Series 115 Unibond	2-3
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	Direct to Metal Enamel by Sherwin	3.0

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
		Williams - OR -	
	1	SUPRIME 3 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
	1	Tnemec Series 115 Unibond	2-4
	1	Tnemec Series 1029 Enduratone	2-3
Metal, New Steel, (Severe Service)	1	Series 27 WB Typoxy by Tnemec	4
	1	73-Color Endura-Shield	2
Metal, Galvanized Steel, (Mild Service)	1	Galvite HS	2.0
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	1	SUPRIME 2 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
	1	Tnemec Series 115 Unibond	2-4
	1	Tnemec Series 1029 Enduratone	2-3
Metal, Galvanized Steel, (Severe Service)	1	Series 27 WB Typoxy by Tnemec	4
	1	Series 10 Primer by Tnemec	2
PVC Pipe		System 66-23 Epoxy Polyamide by Tnemec	
	1	66-Color Hi-Build Epoxoline	4

INTERIOR PAINT APPLICATION TABLE

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Woodwork	1	ProMar 200 Alkyd Enamel Undercoater	1.9
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams-OR	1.7
	1	SUPRIME 11 Int Alkyd Wood Primer	1.5
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
Woodwork Continued	1	Tnemec Series 10-99W Tnemec Primers	2.5
	2	Tnemec 2H-Color Hi-Build Tnemec Gloss	2-3
Drywall	1	ProMar 200 Latex Wall Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 1 100% Acrylic MP Primer	1.1

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
	2	Pro-Hyde Plus Latex Satin by Pratt & Lambert – OR –	1.5
	2	Tnemec Series 1029 Enduratone	2-3
Metal (Aluminum)	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 Semi-Gloss Waterborne Acrylic Enamel	1.5
	1	Tnemec Series 115 Unibond	2-4
	1	Tnemec Series 1029 Enduratone	2-3
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.7
	1	SUPRIME 9 Int/Ext Alkyd Metal	1.1
	2	Primer Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2.5
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
	1	Tnemec Series 115 Unibond	2-4
	1	Tnemec Series 1029 Enduratone	2-3
Metal, New Steel, (Severe Service)	1	Tnemec Series 66-1211 Epoxoline Primer	3-5
	1	Tnemec Series 66 Color Hi-Build Epoxoline	4-6
Metal, Galvanized Steel, (Mild Service)	1	Galvite Paint	2.0
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 9 Int/Ext Alkyd Metal	1.1
	2	Primer Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
	1	Tnemec Series 115 Unibond	2-4
	1	Tnemec Series 1029 Enduratone	2-3
Metal, Galvanized Steel, (Severe Service)	1	Tnemec Series 66-1211 Epoxoline Primer	3-5
	1	Tnemec Series 66-Color Hi-Build Epoxoline	4-6
Ductile Iron (DI) Pipe and fittings	1	SUPRIME 9 Int/Ext Alkyd Metal	1.1
	2	Primer Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2.5
	2	DEFLEX 4218 DTM Enamel by DeVoe	2

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
	1 1	Tnemec Series 115 Unibond Tnemec Series 1029 Enduratone	2-4 2-3
PVC Pipe (Mild Service, Interior Only)	2	Tnemec Series 1029 Enduratone	2-3
PVC Pipe (Severe Service)	1	System 66-23 Epoxy Polyamide by Tnemec 66-Color Hi-Build Epoxoline	4
Concrete Walls and Ceilings (Mild Service)	1 2 1 2 1	ProMar 200 Latex Wall Primer ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR - SUPRIME 4 Latex Wall Primer Pro-Hyde Plus Latex Satin by Pratt & Lambert Tnemec Series 1029 Enduratone	1.1 1.3 1.2 1.5 2-3
Concrete Walls and Ceilings (Severe Service)	2	Tnemec Series N69 Hi-Build Epoxoline II	4-6
Porous Masonry Walls (Mild Service)	 1 2 1 2	Pre-Prime 167 by Devoe ProMar 200 Latex Wall Primer ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR - SUPRIME 4 Latex Wall Primer Pro-Hyde Plus Latex Satin by Pratt & Lambert	1.5 1.1 1.3 1.2 1.5
Porous Masonry Walls (Severe Service)	1 2	Tnemec Series 1254 Epoxoblock Tnemec Series N69 Hi-Build Epoxoline II	 75-100 sf/gallon 4-6
Concrete Floors (Mild Service)	1 1 2 2 2 2	Pre-Prime 167 by Devoe Concrete and Terrazzo Sealer (ANCO Cure and Hard by Intermountain Concrete Specialties. Industrial Enamel by Sherwin Williams - OR - With STAND Alkyd Floor Enamel by Pratt & Lambert – OR – Devguard 4328 Alkyd Enamel by DeVoe Tnemec Series 205 TerraTread	1.5 None 2 1 2 3-5
Concrete Floors (Severe or Mild Service)	2	Tnemec Series 280 TnemeGloss	6-8

*Brand names of materials have been used to indicate the types and quantities of materials required. Approved equals will be accepted.

09910.2.3.2 PAINT FOR WASTEWATER SYSTEMS - All paint for concrete and metal surfaces in wastewater systems shall be especially adapted for such use.

- Fume Resistance. All paint for final coats shall be fume resistant, compounded with pigments suitable for exposure to sewage gases, especially to hydrogen sulfide and to carbon dioxide.

Pigments shall be materials, which do not tend to darken, discolor, or fade due to the action of sewage gases. If a paint manufacturer proposes use of paint which is not designated "fume resistant" in its literature, it shall furnish full information concerning the pigments used in this paint.

- Lead Paint. No lead paints shall be used.

09910.2.3.3 PAINT FOR POTABLE WATER SYSTEMS - All paint systems to be used in potable water service shall meet NSF requirements. See also Subsection 09910.2.3.4 below.

09910.2.3.4 PAINT FOR SUBMERGED SURFACES

- Coal Tar Epoxy. Coal tar epoxy shall meet and conform with Government Specification Mil P-23236 with further qualification that the coal tar epoxy manufacturer and product must be listed on the current U.S. Navy Qualified Products List. Coal tar epoxy shall be subject to the Engineer's approval.

- Alternate Systems. Alternate coating systems for submerged service, such as Tnemec Series 141Epoxy Polyamide Epoxoline by Tnemec, Epoxy Bar Rust 233H, by DeVoe, or equal, may be required for some applications, or may be approved in lieu of coal tar by the Engineer, upon request. Some colors of Epoxy Polyamide Epoxoline, or equal may be acceptable for use in potable water systems, however the manufacturer must be consulted for verification of acceptability prior to use in potable water applications.

- Submerged DIP that come into contact with the potable water process must be painted with Tnemec Pota-Pox Plus Series N140 or approved equal. This includes all submerged DIP in the surface water tank, floc tank, treated water tank, FEQ tank, recovery clarifier, recovery clarifier lift station and any other process that has the ability to come into contact with the potable water process. The surfaces shall be prepped and painted according to manufacturer's recommendation. The DIP shall be coated according to manufacturer's recommendation with a minimum of 2 coats.

09910.2.3.5 HIGH TEMPERATURE SURFACE TO 400°F - Paint for high temperature surfaces shall be DeVoe Hi-Heat Aluminum HT-4, Glidden 592 Metallite Aluminum, or Sherwin-Williams Silver-Brite Heat resisting aluminum paint B59 S1, or approved equal.

09910.2.4 CLEANING MATERIALS

Cleaning materials shall be best quality solvents, chemicals or detergents, which are commercially prepared for preparing painted surfaces and delivered to the site in sealed containers bearing an identifying label and the manufacturer's name.

09910.3 APPLICATION REQUIREMENTS

ALL paint and coating systems shall be applied in strict accordance with the manufacturer's published instructions for use.

09910.3.1 SURFACE PREPARATION

09910.3.1.1 CLEANING - All surfaces to be painted shall be clean and dry except that in some cases the paint manufacturer's directions may require wetting the surface before painting. Grease and oil shall be removed by wiping with mineral spirits or naphtha per Specification SP-1. Rust, scale, welding slag, and spatter shall be removed and the surface prepared by hand tool cleaning, power tool cleaning, or blast cleaning in accordance with the appropriate Specification SP-2 through SP-10.

09910.3.1.2 METAL SURFACES - Except as otherwise provided, all preparation of metal surfaces shall be in accordance with Specifications SP-1 through SP-10 of the Steel Structures Painting Council (SSPC). Sandblasting procedures shall be as follows:

- No surface, which is to be sandblasted, shall be given a coat of primer or paint in the shop or in the field before sandblasting.
- Unless otherwise specified, all iron or steel surfaces which are to be painted as submerged metal shall be dry sandblasted on the site in accordance with Specification SP-10, near white blast cleaning.
- Except as otherwise specified, all metal surfaces, which are to be painted as non-submerged metal, shall be commercial blast cleaned per Specification SP-6. This sandblasting shall be done not more than 12 hours ahead of the painting, subject to humidity and weather conditions between the time of sandblasting and painting operations. If any rusting of sandblasted surfaces occurs before painting, such rusting shall be removed by additional sandblasting.
- Threaded portions of valve and gate stems, machined surfaces intended for sliding contact, surfaces to be assembled against gaskets, surfaces of shafts for sprockets or to fit into bearings, machined surfaces of bronze trim on slide gates, and similar surfaces shall be masked off to protect them from the sandblasting of adjacent surfaces.
- Cadmium-plated or galvanized items shall not be sandblasted except that cadmium plated, zinc-plated, or sheradized fasteners used in assembly of equipment to be sandblasted shall be sandblasted in the same manner as the other metal.
- Surfaces which cannot be sandblasted, or cannot be sandblasted and then painted after the assembly of which they are a part has been completed and placed in final position, shall be sandblasted, or sandblasted and painted, before the items are put into final position. In some cases, while the painting could be done after the items concerned were in place, the limitation on time between sandblasting and painting may make it necessary to paint the surfaces before installation of those items.
- Sand or other media residue from sandblasting operations shall be thoroughly removed, using any method necessary and consistent with the requirements of the painting system, including vacuum cleaners or other means.

09910.3.1.3 GALVANIZED SURFACES - Galvanized surfaces which are to be painted shall first be treated with Koppers No. 40 Metal Conditioner; Amercoat No. 59 as manufactured by Amercoat Corporation, Brea, California; Galvaprep No. 5 as manufactured by Amchem Products, Fremont, California; or approved equal.

09910.3.1.4 CONCRETE SURFACES - Concrete and masonry surfaces shall be free of dust, mortar droppings and spatter, fins, loose concrete particles, form release materials, oil, grease, and other deleterious materials. If required by the coating manufacturer, such surfaces shall be etched as specified below or brush off blast cleaned per ICRI CSP 3=6.

Concrete surfaces specified to be acid etched shall be etched with a 15 to 20 percent solution of muriatic or sulfamic acid until the surface has the texture of find sandpaper. The surface shall then be thoroughly scrubbed with clean water, rinsed, and allowed to dry.

09910.3.1.5 WOOD SURFACES - Wood shall be cleaned and dusted immediately prior to painting. Final dusting shall be accomplished using tack cloth. Shelves, drawers, benches, and associated

woodwork shall be sanded before painting and lightly sanded between coats. Prior to application of each coat, the surfaces shall be again dusted with tack cloth to remove all dust.

09910.3.1.6 BITUMINOUS PAINTED SURFACES - Surfaces, which are to be painted with other than bituminous paint, and which have a bituminous coating (such as coal tar varnished pipe), shall be sealed with not less than 2 coats of Inertol Tar Stop; Sherwin-Williams Metalatex B42W100; Glidden Insulcap as manufactured by the Glidden Company; or approved equal. This seal coating shall be applied in sufficient quantity to permanently prevent bleeding of the bituminous coating.

09910.3.1.7 HIGH TEMPERATURE SURFACES - In general, high temperature paint shall be applied to exposed (un-insulated) steam line valves and traps, heat exchangers, and miscellaneous metal piping and equipment in piping and mechanical systems exposed to high temperatures. The Contractor shall paint these surfaces with two coats of high temperature paint as specified herein or as otherwise shown or directed. No painting shall be done on surfaces with a temperature in excess of 125 degrees F at the time of application. Immediately before application of the first coat of paint, the surface shall be sandblasted according to SSPC-SP-5 (Blast Cleaning to "white" metal). See also Subsection 09910.3.1.2 above.

09910.3.1.8 THINNING - No thinning of paint other than as directed by the manufacturer's published directions shall be done without the approval of the Engineer. No painting shall be done under conditions, which, in the opinion of the Engineer, will jeopardize the appearance of quality of the painting in any way.

09910.3.1.9 TINTING OF FIRST COAT - When two coats of the same material are specified, the first coat applied shall be tinted with aluminum powder, lampblack, or other suitable pigment to distinguish it from the top coat.

09910.3.1.10 BETWEEN-COATS TREATMENT - All painted surfaces shall be dusted between coats, and high gloss finish shall be lightly sanded and dusted between coats unless otherwise directed by the manufacturer.

09910.3.2 PAINT APPLICATION

09910.3.2.1 PAINTER QUALIFICATIONS - Contractor or subcontractor personnel applying the coating system shall have had past experience in application of the type or types of coatings and under similar conditions that it will be required to meet in this contract. The qualifications of personnel applying the coating system, whether Contractor or subcontractor shall be verified by the Contractor prior to allowing application to proceed. The Contractor shall not subcontract paint application to a subcontractor that is not qualified to apply the coating system.

09910.3.2.2 WEATHER CONDITONS - No painting shall be done under dusty conditions, during or immediately after a rain, during rainy weather, or when the temperature is less than 50°F.

09910.3.2.3 GENERAL REQUIREMENTS FOR APPLICATION OF PAINT – These requirements shall be as follows:

- All work shall be done in a workmanlike manner, leaving the finished surfaces free from drops, ridges, waves, holidays, laps, or brush marks.
- Where possible, prime coats shall be applied by brush and well worked into the surface, unless directed otherwise by the paint manufacturer.
- Other paints may be applied by brush, roller, trowel, or spray, unless manufacturer's recommendations or these Specifications require a particular method of application.

- Primer and intermediate coats of paint shall be un-scarred and completely integral at the time of application of each succeeding coat.

- Each coat shall be subject to the inspection and approval of the Engineer before the next succeeding coat is applied, and defective work of any kind shall be deemed sufficient cause for re-coating the entire surface involved.

- Where spray application is used, each coat of paint shall be applied to a thickness equivalent to a brush coat application at a coverage rate not greater than that specified by the manufacturer for a brush coat application. All spray painting shall be done with airless type spray units.

- The time interval between paint coats shall meet the recommendations of the paint manufacturer, and these Specifications. The Contractor shall not allow excessive time or exposure between coats, where such excessive time or exposure will impair the bond between the coats.

- The number of coats specified in these Specifications is the minimum to be applied. Suction spots between coats shall be touched up, and additional coats shall be provided if required to produce a finished surface with a solid, even color free from defects.

- The total thickness of the coating shall be as specified. Additional coats of paint shall be added if necessary to bring the total thickness up to not less than that specified. For control, the Contractor shall determine the dry film thickness of the coatings on metal surfaces with a correctly calibrated thickness meter. The Contractor also shall check for holidays with a low voltage holiday detector. The Engineer may use the Contractor's meter and detector for additional inspection and checking deemed necessary.

- Particular care shall be used to assure that the specified coverage is secured on the edges and corners of all surfaces. Additional brush coats shall be applied if necessary to ensure coverage of the edges and corners.

- Damaged paint or scratched painted surfaces shall be sanded smooth before repainting. Sanding and repainting shall be done to such a degree and in such a manner that all evidence of the scratches or damages is obscured.

09910.3.2.4 COAL TAR EPOXY – Application of coal tar epoxy shall be as follows:

- Where called for in the Painting Schedule, shown on the Drawings, or required in these Specifications, concrete and some other submerged surfaces shall be coated with not less than two coats of coal tar epoxy.

- Structures to be coated are as follows:

  a) Surface Water Flow Meter Vault
  b) Static Mixer Vault
  c) Reuse Flow Meter Vault
  d) Sewer Flow Meter Vault
  e) Main Lift Station Dry Pit
  f) 4" ARV Assembly Vault

- Only components from new, previously unopened containers shall be used to mix coal tar epoxy coatings. Coal tar epoxy shall be mixed and applied in accordance with the manufacturer's recommendations. All coating components shall be mixed with power mixers. The time during pouring or stirring will not be allowed as mixing time. The minimum mixing time as recommended by the manufacturer shall be met. Only unit quantities shall be mixed.

- Coal tar epoxy shall be applied to a total dry film thickness of not less than 16 mils.

- Some metal surfaces may require sandblasting prior to application of the coating system. See Subsection 09910.3.1.2 above.

- In some cases it may also be necessary to apply coatings to parts or subassembly surfaces before they are actually installed at their final Project or system location. All support brackets, stem guides, pipe clips, fasteners, etc. that are bolted to concrete shall be painted on all sides.

- Application of coal tar epoxy shall be performed only at the job site unless specific approval is granted for offsite application. Offsite application will not be allowed unless by an applicator with acceptable proven and documented experience in the application of coal tar epoxy systems.

- Each succeeding coat shall be applied over the previous coat as soon as possible in accordance with the manufacturer's instructions, without causing sagging. Succeeding coats shall not be delayed longer than allowed by the manufacturer's instructions. In no case shall the application of subsequent coats be made after the previous coat has set or oxidized. All coats, and the full thickness on all parts, shall be applied before the previous coat has cured. The Contractor shall check the film thickness after application, and before the coating has cured, to ensure that sufficient coating thickness has been applied. If additional coating is necessary, it shall be applied the same day. Checking and control of thickness at this stage shall be the Contractor's obligation and responsibility and not the Engineer's.

- If the surface coating has been applied for a longer period of time than the limits in the Table below, and if it is found that bituminous paint has not been applied to the specified thickness, the areas that are too thin shall be sandblasted to remove the surface film from the coating. These sandblasted areas shall then be washed and cleaned with the solvent recommended by the manufacturer and shall be re-coated within the time limits specified for coating over fresh bituminous paint. Washing or cleaning the surface of the paint with solvents or other solutions will not be a satisfactory substitute for the specified sandblasting if the painted surface is older than the time limits indicated in the table. This applies even if the paint manufacturer approves the solvent method as adequate for preparing the old surface.

TEMPERATURES AND COATING TIMES

Average Temperature	Maximum Time Between Coats
50 - 60° F	36 hours
60 - 70° F	24 hours
70 - 80° F	12 hours
80 - 120° F	4 hours

Coal tar epoxy shall not be applied when the ambient temperature is less than 50 degrees.

09910.3.2.5 EDGES AND CORNERS - The Contractor is hereby CAUTIONED that the edges and corners of members are difficult places upon which to build the required thickness of paint. The required

thickness must be applied to all surfaces, including the corners and edges, by applying as many spray coats as necessary or by additional brush coats on the corners and edges, if necessary, in order to build up the required thickness.

09910.3.3 FINISH SCHEDULE

The Contractor shall finish all work as follows unless indicated otherwise on the Drawings or within these Specifications:

TABLE OF FINISH SCHEDULES

NO FINISH	FACTORY FINISH	SITE FINISH
Stainless Steel Surfaces	Heating Units	Interior Concrete Building Floors and Walls
Polished Aluminum Surfaces	Electric Control Panel Cabinets	Interior Building Walls & Ceiling
Name Plates	Cranes & Hoists	All Interior and Exterior Exposed Piping, Valves & Pipe Supports
Exterior Concrete	Gauges and Meters	Exposed Electrical Conduit & Junction Boxes
Exterior Masonry Surfaces	Instruments	Entry Doors and Frames
Exposed Plastic Pipe & Fittings	Light Fixtures and Cover Plates	Wood Moldings and Trim
Warning Labels	Electrical Wiring & Transformers	Other Exterior Surfaces Indicated on drawings
Operating Instructions	Ventilating Fans	Sludge Clarifier Equipment
Gratings	Dampers	GAC Units
Handrails	Air Conditioning Units	Bollards
Ladders	Metal Soffit & Fascia Covering	
Stairs	Roofing and Siding	
Buried or Encased Pipe	Roll-Up Overhead Doors	
	Motors, Pumps, Equipment	
	Chain Link Fencing	

09910.3.4 CLEANUP

Upon completion of painting, the Contractor shall remove all masking and protective covers and properly dispose of all rubbish, debris and unused paint materials. The Contractor shall remove and cleanup all paint overspray, drips, spatters and etc. from any and all surfaces where it does not belong.

09910.4 METHOD OF MEASUREMENT

09910.4.1 NO MEASUREMENT

Separate measurement for Painting will not be made when painting is included as part of an item, building or structure listed in the Bid Schedule.

09910.4.2 SEPARATE MEASUREMENT

Separate measurement for Painting will be made as a Lump Sum when painting is listed as a separate item in the Bid Schedule.

09910.5 BASIS OF PAYMENT

When Painting is included as part of the measurement of another item, structure or building listed in the Bid Schedule, separate payment will not be made.

When Painting is required for a specific item, the accepted quantity will be paid for at the contract unit price for:

PAY ITEM	UNIT
Paint (*Item Description)*	Lump Sum

END OF SECTION

11250.1 DESCRIPTION

Supply all labor, materials, equipment and incidentals required to install and place into operation the fine screening system as shown on the Drawings and as specified herein.

11250.1.1 REFERENCE STANDARDS - The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.

A. AICS, American Institute of Steel Construction
B. AISI American Iron and Steel Institute
C. ANSI, American National Standards Institute
D. ASCE, American Society of Civil Engineers
E. ASME, American Society of Mechanical Engineers F. ASTM, American Society of Testing and Materials G. AWS, American Welding Society
H. IBC, International Building Code
I. IEC, International Electric Code
J. IEEE, Institute of Electrical and Electronics Engineers
K. NEC, National Electrical Code
L. NEMA, National Electrical Manufacturers Association
M. Underwriters Laboratory (UL and cUL)

11250.1.2 SUBMITTALS - Submittals shall be provided to the engineer that includes all the following information:

A. Compliance Statement: With each submittal, include a Compliance Statement listing each Specification Section and Part 1, 2, and 3 Sub-Sections, stating paragraph-paragraph, compliance with the Specifications, each minor nonconformity that is within the intent of the Specification and proposed nonconformities. Provide short descriptions of minor nonconformities, and detailed explanation and drawings of other nonconformities.
B. Certified shop drawings showing all important details of construction, dimensions and anchor bolt locations.
C. Descriptive product literature.
D. Schematic electrical wiring diagram and electrical controls information. E. Complete motor and drive data.
F. The total weight of the equipment.
G. A complete bill of materials of all equipment.

11250.1.3 QUALIFICATIONS

A. All the equipment specified under this Section shall be supplied by a single manufacturer involved in the manufacture of the screening equipment. Qualified manufacturers shall have a minimum of ten (10)

years' experience with wastewater screening systems, specifically including through flow continuous belt screens and Washing Compactors, for consideration.

B. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.

C. If patents protecting equipment are not owned by supplier then an affidavit must be supplied stating owner of design and expiration of licensing agreement.

1125.1.4 DESIGN REQUIREMENTS

A. System Description

1. The screen will have a continuous stainless steel belt that automatically rotates within the internal guide system of the static frame.

2. The screen herein specified will be of the straight through type that will present a clean screening grid to the influent flow at all times.

3. The solids will collect as a mat on the front face of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks.

4. The solids will be automatically removed at the top of the screen into an internal hopper and be fed to the screening handling system.

5. The continuous belt will be directly driven by drive sprockets that shall support and rotate the grid assembly.

6. The screen will be totally enclosed and have access covers that will be lightweight and easily removable for maintenance.

7. The Washing Compactor will be positioned next to the screening channels and will be fed by a sluice system.

8. The Washing Compactor will be adequately sized to handle all the screenings and wash water that will be generated by the screen at peak flow. The system will be required to wash the screenings to reduce the organic content and compact the remaining solids into a dry plug.

9. The Washing Compactor will generally comprise of a screw auger rotating within the washing and drainage trough, a wash water system, a compaction zone and an outlet chute arrangement.

10. All stainless steel (including frame, grid, and drive components) mentioned below as stainless steel shall be T316 stainless steel. All hardware shall be T316 stainless steel.

B. System Performance - The fine screening system will be designed to meet the following design parameters:

1.	Number of screens	2
2.	Peak flow per screen	6.91 MGD
3.	Average flow to screen	2 MGD
4.	Screen grid opening	6 mm
5.	Head loss at peak flow	10.51 inches @ 30% blinding
6.	Structural design differential of frame/grid	48 inches minimum @ 100% blinding
7.	Drive design differential (operating)	48 inches minimum
8.	Channel width	18 inches
9.	Channel depth	72 inches
10	Number of Washing Compactors	1
11	Diameter of screw	8 inches
12	Diameter of shaft	2.375 inches
13	Compactor discharge height above grade	60 inches
14	System wash water requirements	25 GPM @ 40 – 60 PSI

11250.2 PRODUCTS

11250.2.1 MANUFACTURER

A. The equipment shall be the Continuous Belt Through Flow Screen and Washing Compactor as provided by Hydro-Dyne Engineering, Inc., Clearwater, FL. No other manufacturer will be accepted

B. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Manufacturer will be responsible for all engineering costs of redesign by the Engineer, if necessary.

11250.2.2 THE CONTINUOUS BELT THROUGH FLOW SCREEN

A. Laced Link Grid - The Continuous Screening Belt

1. The screenings belt will consist of heavy duty stainless steel laced links connected in parallel and separated by Delrin spacers to maintain specified opening. Each laced link hook element shall be fabricated from 14 gauge (minimum) stainless steel. Each straight element shall be fabricated from 16 gauge (minimum) stainless steel. All elements shall be a minimum of 1 inch

wide forming a slotted opening of the specified width and minimum 1 inch deep in the direction of flow. Hooks on elements shall form horizontal lifting trays or shelves for removing large solids and rags every 8 inches.

2. Links, hooks and screening lifting members must be manufactured out of stainless steel. Plastic is not acceptable.

3. The stainless steel laced links will be connected by heavy duty stainless steel axles every 8 inches to form a continuous belt that will rotate within the frame's guide system. Axle diameter shall be a minimum 5/8 inch. The axle design will allow the rowof laced links to pivot. The links shall support the screening grid and bear tension loads across the entire width and length of the screen belt.

4. The axles will be extended to fix a UHMWPE guide link to the side of each row of laced link elements. These guides will interlock to create a continuous guide link system that will slide within the frame.

5. The heavy duty guide links will be minimum 2 inches thick to protect against undue wear from grit and will be specially machined to form a closure seal between the rotating belt and the static frame.

6. The seal shall be continuous from grade level through the water flow forming an uninterrupted closure between the traveling screen grid and the stationary frame. The seal shall be fixed to the screen frame and be adjustable so that it will remain in contact with the rotating screen belt at all times.

7. Guide systems that use rollers, stainless or hardened steel chains will not be acceptable.

8. Grid sealing systems that use neoprene seals or stainless steel hinges will not be acceptable.

9. Grid to frame sealing systems that use adjustable UHMWPE strips attached to the frame will not be acceptable.

10. The bottom of the grid shall be sealed with a replaceable front lower seal brush with a stainless steel holder and polypropylene bristles.

11. Intermittent stainless steel laced link elements that form sharp hooks will be regularly placed along the face of each row of the grid to effectively remove larger particles.

B. The Frame

1. The continuous belt will rotate within a heavy duty stainless steel static support frame that shall stand at a 75 degree angle in the channel.

2. The screen will not be fixed within the channel to allow the entire machine, including screen grid, to pivot/lift out of the channel for repair or bypass. All routine maintenance will be achieved without removing the screen from the channel and shall be performed at grade level.

3. The guide link system will travel around a guide wear track that is integral to the support frame.

4. The design will ensure that the support frame meshes with the closure seal on each guide link to prevent passage of screening material and grit particles.

5. The frame shall accommodate stainless steel protective covers designed to prevent leakage and contain spray wash. All access covers for maintenance will be lightweight and easily removable. Screens with covers requiring neoprene, rubber or plastic seals are not acceptable.

6. If required the screen manufacturer will supply the stainless steel angled filler plates with neoprene seals to connect from the upstream corners of the support frame to the channel walls.

C. The Offloading of Screenings

1. A stainless steel spray wash header will be located in the head space of the screen to offload the screenings from the continuous belt.

2. The spray bar will incorporate brass nozzles at 2 inch spaces that can easily be replaced or removed for cleaning.

3. The spray bar will be positioned behind the rotating belt and will backwash the solids into a discharge hopper manufactured from stainless steel. The wash water will be used to continuously flush the screenings from this hopper into the extended sluice or directly into the Washing Compactor.

4. The addition of a mechanically rotating brush system to aid offloading will not be acceptable.

D. The Drive Mechanism

1. Each screen will have a single 3/4 hp, inverter duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 explosion proof environment. The motor will be TEFC NEMA rated. The motor will be located outside of the screen covers and above the top of the channel.

2. The gear reducer shall be directly coupled to a heavy duty shaft machined from stainless steel.

3. The continuous belt will be supported and rotated around heavy duty stainless steel sprockets located on the drive shaft in the head space of the screen.

4. These sprockets will have lugs that transmit torque directly from the gear reducer to notches on the underside of the UHMWPE guide links. Driving forces shall be transmitted to areas located behind the screen's grid to prevent solids from contacting drive surfaces.

5. Chain driven systems or screens with wheels submerged in the wastewater are not acceptable.

11250.2.3 WASHING COMPACTOR

A. The Screenings Transfer Sluice

1. The screenings sluice will collect screenings and wash water from the discharge hopper of the screen and transfer them by gravity directly into the Washing Compactor's washing trough. Mechanically driven conveyors are not acceptable.

2. The sluice will be manufactured from stainless steel. It shall comprise of U-shaped lengths of trough that will be (flange connected/welded) to the desired overall length.

3. A change in direction will be achieved using long swept bends that will prevent blockages from occurring.

4. The Manufacturer will design and supply the support leg structure manufactured from stainless steel. The legs will be suitable for fixing to a concrete floor.

5. Covers will be a lightweight, no more than 6 feet long and easily removed by a single operator.

6. The manufacturer shall supply two solenoid valves. One valve will be fitted into the back plate at the beginning of the sluice and the second will be located at the sluice bend as shown in the drawings. The contractor will connect to a local plant reuse water supply. The water supply will provide supplementary transport water.

B. The Washing Compactor

1. The main body will be the washing trough that will receive screenings and wash water directly from the end of the screenings transfer sluice.

2. The washing trough will house the screw auger and provide a dedicated section to reduce organic content. It will comprise of angled side walls manufactured

from 10 gauge stainless steel that will direct the screenings on to the screw auger, and a drainage section in which the screw auger will ride.

3. The drainage section will be manufactured from stainless steel that has been machined with 5mm slots. The slots will be perpendicular to the direction of the screw so that the shearing action will prevent material collecting in the slots. The screw will not require stiff nylon brushes to keep the section clean.

4. The underside of the washing trough will be a catch pan that will collect the contaminated water that passes through the drainage section. The catch pan will feed a minimum 4 inch diameter outlet connection. The Main Contractor will connect the pipe to take the water back to the main flow.

5. The stainless steel screw auger will sit in the washing trough. Washing Compactors with shaft less screws are not acceptable as a shaft is required to support the flight and provide necessary torque and compaction.

6. The auger will be a varied pitch screw supported at the compaction end by minimum 5" wide UHMWPE Flight Support Bearing that creates a supporting collar around the screw flight. Each bearing ring will be designed to rotate through 180 degrees to provide a second wear surface below the screw. Each wear surface shall be fitted with a set screw that can be removed for inspection. The operator will be able to inspect and rotate the bearing by removing the outside cover without disassembling the equipment.

7. The end of the screw shall be reinforced with a triangular shaped stainless steel gusset welded behind the final screw flight to provide protection in this high wear/high torque area and to assist in compression of the screenings.

8. The screw will rotate allowing wash water and free organic/fecal material finer than trough openings to escape and return to the influent flow. The wash water system will flush the separated organic material through the drainage section in solution or as small particles.

9. A portion of the washing water will enter the washing trough with the screenings. This will be supplemented by spray nozzles that will direct water on to the screenings prior to compaction. They will be individually set at different angles to maximize the washing opportunity. The nozzles will be recessed into the side wall of the washing trough to protect from ragging and blockage.

10. The screw will transfer the washed screenings into the compaction zone. This will be a section of stainless steel pipe followed by the UHMWPE flight support bearing. The total length of this section will at a minimum equal two full pitches of the screw flight.

11. The compacted screenings will be pushed through the compaction zone and pass through a 45 degree elbow. The outlet chute will be tapered at 1 degree along the full length and will elevate the dewatered screenings to discharge by gravity into a waste receptacle (by Owner).

C. Drive Mechanism

1. Each Washing Compactor will have a single 2 hp, continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 explosion proof environment. The motor will be TEFC NEMA rated.

2. There shall be the ability to change the height of the screw within the washing trough by using adjustment bolts on the gearbox plate. This will prevent excess wear of the screw flights and trough.

11250.2.4 CONTROL PANEL

A. General Information - The manufacturer will supply two UL listed 508A stainless steel main control panel that shall automatically control the equipment offered in this section.

B. The Main Control Panel – NEMA 4X stainless steel enclosure – Each control panel shall consist of the following components for each screening system:

1. Main lockout/disconnect switch
2. Fused disconnect
3. Recycle timer
4. Hour run meter
5. Control transformer
6. Fuses and breakers
7. Motor starter
8. Motor overload sensor
9. Panel power light
10. Screen run/fault lights
11. Washing Compactor run/fault lights
12. Reset pushbutton
13. Variable frequency screen drive
14. Current monitors
15. Allen Bradley MicroLogix PLC [with RSLogix 500Software]
16. Emergency Stop
17. Hand/Off/Auto switch for each motor

C. Ancillary Control Components -

1. Ultrasonic differential level system consisting of the following per screen:
   a. NEMA 4X enclosure with viewing window

b. Milltronics Hydro-Ranger 200 controller with real-time 4-20mA output c. Two (2) NEMA 4X transducers
d. Programming remote
e. Float Switch (Back up system)

D. SCADA Communications - The following signals shall be made available for SCADA Monitoring.

1. Screen running (Available for each Screen)
2. Screen fault (Available for each Screen)
3. Screen in auto (Available for each Screen)
4. Screen High-High differential level (Available for each Screen)
5. Screen High Upstream Level (Available for each Screen)
6. Compactor running (Available for each Compactor)
7. Compactor fault (Available for each Compactor)
8. Compactor in auto (Available for each Compactor)

E. SCADA Programming - The Contractor shall be responsible for programming the Owners SCADA system to monitor the signals listed above. Programming must meet the following:

1. The existing plant SCADA system HMI shall be reprogrammed to display the new Screen and Washing/Compactor Status and Alarms. The system integrator shall configure a control window to show the status of all screening and washing compactor equipment on a single page. Refer to Section 11250.2.4(D) for a list of required I/O points to be displayed.
2. Control screen shall employ the use of industry standard methods using color, sound and other features as appropriate to alert the Operator of alarm conditions and general status.
3. System Integrator shall provide a screen shot of the proposed HMI additions and changes to Owner for review and comment prior to completion.
4. System Integrator shall provide a minimum of 2 hours onsite training to Owner. Training shall consist of familiarizing the Owner in the features, operation and maintenance of the new HMI controls.

11250.2.5 SURFACE PREPARATION AND PAINTING

A. All stainless steel materials, including hardware, shall be acid passivated for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to stainless surfaces.

B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.

C. Motor and gearbox shall be manufacturer's standard coating for humid/wet environments for superior corrosion protection.

11250.2.6 SPARE PARTS - The manufacturer will supply the following spare parts, per screen supplied, with the equipment:

A. Ten (10) hook links and elements spacers
B. Two (2) grid axles
C. Two (2) guide links

11250.2.7 ACCESSORIES - The manufacturer will supply the following accessories, with the equipment:

A. Four (4) 1" explosion proof brass body solenoid valves
B. Two (2) 1.5" wash water strainers
C. Two (2) wash water pressure gauges
D. Two (2) freeze protection packages including thermostat in control panel, heat strips, insulation and stainless steel covers.

11250.2.8 BID ALTERNATE

The project calls for one washer compactor but the contractor is to provide a bid alternate for a second washer compactor. The bid alternate shall include the second washer compactor, electrical components in the control panel, freeze protection, SCADA programming for the washing compactor, and any other additional appurtenances required to provide a fully functioning system. The bid alternate shall have the same components, functionality, and testing as the first washer compactor.

11250.3 EXECUTION

11250.3.1 WARRANTY - The Manufacturer of the equipment supplied under this specification shall provide a warranty for a period of 24 months commencing on acceptance and/or beneficial occupancy by the Owner but no later than 90 days from the date of shipment by the Manufacturer. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

11250.3.2 FACTORY TESTING

A. The screening system and all components shall be factory assembled and tested for a minimum of 24 hours prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.

B. During the factory test period the screening system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled screening system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

11250.3.3 DELIVERY AND STORAGE

A. The screening system shall be appropriately crated and delivered to protect against damage during shipment.

B. An authorized representative of the Contractor shall inspect the screens on delivery to the jobsite and shall report any damage or missing components to the Manufacturer and the Engineer within 72 hours of receipt of the shipment.

11250.3.4 INSTALLATION - The installation of the equipment shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

11250.3.5 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

A. The equipment shall be shipped completely factory assembled. Contractor shall verify all access dimensions, channel dimensions, and any interior building dimensions to ensure equipment may be installed as a factory assembled units.

B. After completion of the installation, the equipment shall be inspected and certified by an authorized representative of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.

C. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.

D. Manufacturer shall state field service rates for a Service Engineer to Owner and Contractor.

In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, and the requirement for additional time is beyond the manufacturer's responsibility, additional time shall be purchased by Contractor to correct deficiencies in installation, equipment, or material without additional cost to Owner.

E. The Contractor shall include in his bid, the cost of the above referenced authorized service representative for a minimum of two (2) eight hour days onsite to complete the certifications and training described in this specification section.

11250.4 METHOD OF MEASUREMENT

The method of measurement shall be per Section 01019.4.

11250.5 BASIS OF PAYMENT

The basis of payment shall be per Section 01019.4.

END OF SECTION

15110.1 DESCRIPTION

This section is a materials specification and is included for guidance in selecting materials for pipe and related fittings and appurtenances used in the construction of water and sewer systems.

15110.1.1 RELATED WORK

Section 01300 – Submittals
Section 02222 – Water Line Pipe Installation
Section 15230 - Waterline Valves and Hydrants

15110.1.2 SUBMITTALS

The Contractor shall submit for review complete information, showing all pipe, materials, fittings, gaskets, couplings, coatings, linings, supports, mechanical restraints, thrust blocks and configuration prior to the delivery of any components to the project. All information shall be provided in accordance with Section 01300 and written evidence of compliance from the manufacturer shall accompany each delivery of material.

15110.1.3 DEFINITIONS

Not used.

15110.2 MATERIALS

15110.2.1 NSF COMPLIANCE

All pipe and materials furnished and installed for culinary use shall comply with NSF International Standard 61. Also, all plastic pipe must be approved by the NSF for potable water use and shall carry the factory "NSF" stamped label on the pipe indicating such approval.

15110.2.2 POLYVINYL CHLORIDE PIPE (PVC)

15110.2.2.1 PVC PIPE FOR WATER LINE CONSTRUCTION – Shall be as follows:

- For sizes less than 4 inches OD, PVC pipe shall be Schedule Rated pressure pipe meeting the requirements of ASTM D1785 of the schedule and size shown on the Drawings.

- PVC pipe 4 inches and larger, shall be rigid, thermoplastic Class Rated pressure pipe meeting the requirements of ANSI/AWWA Standard C900 or C905 (latest revision). The pressure class or the dimensional ratio and the size shall be as shown on the Drawings.

- While Class Rated and Pressure Rated pipe materials are not interchangeable, when specifically allowed in the Contract Documents, for size 4" and larger, rigid thermoplastic Pressure Rated pressure pipe, meeting the requirements of ASTM D2241, may be furnished and installed. Operating pressure for this pipe shall be as shown on the Drawings.

15110.2.2.2 FITTINGS FOR PVC PIPE – Unless specifically authorized otherwise, fittings for 4 inch and larger size PVC pipe in underground service shall be ductile iron (DI) and shall meet the requirements of NSF 61 and ANSI/AWWA C-153. They shall have a standard coating of cement mortar on the interior surfaces in compliances with AWWA C-104. DI fittings meeting these requirements may be used with smaller PVC piping. PVC fittings meeting the requirements of ANSI/AWWA C-907 may be used with PVC pipe smaller than 4 inches, and, in some instances, where specifically authorized, with PVC pipe sizes 4 inches through 8-inches.

15110.2.3 DUCTILE IRON PIPE

15110.2.3.1 INTERIOR COATING - The interior surface of all DI pipe shall be coated with a standard coating of cement-mortar in accordance with ANSI/AWWA Standard C-104 unless required otherwise in the Contract Documents. Field coating of DI pipe will not be acceptable.

15110.2.3.2 BURIED PIPE – Unless shown otherwise on the Drawings, shall be as follows:

- Buried ductile iron pipe shall be Pressure Class 350.
- Shall meet requirements of ANSI/AWWA C-151.
- Joints shall be bell and spigot or mechanical, which meet the requirements of ANSI/AWWA C-111.

15110.2.3.3 EXPOSED PIPE – Shall meet these requirements, unless shown otherwise on the Drawings:

- Exposed ductile iron pipe shall be Pressure Class 350.
- Pipe shall comply with ANSI/AWWA Standard C-151.
- Pipe joints shall be flanged, meeting the requirements of ANSI/AWWA C-115, or mechanical type couplings (MTC), meeting the requirements of ANSI/AWWA C-606. MTC shall be Victaulic grooved couplings, as manufactured by Victaulic Company of America or approved equal), unless shown otherwise on the drawings.
- 3" to 12" compact flanged fittings shall be ductile iron and shall be produced in accordance with laying lengths specified in ANSI/AWWA C10/A21.10. Flange

surface shall be faced and drilled in accordance with ANSI Class 125 B16.1. Nominal body thickness shall be Manufacturer's Standard, but shall not be less than those specified in ANSI/AWWA C153/A21.53 "Standards for Ductile Iron Compact Fittings". Flange thickness shall be in accordance with the Manufacturer's Standards. Working pressure rating shall be 250 psi for water. Fittings shall be made in the United States of America and shall not have been refurbished or reworked by anyone other than the manufacturer. When greater than 250 psi is called for on the Plans, then the Supplier shall furnish higher class rated flanges. Standard Class 125 template for drilling shall be used for all flanges. Drilling templates shall be in multiples of four, so that fittings may be made to face in any quarter. Boltholes shall straddle the centerline and shall be equally spaced. Misalignment of boltholes of two opposing flanges shall not exceed 0.12 inches. Blind flanges 12 inches and over shall be provided with lifting eyes. Insulated flanges shall be provided where required.

- Gaskets shall be full faced, 1/16-inch thick compressed sheets of Aramid fiber base, with nitrile binder and non stick coating, suitable for temperatures to 700°, pressures to 1000 psig and a pH range of 1 to 11. Blind flange gaskets shall cover the entire inside face of the flange and shall be cemented in place. Gaskets shall be as manufactured by John Crane, style 2160; Garlock, style 3000; or approved equal.

15110.2.4 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

15110.2.4.1 PIPE – Shall be as follows:

- PE pipe shall be classified as a Type III, Grade P-34, Class C, Category 5, according to ASTM D1248. All PE pipe shall be manufactured according to ASTM D2513, D3035, F714, or API 15LE and AWWA C906.

- Pipe shall be made of high density, high molecular weight resin. PE plastic shall have a cell classification of 345434C as defined by ASTM D3350/AWWA C906. It shall be rated as PE3408 according to the requirements of the Plastics Pipe Institute. Internal pressure rating shall be as specified elsewhere in the project documents.

15110.2.4.2 FITTINGS FOR HDPE – Molded fittings shall be made of pre-blended virgin resins in accordance with the materials specifications of ASTM D1248. PE3408 fittings shall be made from a Type III, Class C, Category 5, Grade P-34 plastic resin having a cell classification of 345434C according to ASTM D3350. Socket fusion fittings shall be manufactured in compliance with ASTM D2683 and butt fusion fittings with ASTM D3261. Measurements of fittings shall be as required by ASTM D2122. All fittings shall be compatible for heat fusion with any pipe manufactured for like or similar resins.

Heat welded Flange Adapter Couplings shall be used for transition to other type piping material. The Contractor shall follow the manufacturer's recommendations, as well as specified procedures herein in fusing fittings to the polyethylene pipe.

15110.2.5 GALVANIZED S PIPE AND FITTINGS

Shall be of the schedule rating shown on the Drawings and shall be used only in exposed, non-corrosive atmospheres where piping diameters are less than 4 inches.

15110.2.6 PIPE AND FITTINGS FOR WATER SERVICE LINES

Not Used

15110.2.7 PIPE FOR GRAVITY SEWER SYSTEMS

Gravity sewer pipelines may be constructed with PVC or polyethylene (PE) plastic sewer pipe and fittings. Such materials shall be of the type, configuration and size shown on the Drawings and/or on the Bid Schedule.

15110.2.7.1 PVC PIPE - All PVC sewer pipe and fittings shall meet the standards of ASTM D3034 and F679. Such pipe shall be manufactured with a rubber gasketed joining system which meets ASTM D3212 and shall be furnished with a standard dimensional ratio of 35 (SDR 35) for wall thickness, unless shown otherwise on the Drawings.

15110.2.7.2 PE PIPE - All PE sewer pipe and shall be smooth, solid wall, high density polyethylene pipe manufactured from PE 3408 material conforming to ASTM D1248, Type III, Class C, Category 5, Grade P34 with a P3408 rating from the Plastic Pipe Institute. Fittings for this pipe shall be molded from a polyethylene compound equal to or exceeding the properties of the pipe being supplied.

15110.2.8 PIPE FOR PRESSURE SEWER SYSTEMS

Pressure sewer pipelines shall be constructed with DI, PVC, or PE plastic sewer pipe. Fittings and materials shall be of the type, SDR rating, (or pressure class) and size shown on the Drawings and/or on the Bid Schedule.

15110.2.8.1 PVC PIPE - All PVC pipe for pressure sewer lines shall be rigid, pressure rated, thermoplastic pipe which meets the standards of ASTM D2241. Fittings for PVC pipelines shall be Class 50, cement mortar lined, rubber gasketed, DI which meet the requirements of ANSI/AWWA C-153 and C-104.

15110.2.8.2 PE PIPE - PE pipe for pressure sewer lines shall be smooth, solid wall, high density polyethylene pipe manufactured from PE 3408 material conforming to ASTM D1248, Type III, Class C, Category 5, Grade P34 with a P3408 rating from the Plastic Pipe Institute. Fittings for this pipe shall be molded from a polyethylene compound equal to or exceeding the properties of the pipe being supplied.

15110.2.9 PIPE AND FITTINGS FOR IRRIGATION SYSTEMS

Shall be either DI or Pressure Rated PVC, of the type and class shown on the Drawings, for line diameters 4-inches and greater. Buried lines smaller than 4 inches in diameter shall be Schedule Rated PVC as shown on the Drawings.

15110.2.10 PIPE FOR DRAIN SYSTEMS

Piping for sub-drainage may be constructed with polyvinyl chloride (PVC) or polyethylene (PE) plastic non-pressure drainage or sewer pipe and fittings. Such materials shall be of the type, configuration and size shown on the Drawings and/or on the Bid Schedule.

15110.2.10.1 PVC PIPE - All PVC drainage pipe and fittings shall meet the standards of ASTM F794. Such pipe shall be manufactured with a rubber gasketed joining system which meets ASTM D3212 and may be furnished with ribbed, corrugated or smooth exterior walls with smooth interior wall surfaces, unless shown otherwise on the Drawings. Rubber gasketed joints will not be required for collection pipe applications with perforated or slotted pipe sections.

15110.2.10.2 PE PIPE - All PE drainage pipe shall be solid, corrugated or ribbed wall high-density polyethylene pipe with smooth interior wall surfaces. Material shall conform to ASTM D1248, Type III, Class C, Category 5, Grade P34 with a P3408 rating from the Plastic Pipe Institute. Fittings for this pipe shall be molded from a polyethylene compound and with equivalent properties and configurations specifically designed to fit the pipe being supplied.

15110.2.11 MISCELLANEOUS FITTINGS AND MATERIALS

15110.2.11.1 PIPE SUPPORTS - Floor mounted pipe supports for suspended, exposed piping systems shall be adjustable stanchion type supports designed to cradle the pipe diameter by 170 degrees. The support shall fit ductile iron or steel diameters snugly, without excessive gaps between the support and the pipe. Support saddle width shall be a minimum of 2 inches wide. The support must offer a minimum of 3 inches of final adjustment, after installation. Supports shall be supplied with independent base and adjustment collar designed to accept standard sized Schedule 40 galvanized steel pipe for coarse adjustment. Supports shall be fabricated from A36 mild steel, and shall have an electro-galvanized finish. Floor mounted pipe supports shall be the Standon Model S92 or C92 as manufactured by Material Resources, Inc., 22700 N. W. Quatama Street, Hillsboro, Oregon 97124, or approved equal. The standard required model shall be the S92. Non standard materials or model numbers shall be as specified on the Drawings.

15110.2.11.2 "Y" STRAINERS - shall be constructed of high-tensile ASTM A126 Class B Cast Iron with blow-off connections and self-aligning cylindrical screens and shall be equal to Watts Regulator Series 77F or better quality.

15110.2.11.3 FASTENERS – Fastener requirements are as follows:

- Unless otherwise required in these Specifications or shown on the Drawings, all bolting hardware for buried pipe, fittings, valves, and components shall be of manufacturer's standard materials.

- Unless otherwise required in these Specifications or shown on the Drawings, all bolting materials for exposed pipe, fittings, valves, and components shall be Type 316 stainless steel. Where space restrictions preclude the use of regular bolts, stainless steel threaded studs may be used on all valve flange connections.

- In all instances where stainless steel threaded fasteners are used, a coating of an approved, permanent anti-seize compound shall be applied to the fastener to prevent galling and to assist in disassembly.

- All bolts and/or studs shall extend through the nuts at least 1/4 inch.

15110.2.11.4 COUPLINGS – Couplings shall meet the following requirements:

- Unless prescribed otherwise on the Drawings or in these Specifications, couplings shall meet the requirements of ANSI/AWWA C-219. All flexible couplings shall meet the minimum requirements of Smith Blair 400 series.

- Sleeves shall have a smooth inside taper and there shall be no surface irregularities on any sealing surface. Gaskets shall be suitable for the project application.

- Flexible couplings for buried DI and PVC pipe sizes 2 through 16 inches in diameter shall be fabricated of steel or ductile iron. For pipe sizes larger than 16 inches, flexible couplings shall be of steel. Coupling components for use in potable water systems shall be factory coated with an FDA approved, bonded epoxy coating, applied to an average 12 mil thickness.

- Flexible couplings for exposed pipe shall be manufactured of steel, unless shown otherwise on the Drawings, or approved by the Engineer. Coupling components for use in potable water systems shall be factory coated with an FDA approved, fusion-bonded epoxy coating, applied to an average 12 mil thickness.

15110.2.11.5 RESTRAINT HARNESS – Where required, restraint harness for bell and spigot pipe joints shall be as manufactured by EBAA Iron Co. or an approved equal. The restraint shall consist of a split bell ring to go behind the bell and a split, serrated ring to grip the pipe on the other side of the joint. The harness shall be held together with clamping bolts and tie bolts. The rings shall be fabricated of 60-42-10 DI conforming to ASTM A-536. Clamping bolts shall be grade 5 zinc coated machine bolts. Tie bolts are of low alloy steel. The harness shall have a minimum working

pressure of 150 psi. Harness size shall be as shown in the schedule on the Drawings or as specified in the Special Provisions.

15110.2.11.6 VALVES AND FITTINGS - Shall be as specified in their respective sections in these Specifications.

15110.2.11.7 BOXES AND ENCLOSURES – Shall be of the size, type, and configuration indicated on the Drawings and Contract Documents.

15110.3 CONSTRUCTION REQUIREMENTS

See Sections 02222 for construction requirements for applicable piping systems.

15110.4 METHOD OF MEASUREMENT

In general, fittings for pipe and piping systems are, and will be, considered appurtenant to the pipeline being installed unless specifically called out for separate payment on the Bid Schedule.

15110.5 BASIS OF PAYMENT

Not used.

END OF SECTION

15230.1 DESCRIPTION

This section covers furnishing and installing valves and fire hydrants in water transmission and distribution lines, together with fittings, thrust blocking, and boxes and enclosures related to the operating equipment.

15230.1.1 RELATED WORK

Section 01300 – Submittals
Section 02222 – Water Line Pipe Installation
Section 15110 - Pipe and Piping Systems

15230.1.2 SUBMITTALS

All information shall be provided in accordance with Section 01300. Written evidence of compliance from the manufacturer shall accompany each delivery of material.

15230.1.2.1 VALVES 12 INCHES AND SMALLER, AND HYDRANTS - For valve sizes 12-inches and smaller, and fire hydrants, the Contractor shall furnish the manufacturer's standard data and catalogues for review and approval.

15230.1.2.2 VALVES LARGER THAN 12 INCHES - For all valves sized larger than 12-inches, the Contractor shall furnish shop drawings and technical data prepared by the manufacturer for review and approval.

15230.1.2.3 CONTENT - Submittals shall include complete details, dimensions, weights, diameter of stems, alloy for all valve parts and any information that may be required to assemble, install, operate and maintain the valve.

15230.1.2.4 BUTTERFLY VALVES - Certification of performance together with leakage and hydrostatic tests as described in Section 13 of ASTM/AWWA C-504 shall be furnished to the Engineer upon the Engineer's request.

15230.1.2.5 BALL VALVES - Certification of performance together with leakage and hydrostatic tests as described in Section 5 of ASTM/AWWA C-507, shall be furnished top the Engineer upon the Engineer's request.

15230.1.3 DEFINITIONS

Not used.

15230.2 MATERIALS

15230.2.1 GATE VALVES

15230.2.1.1 COMPLIANCE - All gate valves shall conform to AWWA C-500 or C-509 with the following characteristics:

15230.2.1.2 3-INCH AND SMALLER VALVES - Valves 3-inches and smaller shall be as follows:

- Valves shall be as manufactured by Ford, Hayes, Mueller, Red & White, or an approved equal.
- Valves shall be standard, double-disc, non-rising stem valves with wheel handles.
- Valve bodies shall be all bronze or brass.
- Valves shall be threaded, unless shown otherwise on the Drawings or required in these Specifications.

15230.2.1.3 GATE VALVES 4-INCH THROUGH 14-INCH - Gate valves 4-inches through 14-inches in size shall be as follows:

- Valves shall have a ductile iron body.
- Valves shall have a solid cast iron, rubber coated, wedge gate and a resilient seat.
- Gate shall be designed to work equally well with pressure on either side of it.
- Valves shall be of the non-rising stem type and shall be left hand opening (counter-clockwise) with a 2-inch square operating nut.
- All interior ferrous surfaces exposed to fluid flow shall have an NSF approved, fusion bonded, epoxy coating. Epoxy coatings shall be factory applied by an electrostatic or thermosetting process.

15230.2.1.4 GATE VALVES 16-INCHES AND LARGER - Gate valves 16-inches and larger shall be as follows:

- Valves shall be double-disc gate valves with flanged ends.
- Valves shall be manufactured in accordance with AWWA C-500. Bolts, nuts, studs, etc., used with the gear case also shall conform to the requirements for Bonnet Bolting in AWWA C-500.
- Valves shall have bevel gears and shall be actuated by 2-inch square operating nuts.
- The gears and stuffing box shall be enclosed in a watertight cast or ductile iron case for operation in buried location.
- The case shall be filled with grease at the factory.
- Valves shall be designed to operate in a horizontal orientation.

- Valves shall be equipped with bronze tracks, rollers and scrapers.
- By-pass valves shall be furnished with each valve mounted in position A as indicated in AWWA C-500.

15230.2.1.5 VALVES ON WATER MAINS - Valves on water mains shall have the following features:

- In-line valves shall have push-on or mechanical joints conforming to AWWA C-111.
- Valves attached to side outlets shall be flanged.
- By-pass valves shall be flanged.
- Valves in blow-off lines shall be flanged.
- Valves in fire hydrant lines shall have push-on or mechanical joints.
- Valves in air release and vacuum relief lines shall be flanged or threaded.
- Valves 12-inches and smaller shall be equipped with O-ring packing.

15230.2.2 BUTTERFLY VALVES

15230.2.2.1 MANUFACTURER - Butterfly valves shall be Dresser Industries "450", Allis-Chalmers "Streamseal", Henry Pratt "Groundhog", Mueller Lineseal III, or an approved equal.

15230.2.2.2 COMPLIANCE - Butterfly valves shall conform to AWWA C-504.

15230.2.2.3 CLASS - Valves shall be Class 150 seated, tight closing valves, furnished with mechanical or flanged joints

15230.2.2.4 SEATS - Rubber valve seats shall be replaceable without disassembling the valve and shall not be interrupted by the shafting. Rubber seats may be retained on the disc edge by stainless steel clamping in lieu of bonding to the valve body.

15230.2.2.5 SHAFT PACKING - Shaft packing shall be of the self-adjusting permanent type.

15230.2.2.6 OPERATION - Underground opening and closing shall be accomplished with permanently lubricated screw-type operators, totally enclosed and of watertight construction. Overload protection shall be incorporated into the operator allowing the application of 450 foot-pounds input torque at full-open and full-closed positions without damage to the operator or valve. A 2-inch square wrench nut and valve box

shall be provided for operating the valve. Valves shall open counter clockwise unless indicated otherwise in the Special Provisions.

15230.2.3 BALL VALVES

15230.2.3.1 MANUFACTURER - Valves shall be produced by a manufacturer having at least five years experience in the manufacture of water works and valves.

15230.2.3.2 VALVES 4-INCHES AND LARGER - Ball valves, 4-inches and larger, shall be ductile iron or cast-steel body, double seated valves meeting the requirements of ANSI/AWWA C-507.

15230.2.3.3 SMALLER VALVES - Smaller valves shall be stainless steel, bronze, or iron bodied valves of the size, type and class shown on the Drawings.

15230.2.4 CHECK VALVES

15230.2.4.1 COMPLIANCE - Check valves shall be manufactured in accordance with ANSI/AWWA C-508.

15230.2.4.2 DESIGN - Check valves shall be of a clear waterway, swing-check type. They shall be designed to be mounted horizontally. They shall be fitted with flanged ends for easy servicing. They shall have an iron body and be bronze mounted.

15230.2.4.3 SEATING - Valves shall be provided with a metal to resilient material seating.

15230.2.5 HOSE BIBS

Hose bibs shall be 3/4-inch bronze or brass body, Watts Model SC-1, Red & White Model RW 301 or approved equal. All hose bibs shall have a tee handle.

15230.2.6 SAMPLE FAUCET

Sample faucet shall be a ½-inch chromed or brass body hose bib without hose connection threads.

15230.2.7 FIRE HYDRANTS

15230.2.7.1 COMPLIANCE - Fire hydrants shall conform to standard for dry barrel fire hydrants, AWWA C-502 and modifications herein specified.

15230.2.7.2 DESIGN - Hydrants shall be designed as follows:

- Hydrants shall be of the "compression" or "toggle joint" type with safety flange and safety stem coupling above the ground line so that they can be repaired without shutting off the water.

- Hydrants shall be of the dry top design with two or more "O" rings sealing the water from the operating mechanism.

- Hydrants shall be furnished with 5-inch minimum valve openings, one 4 1/2-inch NST pumper connection and two 2 1/2-inch hose connections.

- Hose nozzle threads, pump nozzle threads, operating nut and opening direction shall match existing hydrants in the system.

- Hydrant lengths shall be designed for the cover depth shown on the drawings plus the diameter of the main line pipe.

15230.2.7.3 PAINTING - The portion of the hydrant above the ground line shall be painted in accordance with the Owner's standards.

15230.2.8 OPERATING WRENCHES

Unless notified otherwise by the Engineer, the Contractor shall furnish two, T-handle, operating wrenches for each project incorporating valves with 2-inch, square-head, operating nuts.

15230.2.9 VALVE BOXES

Valve boxes shall be cast iron, two piece, and adjustable valve boxes. Valve boxes shall be of the slip joint type and be of sufficient length for the pipe burial depth required. The cast iron cover of the valve box shall have the word "water" stamped thereon.

15230.2.10 CONCRETE ENCLOSURES

Concrete enclosures for valves shall be precast and of the type, size and configuration shown on the Drawings and shall be fabricated in accordance with the requirements for precast concrete construction provided in Section 03500.

15230.3 CONSTRUCTION REQUIREMENTS

15230.3.1 SETTING VALVES AND VALVE BOXES

All valves shall be set and jointed to the pipe in the manner described for pipe laying and jointing in Section 02222 of these Specifications. Valves shall be oriented with the operating nut vertical. Valve boxes shall be centered and plumb over the operating nut and shall be set so that no shock or stress will be transmitted to the valve. Tops of the valve boxes shall be set flush with the ground surface, concrete collars, or street surfacing, unless otherwise shown on the Drawings.

15230.3.2 VALVE RESTRAINT

Restraint shall be installed on all valves connected with slip-on, gasketed, or O-ring joints (i.e., bell & spigot, mechanical, etc.) in accordance with these Specifications and as shown on the Drawings.

15230.3.3 CONNECTING TO EXISTING MAINS

15230.3.3.1 CONNECTION TO EXISTING WORK - All connections to existing water mains shall be made by the Contractor, unless otherwise provided in these Specifications. The Contractor shall provide labor and materials, including special fittings and restraint devices, required to make the required connections between existing lines and new lines.

15230.3.3.2 INTERRUPTION OF SERVICES - Where the connection of new work to old requires interruption of service, the Owner, Engineer and Contractor shall mutually agree upon a date for such connection which will allow ample time to assemble labor and materials and to notify all customers in accordance with Section 01510.

15230.3.4 FIRE HYDRANT INSTALLATION

15230.3.4.1 SETTING - All hydrants shall stand plumb use hand level with the pumper nozzle facing the street. The hydrant shall be set with the ground line at the location indicated by the hydrant manufacturer.

15230.3.4.2 DRAINAGE - Drainage shall be provided at the base of the hydrant by placing clean gravel under and around the base of the hydrant as shown on the Drawings.

15230.3.4.3 RESTRAINT - All hydrants shall be restrained by setting thrust blocks or mechanical restraint assemblies in accordance with the Drawings.

15230.3.4.4 AUXILIARY GATE VALVES - All fire hydrant assemblies shall include auxiliary gate valves positioned as shown on the Drawings.

15230.3.5 THRUST BLOCKS

Thrust blocks or joint restraints (Mega Lug) shall be formed to prevent coverage of the pipe joints in accordance with the details shown on the Drawings and as described in Section 03100 and 03050. All thrust blocks shall be set against undisturbed earth.

15230.4 METHOD OF MEASUREMENT

15230.4.1 VALVES

Excavation, foundation preparation, restraint devices, valve boxes, backfill, and other miscellaneous devices, materials, or equipment required for installation shall be considered part of and included in the measurement of all valves and valve assemblies.

15230.4.1.1 NUMERICAL COUNT - When valves are installed as separate items or assemblies, the measurement shall be determined by counting the number of each size and type (including any associated valve box and concrete valve box collar) of valve installed and accepted.

15230.4.1.2 LUMP SUM - When valves are located in an enclosure, measurement shall be made as lump sum for the enclosure assembly and shall include the valve, any supplemental valves and fittings in the enclosure, and the enclosure.

15230.4.2 HYDRANTS

Measurement of hydrants shall be made by counting the number of hydrants set and accepted. For each hydrant, this measurement shall include the tee, shut-off gate valve, excavation and backfill, drain gravel, valve box and concrete collar, restraint, hydrant, and 5-feet of pipeline extending from the tee on the main line to the hydrant.

15230.4.3 NO SEPARATE MEASUREMENT

No separate measurement will be made for thrust blocks or other restraint provided with valves and fittings. Neither will separate measurement be approved for sample faucets and hose bibbs. Measurement for these items will be included with the quantity of the assembly whereon they are installed.

15230.5 BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price.

PAY ITEM	UNIT
(Size) Gate Valve	Each
(Size) Ball Valve	Each
(Size) Ball Valve	Each
(Size) Butterfly Valve	Each
(Size) Check Valve	Each
Fire Hydrant Assembly	Each

END OF SECTION

16010.1 DESCRIPTION

The General Conditions, Supplementary General Conditions, Alternates and Addenda, applicable drawings and the Technical Specifications herein shall apply to the providing and construction of a complete electrical system under the requirements of this Division 16.

16010.1.1 RELATED WORK AND REFERENCED SECTIONS

Section 01300 - Submittals
Section 02200 - Trench Excavation and Backfill
Section 16150 - Electrical Control Devices
Section 16400 - Service and Distribution System

16010.1.2 SCOPE

A. The Work required under this Section consists of the Electrical General Requirements and related items necessary to complete the Work indicated within the Contract Documents.

B. This Section describes procedures and incidental items of Work relating to Electrical Division 16.

C. The drawings are diagrammatic, intended to indicate the general scope and location of the Work to be installed and are not to be considered as complete in every detail. The Contractor shall install all Work indicated and/or specified herein, complete in every way to perform the function (s) intended without additional cost.

D. Plans and Specifications are complementary; whatever is called for in either shall be as called for in both. In the event Work is called for in more than one place and is of conflicting requirements, the right shall be reserved to require the installation of the larger or the more expensive.

16010.1.3 CONTRACT DOCUMENTS

A. Contract documents consist of drawings, specifications, and other documents issued by the Engineer. Each is complementary and requirements shown, written or reasonably inferable therefrom on one is considered as written, shown and implied in all.

B. Electrical drawings are diagrammatic, but shall be followed as closely as actual construction and Work of other Contractors will permit. Runs to panels from outlets referred to as “home runs” are indicated, by pointing in the general direction of panels. Contractor shall continue such circuits to the panels as though the routes were completely indicated.

C. Deviations from the Drawings required to make Work of this Contract conform to Building as constructed, or as to Work of other contractors or subcontractors, shall be made by the Contractor at his expense. The Engineer reserves the right to make minor changes in the location of equipment and outlets without additional charges.

D. The Contractor shall familiarize himself with the architectural and mechanical plans. The Contractor shall perform all Work and provide all material required by the electrical Contractor shown under these and all other sections of the plans and specifications.

16010.1.4 SUBMITTALS

All submittals shall meet the requirements of Section 01300 of these Specifications.

16010.1.4.1 SHOP DRAWINGS – Submittal of shop drawings shall be as follows:

A. Submittal of shop drawings shall meet the requirements of Section 01300 of these Specifications.

B. Shop drawings shall be submitted within fifteen (15) days after the award of contract.

C. Shop drawing shall include functional and descriptive literature of the particular item furnished complete with dimensional drawings, rough-in and installation instructions, knock-out locations, hangers or mounting devices, etc., as required for the proper checking and installation of the equipment. Catalog sheets without any reference made to the particular item will not be acceptable. All special features called for in the Contract Documents shall be noted. Where performance test results of a product design are called for in the technical sections of these specifications, test data sheets shall be provided with the shop drawing submittal.

D. Shop drawings shall be submitted for all switch gear, motor control centers, motor starters, control panels, telemonitoring panels, alarms, electrical controls, electrical instrumentation, communication devices and circuitry, lighting fixtures, and equipment anchors and supports for seismically supported components.

E. In connection with seismic restraint requirements, shop drawings are required for all equipment anchors, supports, and seismic restraints. Submittals shall include weights, dimensions, load/deflection data, centers of gravity, standard connections, manufacturer's recommendations, and behavior problems (vibration, thermal, expansion, etc.) associated with equipment so that the final design can be properly reviewed.

F. Three preliminary sets shall be submitted to the Architect/Engineer for their review. Following review, two sets will be returned to the Contractor for correction. After corrections have been made, the formal six sets of the corrected shop drawings shall be submitted for final review and distribution.

G. Each shop drawing required under this or other sections of Division 16 shall be bound together in sets in one hard back three ring binder per set, properly indexed for the formal submittal. Binders shall be properly sized to adequately contain all of the materials to be placed therein and shall be labeled to identity the Owner, the name of the job, the name of the Contractor and/or any sub-contractor (s), and any other pertinent information.

16010.1.4.2 MATERIALS LIST - A materials list including manufacturer, type, size, model number and other properties shall be submitted for all raceway, conduit, fittings, support materials, wire, cable, junction boxes, and wiring devices, including boxes for weather proof devices.

16010.1.4.3 EQUIPMENT/INSTRUMENT LIST - Equipment/Instrument list(s) including manufacturer, type, size, model number and other properties shall be submitted for all equipment and instruments.

16010.1.4.4 OPERATION AND MAINTENANCE MANUAL – The Contractor, or electrical subcontractor, shall assemble and deliver to the Owner an operation and maintenance (O&M) manual for the electrical systems furnished and installed in connection with the Work. O&M manuals shall be as follows:

A. Number of copies shall be as specified in Section 01300 or as required in the Special Provisions or by the Engineer or the Owner. The O&M manual shall be reviewed and

approved prior to the final inspection.

B. Each copy of the O&M manual shall be bound in a hard-backed binder. The front of each binder shall have the following information printed on it by silk screen process:

OPERATION AND MAINTENANCE MANUAL
FOR
(*PROJECT NAME*)
(*SPECIFIC SYSTEM NAME AND/OR LOCATION*, as appropriate)
(*OWNER'S NAME*)

C. Each copy shall contain a master index at the beginning of the manual showing all items included.

D. A separate section for each different type of item of equipment or information furnished shall be provided. Use plastic tab indexes for all sections of the book.

E. The first section of the manual shall consist of the names, addresses and telephone numbers of the Mechanical Engineer, Electrical Engineer, General Contractor, Electrical Contractor.

F. Descriptive literature (manufacturer's catalog cuts and other data) of each manufactured item shall be included. Literature shall show capacities and size of equipment used and shall be marked indicating each specific item with all applicable data underlined.

G. Operating instructions shall, at a minimum, include:

1. General description of the electrical system.
2. Where applicable, a step-by-step procedure to follow in putting each piece of electrical equipment in operation.
3. Provide diagram for the electrical control system showing the wiring of all related electrical control items, such as fuses, interlocks, electrical switches and relays.
4. Test results of all items requiring testing as called for in the technical section of specifications.

H. Maintenance instructions shall, at a minimum, include:

1. Manufacturer's maintenance instructions for each piece of electrical equipment installed in the project. Instructions should include installation instructions, parts numbers and lists, operation instructions of equipment, name of vendor, and maintenance and lubrication instructions.
2. A summary list of each piece of electrical equipment requiring lubrication, showing the name of the equipment, location, type and frequency of lubrication.
3. A complete list of all electrical equipment used indicating name, model, serial number and nameplate data of each item, together with number and name of each system with which the item is associated.

I. An approved copy of the manual shall be used during final inspection and shall be left with the Owner for its use and disposition.

16010.1.4.5 OTHER INFORMATION - Other information shall be provided as required by the Engineer.

16010.2 MATERIALS

All equipment and materials shall be as specified, new, of the best quality and free from defects. Each type of equipment or material shall be the same make and quality.

16010.2.1 UNDERWRITERS LABORATORIES

All equipment, materials, and devices shall be approved by Underwriters Laboratories, Inc. (UL). Custom designed items shall be fabricated using UL approved materials. All custom panels shall bear the UL label certifying UL-508 standards.

16010.2.2 MATERIALS AND EQUIPMENT TO BE SUPPLIED

The Contractor or electrical Subcontractor shall provide all materials, equipment, and any other fittings or devices required for a complete and finished installation. Materials and equipment shall be as shown on the Drawings and/or as called for in these Specifications, including the Special Provisions if any, unless otherwise approved, in writing, by the Engineer.

16010.2.3 APPROVAL OF SUBSTITUTIONS

Equipment and materials are designated by one or more manufacturer's name brands or numbers. It is not the intent of the Specifications to exclude other equipment or materials that equal the standard of those specified. If the Bidder, in its bid, desires to use equipment or materials other than those specified, the Bidder must obtain written approval from the Engineer in this regard at least seven (7) calendar days prior to bidding. Submit complete data, including detailed specifications and drawings with written request in duplicate. Samples may be requested if deemed necessary. Certificates of compliance with specifications or a list of all exceptions to the specifications shall be included with request.

16010.2.4 STORAGE OF EQUIPMENT AND MATERIALS

A. The Contractor shall be responsible for the proper transportation, unloading, storage, and holding of all electrical systems, materials, and equipment until they are installed in the Work, and accepted by the Owner. This shall include responsibility for damage, loss, theft, and pilferage.

B. Materials and equipment shall be handled and stored in accordance with the manufacturer’s and/or supplier’s instructions. Packaged items shall be stored in original, undamaged condition with manufacturer’s seals and labels intact. Materials and equipment shall be stored in a neat and orderly condition at all times and allowing for easy access for inspection.

16010.2.5 RACEWAYS AND FITTINGS

The manufacturer shall be Republic Steel, Triangle, National, Carlon, Allied or approved equal. All conduits shall be in accordance with the requirements of the 2011 edition of the National Electric Code (NEC), or latest version adopted by Town, and applicable local codes. Steel conduit shall be in accordance with recommendations of the latest edition of American Iron and Steel Institute “Design Manual on Steel Electric Raceways.”

A. RIGID GALVANIZED STEEL CONDUIT (RGS)

1. Shall be USAS C80.1, zinc-coated by hot-dip galvanizing or sheradizing with additional enamel or lacquer coating.
2. Fittings shall be threaded type and of the same material as the conduit.

3. Unless otherwise noted, rigid metallic conduit shall be used for underground runs, under slab runs, and where runs are placed in concrete. It shall also be used for exposed runs in mechanical rooms and for other exposed runs where the conduit is exposed to moisture, weather or mechanical injury.
4. Where rigid metallic conduit is used for underground installations, including elbows required to make sweeps in PVC conduit runs, the conduit shall be wrapped with 3m-50 10 mil pipe wrap or approved equal.

B. INTERMEDIATE METAL CONDUIT (IMC)

1. Shall be UL Standard 1242, hot-dip galvanized steel.
2. Fittings shall be threaded type and of the same material as the conduit.
3. It can be used for exposed runs in mechanical rooms and for other exposed runs where the conduit is exposed to moisture, weather or mechanical injury.
4. **This conduit shall not be used in hazardous areas.**

C. ELECTRICAL METALLIC TUBING (EMT)

1. Shall be in accordance with UL "Standard for Electrical Metallic Tubing" No. 797, galvanized mild steel with interior coat of enamel.
2. Fittings shall be steel compression type.
3. **Cast type, indenter, or set-screw type fittings shall not be used**.
4. EMT shall be used for exposed and concealed runs to lighting fixtures above 10 feet or above ceilings.
5. **Not approved for any exposed conduit runs or drops**.

D. NON-METALLIC CONDUIT (PVC)

1. Shall be PVC Schedule 40 heavy wall suitable for direct burial.
2. Fittings shall be threaded or solvent welded type of the same material as the conduit.
3. **Shall not be used above grade or embedded in concrete, except as noted specified for runs above 600 volts. PVC shall not be used where exposed or concealed in walls or floors**.
4. PVC may be used for all underground runs, except for bends exceeding 22 degrees where jacketed or wrapped rigid galvanized steel is required, and runs under concrete slabs. Runs under concrete slabs shall be embedded in earth a minimum of 4 inches below the bottom of the slab. Risers through concrete slabs shall be rigid steel or intermediate metal conduit.
5. Provide PVC to steel adapters as required.

E. FLEXIBLE LIQUID-TIGHT CONDUIT

1. Shall be galvanized steel, liquid-tight, with moisture and oil- proof extruded PVC cover.
2. Fittings shall be liquid-tight, compression type.
3. Approved for flexible connections to equipment, items or instruments subject to vibration such as motors, fans, pumps, dry transformers, etc.
4. **Flexible Liquid-tight conduit shall not be less than 18 inches in length and not more than 3 feet in length**.

F. FLEXIBLE STEEL CONDUIT

1. Shall be galvanized steel.

2. Fittings shall be compression type of the same material as the conduit.
3. Shall be used for lighting fixture runs above drop ceiling grid systems or other devices required or approved by NEC or as requested or approved by the Engineer. (Install ground conductor per NEC in runs over 6 feet in length.)

G. PVC COATED CONDUIT

1. Rigid Steel conduit coated with a minimum of 40 mil of PVC coating shall be used in all corrosive areas or where required by NEC or the Engineer.
2. **All fittings, boxes, support materials, clamps, etc., used with PVC coated conduit shall be PVC coated in a like manner**.
3. Wiring devices shall be corrosion resistant UL rated in corrosive areas requiring PVC coated conduit.

H. WALL AND FLOOR SLEEVES

Shall be galvanized sheet steel or pipe.

I. CLAMPS

1. Shall be galvanized malleable iron one-hole straps, beam clamps or other approved device with necessary bolts and expansion shields.
2. **Perforated metal straps shall not be used**.

J. CONDUIT SIZES

1. Shall be as indicated on the drawings.
2. **Shall not be smaller than ¾ inch exposed or 1 inch buried conduit unless otherwise specifically approved by the Engineer**.

K. CONDUIT BUSHINGS

1. For conduit 1-1/4 inch and larger use OZ type BLG or SBLG with Lay-in-Lug.
2. Use Lay-in-Lug bushings on multiple conduit entrances to enclosures or gutters.
3. Bonding bushings shall be used on conduits containing service entrance conductors.

L. ENTRANCE SEALS

Provide and install OZ entrance seals on all conduits entering building below grade.

M. RACKS AND SUPPORTS

1. Conduit support racks, Unistrut supports and fittings, etc., shall be hot-dipped galvanized, except in corrosive areas where the supports and fittings must be PVC coated.
2. **Painted metal supports are not allowed**.

N. PULL BOXES

1. Pull boxes, which are required for proper conduit installation, shall be sized according to the requirements of Article 370 of the NEC.
2. Shall be cast type condulets with threaded hubs

O. OUTLET/JUNCTION BOXES

1. Boxes shall be provided in the wiring or raceway systems wherever required for routing/pulling of wires, making connections and mounting of devices or fixtures.
2. Boxes in exposed conduit runs shall be cast metal condulets with threaded hubs installed exposed. **Non-metallic boxes are not allowed**.
3. Each box shall be metal and shall have the volume required by the National Electrical Code for the number of conductors enclosed in the box. Boxes for mounting lighting fixtures shall not be less that 4 inch octagonal or 4 inch square except that smaller boxes may be installed as required by fixture configuration, as approved. Boxes in the raceway system shall not be less than 1-1/2 inches deep, except where shallower boxes required by structural conditions are approved.
4. Boxes for other than lighting fixture outlets shall not be less than 4 inches square.
5. Boxes in concealed conduit runs shall be equipped with tile extension rings, device mounting straps and accessories required for the purpose of the outlet.

16010.2.6 A. CONDUCTORS

1. Shall be of the type, size, and locations as shown on the Drawings and meet the requirements of the latest addition of the National Electric Code (NEC).
2. Shall be soft-annealed coated copper in accordance with ASTM B33 or B189.
3. Conductors No. 10 and smaller shall be solid copper for lighting circuits only, all other circuits shall be stranded copper.
4. All conductors shall be THHN/THWN copper rated at 600 volts, unless otherwise noted.
5. **Aluminum conductors will not be allowed**.

B. GROUNDING CABLE

Shall be as called out on the drawings and per NEC. (Grounding lugs shall be the clamp type made of high conductivity copper alloy and shall be provided for all equipment to be grounded.)

16010.2.7 SPLICES, TAPS AND TERMINATIONS

A. Splices, taps and terminations made in interior damp or wet locations, corrosive atmosphere locations or exterior boxes above or below grade shall be covered with 3M heat shrinkable ITCSN series sleeves or end caps or Raychem equal as approved by the Engineer.

B. All splices shall require approval by the Engineer.

16010.2.8 SAFETY SWITCH DISCONNECTS

A. Provide disconnect switches where shown and required by NEC as specified herein.

B. Type: Heavy duty, manual, single throw, fusible or non-fusible as indicated.

C. Rating: 600 volt, ampere size as noted or as required for load served.

D. Enclosure: Nema 4, Gasketed stainless steel or as called out in equipment schedule on drawings.

E. Fuses: Switches shall be equipped with Type "R" fuse clips factory installed. Fuses shall be dual element type RK5 of size as noted.

F. Non-Fusible Switches: For equipment 2 horsepower and smaller, shall be horsepower rated; toggle switch type; quantity of poles and voltage rating as indicated. For equipment larger than 2 horsepower, switches shall be the same as fusible type.

16010.2.9 JUNCTION BOXES

A. Junction or pull boxes, which are required but not shown, shall be sized according to requirement of Articles 370 and 373 of NEC.

B. Shall be cast type condulets with threaded hubs.

16010.2.10 WIRE DEVICES

A. Switches: 20 ampere, 120/277 volt, toggle type. Single pole used as designation for entire series - double pole, 3-way, 4-way or lock type. Hubbell #1221, Bryant #1221, Leviton #1221. Switch and pilot shall be Hubbell #1221-PL or Leviton #1221-PL. Double pole toggle switch shall be Hubbell #1222-2.

B. Ground Fault Interrupter Receptacles: 20 ampere, 125 volt, NEMA 5-20R, gray color. Leviton #6398.

C. Receptacles: 20 ampere, 125 volt, NEMA 5-20R, gray color for locations where indicated. Hubbell #5352, Bryant #5352, or Leviton #5352.

D. All devices shall be gray in color.

E. Special receptacles other than those listed above shall be as designated on the drawings.

F. Device Plates:

1. For surface mounted boxes plates shall be stainless steel suitable for use on cast metal device boxes, condulet FS and FD types. Shall be complete with gaskets and approved for wet locations.

2. For flush boxes in finished areas, plates shall be stainless steel. Gang plates shall be one-piece.

16010.3 CONSTRUCTION REQUIREMENTS

Unless notified otherwise, the Contractor responsible for the electrical Work shall perform all electrical work in accordance with the Drawings and with these Specifications.

16010.3.1 CODES, PERMITS, LICENSES AND STANDARDS

A. PERMITS AND LICENSES – The Contractor shall secure all permits and licenses required in connection with this work.

B. CODES AND STANDARDS - All work, labor, and equipment shall conform to applicable State and Local Codes and Standards and the applicable sections of the latest revisions of the following:

- American Society for Testing and Materials (ASTM)
- National Fire Protection Association, 2011 National Electrical Code (NEC) or latest adopted by Town.
- Insulated Power Cable Engineers Association (IPCEA)
- Underwriters Laboratories Inc. (UL)
- American Steel and Iron Institute, "Design Manual on Steel Electrical Raceways"
- National Electrical Manufacturer's Association (NEMA)
- American National Standards Institute (ANSI)
- Institute of Electrical and Electronic Engineers (IEEE)
- 2012 Uniform Building Code (UBC)
- Uniform Fire Code (UFC)
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- See Gilbert website for applicable codes and specifications.

Conflicts between any of the above referenced codes and standards and between any of them and these Specifications and/or the Project Drawings shall be resolved by complying with the more stringent requirements.

16010.3.2 SAFETY

A. REGULATIONS - The Contractor's work shall conform to the Associated General Contractors of America, Inc. *Manual of Accident Prevention in Construction* and shall comply with all current regulations of the Occupational Safety and Health Act (OSHA) as required for work identified on the Drawings or in these Specifications.

B. SAFETY GUARDS - All equipment, which the Contractor furnishes and installs, shall be provided with appropriate safety guards for prevention of accidents. The Contractor shall provide and maintain any other necessary construction required to secure safety of life or property, including the maintenance of sufficient lights to secure such protection.

16010.3.3 DIAGRAMMATIC DRAWINGS

A. The electrical drawings are diagrammatic, intended to indicate the general scope and locations of the work to be installed and are not to be considered as complete in every detail. The Contractor shall install all work indicated and/or specified herein, complete to perform the function intended without additional cost.

B. The electrical drawings are diagrammatic, however, they shall be followed as closely as actual construction and work of other contractors will permit. Runs to panels from outlets, referred to as "home runs", are indicated on the drawings by arrows pointing in the general direction of panels. Contractor shall continue such circuits to the panels as though the routes were completely indicated. Deviations from drawings required to make the work of this Contract conform to building as constructed, or as to work of other contractors, shall be made at the Contractor's expense. The Engineer reserves the right to make minor changes in the location of equipment and outlets without additional charges.

16010.3.4 SITE EXAMINATION

Examination of the site shall be made by the Contractor, who shall compare it with the drawings

and specifications and satisfy himself as to the conditions under which the work is to be performed. The Contractor shall, at such time, ascertain and check all conditions which may affect its work. No allowance shall subsequently be made in the Contractor's behalf for any extra expenses to which the Contractor may be put due to failure or neglect on its part to make such examination and determination of the condition.

16010.3.5 SUPERVISION

A. A competent foreman or superintendent, approved by the Owner's Representative, shall be at the site at all times to receive instructions and shall have the proper authority to act on behalf of the Contractor. The Contractor shall verify dimensions given on the electrical drawings and report any errors or inconsistencies to the Engineer before commencing the work. The Engineer or its representative will interpret the meaning of the Drawings and Specifications where questions arise.

B. Contractor shall assign persons to be in direct charge of work who are thoroughly experienced in the types of construction work specified herein. All labor shall be performed in a workmanlike manner by skilled workmen under the supervision of competent foremen.

16010.3.6 WORKMANSHIP

Workmanship shall be in accordance with the best present-day construction methods and shall be neat and orderly throughout the project.

16010.3.7 COORDINATION OF CONSTRUCTION

A. The Contractor shall coordinate work with other contractors, subcontractors, the Owner, and the Engineer to assure orderly and expeditious progress of work. The Contractor shall select order/sequence of work and establish schedule of working hours for construction, all subject to review and direction by the Owner.

B. This Contractor shall be held solely responsible for the proper installation of its work. The Contractor shall arrange with the proper contractors for the installation of anchors and other embedded devices, and for the leaving of required chases, openings, etc., and shall do all cutting and patching made necessary by its failure or neglect to make such arrangements with others. Any cutting or patching done by this Contractor shall be subject to the directions of the Engineer and shall not be started until approval has been obtained.

C. All cutting, welding or drilling of concrete or structural members shall be properly reinforced and patched to match as nearly as possible the surrounding work. Before cutting, welding or drilling any concrete or structural member, the Contractor shall secure the approval of the Engineer. Where deemed appropriate by the Engineer, in the case of gross negligence pertaining to this issue, the Engineer reserves the right to back-charge the Contractor for the Engineers associated costs.

16010.3.8 **INSTALLATION**

RACEWAY AND FITTINGS

A. STANDARDS

1. All conduit to be installed in accordance with the requirements of the National Electrical Code, latest addition.
2. Steel conduit to be installed in accordance with recommendations of American Iron and Steel Institute "Design Manual on Steel Electrical Raceways", latest addition.
3. PVC coated, "Plastic-Bond-Red", conduit installed in accordance with instructions in Robroy Plastic –Bond installation manual.

B. ELECTRICAL CONTINUITY

All metallic conduit systems shall be electrically continuous throughout.

C. MOISTURE

1. All conduit raceway systems shall be essentially moisture tight.
2. Conduit drainage shall be accomplished by sloping conduits towards manholes or boxes.
3. Where pockets cannot be avoided in exposed conduits, provide drainage fittings or weep holes. Weep holes drilled through the walls of any conduit or fitting shall not produce burrs on the inside or outside surface.

D. ALIGNMENT OF EXPOSED CONDUIT

Install conduit runs parallel or at right angles to lines of structure.

E. FIELD CUTS AND THREADS

1. Field cuts shall be made square, threads clean and sharp.
2. Remove burrs, sharp or rough edges by reaming.
3. Before couplings or fittings are attached, apply a coat of red lead or zinc chromate to male threads of RGS or IMC conduit, also apply these coatings or other special compound recommended by the manufacturer of the conduit where the conduit protective coating is damaged.
4. PVC coated conduit system requires male threads on conduit, elbows and nipples and all female threads on fittings or conduit couplings to be protected by application of a urethane coating.
5. **Care must be taken to assure that concrete surfaces are protected from cutting oil, any/all damage will be the responsibility of the Contractor**.

F. BENDS

1. Uniform, whether job-fabricated or made with standard fittings or boxes.
2. Do not dent or flatten conduit
3. Conduit installation should be installed symmetrically insofar as practicable.
4. Unless approved otherwise, bends larger than 1-1/4 inch shall be factory made.
5. Bends in exposed conduit shall be symmetrical insofar as practicable.
6. Do not expose bends at floor or ceiling.

G. LOCATION

1. Conduit routing is generally shown in schematic fashion, unless dimensioned or noted to the contrary.
2. Contractor is responsible to route conduits as required to connect equipment or devices.

3. Vertical risers, equipment and device locations are approximately as indicated on the drawings. Contractor shall coordinate installation of conduit with structure and equipment.
4. Contractor is responsible to coordinate conduit installation with other contractors installations, in the event of conflict, field routed conduit shall be moved at the Contractors expense.
5. Conduit shall be located a minimum 6 inches away from steam, hot water, or other hot surface. Protect from heat, as Engineer approved, if the 6 inch separation is impracticable.
6. Diagonal installation is not permitted.

H. BURIED/EMBEDDED CONDUIT

1. Buried conduit shall be a minimum of 30 inches below finished grade, sloped toward manholes or pull boxes.
2. RGS conduit installed underground, or used in PVC runs for sweeps larger than 22 degrees, must be wrapped with 3M-50 10 mil pipe wrap, approved asphalt compound or approved equal.
3. Mid-run weep holes and gravel drainage pockets will not be permitted.
4. Conduits embedded in concrete or masonry shall be securely held in place during concrete placement and construction operations.
5. In concrete floors, conduit shall be set before pouring of concrete begins. Conduit shall be routed in a direct line, with bends as long as possible, with 2 inches minimum from conduit to bottom of slab and maximum conduit size of 2 inch, unless otherwise approved.
6. Non-metallic conduits above 600 Volts shall be encased in red concrete covered by a minimum of 2 inches on all sides.

I. WALL PENETRATIONS

1. Penetrations through exterior building walls to be by core drilling and providing appropriate conduit entrance seals.
2. Openings through existing partitions shall be provided at Contractor's expense. Holes through masonry construction shall be drilled with suitable core drilling machine.
3. All work is to be performed neatly.
4. Patches shall match original material in composition and appearance.
5. Provide fire seals as detailed or required by NEC where a fire rated wall or partition is penetrated.
6. A template shall be provided by the Contractor to hold conduit groups terminating together or passing through fire walls or floors.
7. In walls and partitions, conduit shall be installed vertically. If vertical installation is impracticable, the Engineer shall approve horizontal installation for each location.

J. EXPANSION FITTINGS

Install expansion fittings in all conduit runs crossing structural expansion joints and in all straight conduit runs exceeding 75 feet in length.

K. CONDUIT ENDS

1. Insulating bushings shall be installed at open conduit ends, terminating in panels, control centers, consoles or other similar locations.

2. Plug space around cables with oakum and/or an approved sealing compound where conduits enter switchboards, cabinets or similar locations.
3. Cap or plug all spare conduit ends to prevent the entrance of foreign material.

L. CONDUIT CONNECTIONS

1. At cabinets and boxes use double locknuts and insulating bushings for rigid conduit.
2. At cabinets and enclosures with NEMA ratings, penetrations must be standard size and all conduit fittings and hole covers must be listed for the enclosure rating and purpose.
3. At cable tray securely clamp conduit to tray and install insulating bushings.
4. Install insulated grounding bushings with lay-in ground lugs where metallic conduit terminates in non-metallic manholes or pullboxes.
5. Flexible conduit for connection to movable/vibrating equipment shall be liquid-tight, SEALTITE as manufactured by Anaconda Metal Hose Company, or approved equal, utilizing approved liquid-tight fittings.
6. Conduit sealing material for seal-offs used at hazardous locations shall be Chico SpeedSeal Compound using EYS sealing fittings by Crouse-Hinds or approved equal.

M. SUPPORTS

1. Hangers and supports shall be galvanized or PVC coated except as noted.
2. Hangers and supports for wet well area shall be 316 Stainless.
3. Hangars generally are not detailed, but must be adequate to support combined weight of conduit. Rigid fastenings are to be spaced at a maximum of 6 feet.
4. Clamps will be galvanized malleable iron one-hole straps, beam clamps or other approved device with necessary bolts, washers and expansion shields.
5. **Perforated metal straps shall not be used**.
6. Adjustable hangers shall be used to support horizontal runs only, use trapeze hangers for parallel runs of conduit. Install u-bolts or other approved clamping device at each end and at each elbow. Install clamp every third intermediate hanger for each conduit.

N. CONDUIT CLEANING

Contractor is to clean and swab the inside of conduits, by mechanical means, to remove foreign materials and moisture before conductors are installed.

O. SPARE CONDUITS

1. Spare conduits shall have a nylon pulling line installed for future installation of cables.
2. Recessed panels shall have three 1 inch spare conduits in the wall space stubbed-out above ceiling and three 1 inch spare conduits stubbed under the floor.
3. Spare conduits shall be capped.

CONDUCTOR INSTALLATION

A. BENDING RADII

Not to be less than permitted by ICEA and/or NEC.

B. SUPPORTS IN VERTICAL RUNS

To be in accordance with NEC requirements.

C. SPLICING

1. Will be permitted only with Engineers approval, and will be held to an absolute minimum.
2. Permitted only in junction boxes or similar accessible locations.
3. Cover with heat shrinkable sleeves to make moisture proof and corrosive resistant.
4. No splicing of instrument or control wiring shall be allowed without specific approval, by the Engineer.

D. CONNECTORS

1. Solderless compression or mechanical type will be utilized where screw does not bear directly on the wire.
2. Apparatus lugs, conductor, and coat shall be thoroughly cleaned with suitable oxidation inhibiting compound prior to connection.
3. Retaining cup washers shall be used where solid wire is used at terminal blocks.
4. Compression type connectors shall be installed using ratchet type crimping tools that will not release until full compression has been achieved.
5. Dies for the crimping tools shall be matched to the connector and approved for use by the Engineer and the connector manufacturer.
6. Twist on type, Scotch-lok or approved equal, connectors shall be restricted to the connection of lighting fixture wires only.

E. POWER CABLES

All power cables will be installed in strict accordance with the manufacturers instruction, and in conformance with NEC.

F. CONNECTIONS

All apparatus lugs shall be tandem single or multi-barrel lugs as detailed/required.

G. CONDUCTOR PULLING

1. Use pulling grips or eyes.
2. Firmly mount pulling reels on portable stand and secure against displacement
3. Use an approved by the Engineer commercial pulling compound for lubrication.
4. Monitor and do not exceed cable-pulling tension as specified by the cable manufacturer.

H. COLOR CODING

1. Single phase service - use white for neutral conductor, and black for ungrounded conductors.
2. Three phase service - feeder and branch conductors shall be color coded as follows:

	120/208 Volt	277/480 Volt
a.	Phase A – Black	Brown

b.	Phase B – Red	Orange
c.	Phase C – Blue	Yellow
d.	Neutral – White	Grey
e.	Ground – Green or Bare	Green or Bare

3. Coding shall be by insulation color or minimum 1 inch band of colored tape.
4. Green covering of conductors shall be solely for grounding.

I. PHASING

1. Where common neutral is run for two or three circuits, phase conductors shall be connected to breakers in the panel, which are connected to different phase legs.
2. Home runs may be combined at the option of the Contractor, providing not more than three circuits are installed in one conduit, unless otherwise approved by the Engineer.

J. SERVICE SYSTEMS

1. Incoming service systems shall be grounded at two points with the UFER (ground wire tied to the rebar of the footings) and to driven ground rods as indicated on the Standard Detail Drawing.
2. Jumpers shall be provided around water meters and any dielectric sections of pipe.
3. Size shall be as indicated on the Drawings and/or as required by NEC.
4. Connections shall be accessible for inspection.
5. Neutral conductor connection to grounding electrode conductor shall be at the main service enclosure only.
6. Type of equipment and details of installation shall be verified with Power Company representatives.
7. Metering equipment shall be provided as indicated on the Drawings or as required by these Specifications.

16010.3.9 INSTALLATION OF POWER AND CONTROLS TO EQUIPMENT

Contractor shall provide all power and control wiring required for the work of other trades as described on the drawings and in the specifications, except where the furnishing and installing of such wiring is specified elsewhere. Connect cord sets to Owner furnished equipment and make connections to all electric power consuming equipment whether furnished under contract or by Owner.

16010.3.10 TEMPORARY ELECTRIC SERVICE DURING CONSTRUCTION

A. The Project Contractor is responsible for all project electrical work unless otherwise noted. The Contractor shall be aware, however, that some or all of the project electrical work may be performed by the Owner and/or an independent electrical contractor. The division of work to be performed by others may be indicated on the drawings, or may be as called for by the Engineer. But, the Contractor shall be responsible to review the Drawings and consult with the Engineer, to determine if its scope is less than one hundred percent of all project electrical work. The Contractor shall also be responsible to coordinate and schedule its work with that of the Owner or independent electrical contractor, and to leave its installations ready, with the connecting wires coiled, for the Owner or independent contractor to connect to or to terminate as necessary, thereby ensuring the most efficient completion of the project by all parties.

B. The Contractor or electrical subcontractor doing the work shall provide temporary power, complete with metering and wiring, for lighting and power outlets for construction tools and equipment. This contractor will make arrangements with the local power company for temporary electrical service connections for construction power.

C. No attempt shall be made herein to specify construction power requirements for equipment in detail. However, all temporary wiring shall meet NEC, Article 305, requirements. The service shall be provided with a main disconnect, and all power receptacles shall be, or be protected by, appropriately rated GFI single-pole devices.

D. At completion of the Project, or sooner if directed, the temporary power supply shall be disconnected and removed from the construction site.

E. During construction, if it becomes necessary to shut down power to a critical item of equipment or process, the Contractor or electrical subcontractor shall provide the necessary wiring and a portable generator or other source of electric power to keep such critical equipment or process in operation.

16010.3.11 SEISMIC RESTRAINT

A. The appropriate Seismic Zone Classification will be provided on the Drawings or in the Special Provisions. All electrical equipment shall be securely anchored and seismically braced in accordance with the regulations contained in the most recently adopted edition of the UBC and with the SMACNA *Guidelines for Seismic Restraints of Electrical Systems* as they pertain to the Seismic Zone Classification given.

B. Units mounted and secured directly to structures shall be provided with connectors of sufficient strength to meet the restraining criteria.

C. All electrical equipment which is to be securely anchored (hard mounted) to the building or structure shall have supports designed to withstand lateral and vertical "G" loadings equal to or greater than UBC requirements and SMACNA guidelines for the given seismic zone.

16010.3.12 LABELING OF J-BOX COVERS

All J-Box covers shall be labeled with information showing the voltage and the circuit number in reference to each home run pulled through that J-Box and a particular run of conduit. The Contractor shall continue such circuits to the panels as though the routes were completely indicated.

16010.3.13 REPAIR OF WORK

A. The work shall be carefully laid out in advance and where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support, or anchorage of the conduit raceways or other electrical work, this work shall be carefully done. Any damage to building, piping or equipment shall be repaired by skilled mechanics of the trades involved, at no additional cost to the Owner.

B. Penetrations within fire rated wall assemblies shall be appropriately repaired and replaced to full integrity of the designed fire resistance of the wall.

16010.3.14 TESTING

On completion of the work, the installation shall be tested free from all grounds and short circuits. Normal feeders, circuits, and service entrance conductors with wire size #2 and larger shall be tested for leakage phase-to-ground and phase-to-phase prior to energizing the electrical system. The Contractor shall submit a written report to the Engineer showing methods used and readings taken. Voltage applied for testing shall not exceed two times normal operating voltage.

16010.3.15 GUARANTEE/WARRANTY

A. The following guarantee is a part of the specification and shall be binding on the part of the Contractor:

"The Contractor guarantees that this installation is free from defects. The Contractor agrees to replace or repair, to the satisfaction of the Owner's Representative, any part of this installation which may fail or be determined unacceptable within a period of one (1) year after final acceptance."

B. Electrical systems and equipment shall not be considered acceptable for substantial completion until they have performed in service continuously without malfunction for at least ten (10) days.

16010.3.16 DEFECTIVE EQUIPMENT

If equipment fails to conform to the Specifications or to operate satisfactorily, the Owner will have the right to operate said equipment until defects are corrected. The Owner will have the right to operate rejected equipment until it is replaced, without cost for depreciation use or wear. The Contractor shall remove defective equipment from operation for examination, adjustment, alteration, or change only at times approved by Owner.

16010.3.17 CLEAN-UP

A. As the work progresses, and on a daily basis, the Contractor shall remove from the premises and surrounding streets, alleys, etc., all rubbish and debris resulting from its operations and shall leave all equipment and material furnished by the Contractor absolutely clean and ready for use.

B. In addition, the Contractor shall periodically remove all debris and waste in order to maintain safe working and operating conditions, and shall dispose of the same in an approved manner. At the completion of work, The Contractor shall remove all its rubbish, tools, scaffolds and surplus materials from and about the site, leaving its work clean and the areas ready for occupancy.

16010.3.18 AS-BUILT DRAWINGS

Blue line white prints of drawings will be furnished by the Engineer, on which the Contractor shall accurately and neatly mark, in colored pencil, all changes or deviations from the drawings as such changes are made in the work. These drawings shall be reviewed with the Engineer on a timely basis, not to exceed at least once each month. Failure to keep as-built drawings up to date shall be cause for withholding monthly or final payment.

16010.3.19 FINAL INSPECTION AND ACCEPTANCE

The Contractor shall notify the Engineer when work is considered to be complete, in full operating condition, and ready for final inspection. The Engineer, after determining that the installation is ready for final inspection, will conduct the final inspection and tests as are deemed necessary to

determine that the provisions of the specifications are satisfied. The Owner will not accept work nor make final payment to the Contractor until Engineer has certified that the work of the Contractor is complete and in conformance with the specifications and guarantees.

16010.4 METHOD OF MEASUREMENT

16010.4.1 NO SEPARATE MEASUREMENT

Separate measurement shall NOT be made for furnishing or installing electrical systems, components, materials required to be installed within the pay limits for a building or enclosure identified in the Bid schedule to be furnished by the Contractor.

16010.4.2 SEPARATE MEASUREMENT

A. NEW BUILDINGS - Separate measurement shall be made for installation of electrical systems, components, and materials, required for a building or enclosure shown on the Drawings and as called for in these Specifications and identified in the Bid Schedule, when such electrical systems, components, and materials are identified and listed in the Bid Schedule.

B. EXISTING BUILDINGS - Separate measurement will be made for installation of electrical systems, components, and materials, required to be installed or replaced in an existing building or enclosure, as shown on the Drawings and as called for in these Specifications, when such electrical systems, components, and materials are identified and listed in the Bid Schedule.

16010.5 BASIS OF PAYMENT

16010.5.1 No separate payment shall be made for furnishing or installing electrical systems, components, or materials required to be installed within the pay limits for a building or enclosure identified in the BID schedule to be furnished by the Contractor.

PAY ITEM	UNIT
Electrical System *(Indicate Building)*	Lump Sum
Install Electrical *(Describe Component)*	Lump Sum
Install Electrical *(Describe Component)*	Each
Install Electrical *(Describe material)*	Lump Sum
Install Electrical *(Describe material)*	Lineal Foot
Replace Electrical *(Describe Component)*	Lump Sum
Replace Electrical *(Describe Component)*	Lump Sum
Replace Electrical *(Describe material)*	Lump Sum
Replace Electrical *(Describe material)*	Lineal Foot

16150. 1 GENERAL

16150.1.1 QUALITY ASSURANCE

A. Comply with NFPA 70 requirements for electrical materials and installation.

B. Provide products and components which have been UL listed and labeled, including UL marks indicating special type usage whenever applicable.

16150.2 PRODUCTS

16150.2.1 MOTOR STARTERS

A. Acceptable Manufacturers:

1. Allen-Bradley Co.
2. Eaton Corp/Power Distribution Div.
3. Cutler Hammer
4. General Electric Co. (GE Supply)
5. Square D Co.

B. Provide factory fabricated starters complying with NEMA Standards Publication ICS 2 with NEMA Type enclosures as specified in Section 16010.

C. Provide starters with thermal overload protection on each phase utilizing interchangeable melting alloy, Class 20 (trip in 20 seconds or less when carrying a current equal to 600 percent of its current rating) overload heaters, sized in field for full load current rating indicated on each motor nameplate.

D. Manual Motor Starter: Quick-make, quick-break trip free toggle or pushbutton operating mechanism; provisions for positive padlocking in OFF position.

E. Magnetic Motor Starter: Non-reversing or reversing, as indicated; manual reset overload relay with reset button on face of enclosure; full voltage starting; control transformer of sufficient capacity to handle operating coil and associated controls, integral with each starter; 120 volts control circuit, fuse protected; equipped with pilot light.

16150.2.2 CONTACTORS

A. Acceptable Manufacturers:

1. Allen-Bradley Co.
2. Eaton Corp/Power Distribution Div.
3. Culter Hammer
4. General Electric Co. (GE Supply)
5. Square D Co.

B. Provide contactors complying with NEMA Standards Publication ICS 2 with NEMA Type enclosures as specified in Section 16010, unless otherwise indicated.

16150.2.3 RELAYS

A. Acceptable Manufacturers:

1. Control Relays:
2. Allen-Bradley Co.
3. IDEC Systems & Controls Corp.
4. Omron Electronics, Inc./Control Components Div.
5. Potter & Brumfield
6. Square D Co.

B. Provide relays complying with NEMA Standards Publication ICS 2 with NEMA Type enclosures as specified in Section 16010, unless otherwise indicated.

16150.2.4 CONTROL PANELS

A. Acceptable Manufacturers:

1. Allen-Bradley Co.
2. Eaton Corp/Power Distribution Div.
3. Cutler Hammer
4. Square D Co.

B. Provide factory fabricated oiltight pushbuttons, selector switches, pilot (indicating) lights, and pushbutton stations complying with NEMA Standards Publication ICS 2, heavy duty, with NEMA Type enclosures as specified in Section 16010.

1. Fabricate pushbutton stations for vertical or horizontal mounting, as indicated, and with button and light arrangements, as indicated on drawings.

C. Pushbuttons: Momentary or maintained contacts, as indicated; contacts rated 10 amps continuous carrying current, 600 volts AC; quick-make, quick-break, snap action operating mechanism.

D. Selector Switches: Rotary type; two or three position control, as indicated; legend plate with markings as indicated.

E. Pilot Lights: Transformer type, 120 volts AC; glass or acrylic plastic prismatic lens, color as indicated; legend plate with markings as indicated.

16150.2.5 CIRCUIT AND MOTOR DISCONNECTS

A. Acceptable Manufacturers:

1. Cutler Hammer
2. Allen-Bradley Co.
3. Siemens Corp/Electrical Apparatus Div.
4. Square D Co.
5. General Electric Co. (GE Supply)

B. Provide factory fabricated switches complying with NEMA Standards Publication KS 1 with NEMA Type enclosures as specified in Section 16010.

C. Safety Switches: 3 pole, heavy-duty, horsepower rated disconnect; rated at 600 volts; quick-make, quick-break operating mechanism; integral operating handle provided with means for positive padlocking in OFF position; current carrying parts constructed of high conductivity copper, with silver-tungsten type switch contacts; fusible or non-fusible as indicated; positive pressure type reinforced fuse clips for fusible switches.

D. Fuses: Dual element type, with time delay; non-renewable; current limiting where indicated.

16150.2.6 TRANSFER SWITCHES – MANUAL

A. Acceptable Manufacturers:

1. Cutler Hammer
2. Square D Co.
3. General Electric Co. (GE Supply)

B. Provide manual transfer switches complying with NEMA Standards Publication KS 1, specifically designed to transfer power from one load to another load, with NEMA Type enclosures as specified in Section 16010.

C. Manual Transfer Switches: Double throw, 3 pole, heavy-duty, safety switch; rated at appropriate amperes, 600 volts; quick-make, quick-break operating mechanism; blades visible from front of unit for positive indication that switch is OFF; integral three position operating handle provided with means for positive padlocking in OFF position; current carrying parts constructed of high conductivity copper, with silver-tungsten type switch contacts; non-fusible.

16150.3 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

16150.3.1 These control devices shall be considered pertinent to the equipment which they are associated with. They will not be measured or paid for separately, but shall be included in other appropriate bid items.

16400.1 GENERAL

16400.1.1 APPLICABLE SECTIONS

The General Conditions, Supplementary General Conditions, Special Conditions, Alternates and addenda, applicable drawings and the technical specifications herein shall apply to all work under this Division 16.

16400.1.2 SCOPE

Provide all operations, methods, labor and equipment and provide and install all materials and incidentals necessary for the completion of the work as specified herein or included on the drawings.

16400.1.3 WORK INCLUDED

A. Electrical work required for this work is shown on the drawings and includes, but is not necessarily limited to:

1. Complete new electrical distribution system for power and lighting as shown.

2. Complete system of raceways and outlets for Control and all other auxiliary systems of this Division 16. Unless noted otherwise, the equipment and wiring of these auxiliary systems will be furnished and installed under their respective sections; however, the conduit raceway systems will be furnished and installed under this Section 16400.

3. All excavating, backfilling, compacting, and grading required for the installation of all work covered under this Division 16.

B. Shall furnish and install all component parts of all the systems required for their safe and proper operation, whether or not specifically mentioned or noted on the drawings, except those items or articles which are specifically noted hereinafter as being supplied otherwise.

C. Perform all trenching and backfilling required in connection with the work of this section in strict accordance with the provisions of Division 02000 of these specifications.

D. Provide all required electrical connections and service to items described in all other sections of these specifications. Provide all those services outlined in other divisions of the specifications as being done by the electrical sub-contractor.

16400.1.4 RELATED WORK SPECIFIED ELSEWHERE:

Section 16010 - Electrical General Requirements
Section 16410 - Fuses

16400.2 PRODUCTS

16400.2.1 DISTRIBUTION PANELBOARDS

A. Distribution panelboards shall be factory assembled dead front, wall mounted as scheduled and braced for the indicated ampere rms symmetrical with equipment, bussing connections, circuit breakers and all similar components indicated on the drawings or

required for proper completion. Each breaker shall have an etched micarta nameplate secured by two cadmium plated screws. Nameplates shall indicate equipment served as shown in schedule. Busses shall be copper of a maximum current density of 1000 amperes per inch and shall be equipped with uninsulated equipment ground bus. Three phase, 4-wire panels shall have full capacity neutral bus.

B. All floor mounted panels shall be mounted on a **4" housekeeping pad** and therefore to comply with NEC, the operating handles of switches and breakers shall be no more than 6'-2" above the bottom of the panel.

C. Distribution panel boards shall be wall mounted as indicated in schedules. For access to wiring gutters, panel shall be door within door construction. Shall be Square D, I-Line or equal of Siemens I.T.E., Cutler Hammer/Westinghouse or General Electric.

16400.2.2 BRANCH CIRCUIT PANELBOARDS

A. Branch circuit panelboards shall be Square D for the scheduled voltage, 3 phase, 4 wire operation or equal of Siemens, or General Electric. Shall be equipped with bolt-on breakers. Minimum width shall be 20 inches. Minimum depth shall be 5.75 inches. Panel trims shall be of the door within door construction.

B. Busses shall be copper.

C. Branch circuit breakers shall be provided per schedules on drawings. All multi-pole breakers shall be common trip.

D. Doors shall be complete with corrected circuit schedule on inside. Panels shall be NEMA 3R type construction.

16400.2.3 DRY TYPE TRANSFORMERS

A. General Purpose Dry-Type Transformers: (Under 600 volts)

1) General: Furnish and install at locations shown on the drawings dry-type two winding power transformers for general power and lighting applications indicated. Transformers shall be UL listed and bear the required Listing Mark.

2) Electrical Rating: Shall be 60 hertz of sizes, phases, high voltage and low voltage as scheduled on the drawings. Each transformer, unless specifically noted otherwise, shall have six (6) 2-1/2% full capacity taps, two above and four below nominal voltage in the high voltage winding.Temperature Classification: Each transformer shall utilize an insulation system that has been properly temperature classified and approved by Underwriters' Laboratories. Unless specifically noted otherwise, the insulation classification shall be 220 C with 150 C winding temperature rise in accordance with Underwriters' Laboratories specification UL506.

3) Load Rating:

a. Each transformer supplied to this specification shall be capable of operating at 100% of nameplate rating (NPR) continuously while in an ambient temperature not exceeding 40ºC and shall be capable of meeting the daily overload requirements of ANSI Standard C57.96 as stated in the following chart:

PERMISSIBLE ONCE DAILY OVERLOADS WITH NORMAL LIFE MAINTAINED			
Peak Load Following and Followed by a Constant Load of			
Peak Load Time (Hours)	90% NPR	70% NPR	50% NPR
1/2	162% NPR	185% NPR	200% NPR
1	138% NPR	148% NPR	152% NPR
2	123% NPR	128% NPR	133% NPR
4	113% NPR	115% NPR	118% NPR
8	106% NPR	107% NPR	108% NPR
NPR = Nameplate Rating			

b. Transformer loaded in accordance with this paragraph shall be capable of long service life under the thermal conditions specified. There shall be no need for derating.

4) Sound Rating: Each transformer shall have sound levels equal or lower than those established in the latest revision of ANSI Standard C89 as shown in the following chart:

Transformer Rating KVA	Maximum Sound Level Decibels
10-50	45
51-150	50
150-300	55

5) Other Requirements: The following requirements shall be in accordance with Underwriters' Laboratories specification UL506:

a. Enclosure:

(i) Ventilation openings
(ii) Corrosion resistance
(iii) Cable bending space
(iv) Grounding provisions
(v) Surface temperature rise
(vi) Wiring compartment temperature rise
(vii) Terminations

6) Test Requirements:

a. Each transformer furnished to this specification shall be subjected to the following production tests:
(i) Applied potential
(ii) Induced potential

(iii) No load losses
(iv) Voltage ratio
(v) Polarity
(vi) Continuity

b. The manufacturer shall have performed the following additional tests on units identical to the design type being furnished to this specification. Proof of performance of these lists in the form of test data sheets shall be provided as part of the shop drawing submittal.

(i) Sound levels
(ii) Temperature rise tests
(iii) Full-load losses
(iv) Regulation
(v) Impedance

7) Shop Drawings: Submit shop drawing for review prior to delivery to job site.

16400.3 EXECUTION

16400.3.1 INSTALLATION OF GROUNDING SYSTEM

A. The conduit system and neutral conductor of the wiring system shall be grounded to the cold water pipe having a continuous path to earth in compliance with grounding provisions as outlined in the NEC. Point of connection to the water system shall be as near as practicable to the service entrance. Provide bonding jumper same size as system ground to provide ground continuity from customer's side of metallic lines service entrance and street side of metallic mains. The neutral and ground shall be connected together at the main service switch only.

B. Where the water main is not metallic, delete water pipe ground requirements and provide a concrete encased electrode consisting of a 20-foot length of #3/0 bare copper conductor tied to the steel reinforcing bars and encased within a concrete footing. This footing shall be in direct contact with earth and located near the main panel.

C. The Contractor shall also install a made electrode ground system consisting of copperclad rods spaced not closer than six feet apart. Grounding conductors and connections to ground rods shall be protected from damage and shall be placed to avoid disconnect by unauthorized personnel. Interconnect with water pipe ground system.

D. The equipment grounding system shall be such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with the electrical circuits operate continuously at ground potential and provide a low impedance path for the possible ground fault currents. The system shall comply with the National Electrical Code, modified as indicated on the drawings or specifications and as hereinafter specified to incorporate a maximum 25 ohms ground resistance. Grounding connections shall be accessible for inspection.

E. The distributions system shall be provided with a separate equipment grounding conductor for each single or three-phase feeder, each branch circuit with a multi-pole protective device and each single phase receptacle and motor circuit as indicated. The required grounding conductor shall be installed in the common raceway with the related phase and/or neutral conductors. Single-phase branch circuits required for lighting, shall

consist of phase and neutral conductors installed in common metallic conduit which shall serve as the grounding conductor. Conduit equipment connections utilized in conjunction with the above single-phase branch circuits shall be provided with suitable bonding jumpers connected to approved grounding type bushings. Single-phase branch circuits and all branch circuits installed in flexible conduits shall be provided with a separate grounding conductors as hereinbefore specified for the multi-pole branch circuits.

16400.3.2 INSTALLATION OF PANELS

A. Installation: Unless otherwise indicated on the drawings, install wall panels with the top of the trim 6'-0" above the finished floor. Panels located in equipment rooms and wire closets shall be surface mounted. Floor mounted panels shall be provided with a 4" concrete housekeeping pad. Floor mounted panels shall be anchored to floor at all four corners and to wall or structural member at top for seismic restraint.

B. Directories: Mount a typewritten directory behind glass or plastic on the inside of each panel door. On the directory, show the circuit number and complete description of all outlets with specific locations on each circuit. In addition, provide a typewritten label inside door showing source of power to panel both as to feeder switch, panel designation and location within buildings.

16400.3.3 GENERAL PURPOSE DRY TYPE TRANSFORMERS

General purpose dry transformers shall be mounted on floor at locations shown on drawings. Each shall be anchored to floor by means of a minimum of four 1/2" x 6" anchor bolts grouted in existing concrete floor.

16400.3.4 TESTING

A. General: Upon completion of this portion of the work, test all parts of the electrical system in the presence of the Engineer Owner's Representative.

B. Test Requirements: All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects, and shall show an insulation resistance between phase conductors and ground of not less than that required by the National Electrical Code.

16400.3.5 FINAL INSPECTION

A. This Division 16 contractor's job foreman shall be present at the final inspection of the work by the Owner.

B. Electrical job foreman shall have pad and pencil to list all deficient items noted. Corrections and adjustments of deficient items shall be done after the inspection, not during.

C. See Section 16010 for other requirements for final inspection.

16400.4 METHOD OF MEASUREMENT

16400.4.1 SERVICE ENTRANCE. Provide all conduit, sweeps, support members, concrete transformer pads & pad vaults, grounding equipment, breakers, disconnects, enclosures, conductors, and appurtenances as required by the local utility, and as shown on the drawings and as defined in the applicable sections of the specifications required for a complete and fully functioning system.

16400.4.2 GROUNDING SYSTEM. Provide all grounding conductors, connections, ground rods, ground wells, and associated appurtenances and as shown on the drawings, and as defined in the applicable sections of the specifications.

16400.4.3 POWER PANEL (PP) OR MOTOR CONTROL CENTER (MCC). Provide all conduit, sweeps, pull boxes, power panels, motor starters, motor savers, receiving and installation of motor control center, transient voltage surge suppressor (TVSS), support members, grounding equipment, breakers, disconnects, enclosures, conductors and connections, and appurtenances as shown on the drawings and as defined in the applicable sections of the specifications required for a complete and functioning system.

16400.4.4 DRY TYPE TRANSFORMERS. Provide dry type transformer and appurtenances as shown on the drawings and as defined in the applicable sections of the specifications required for a complete and functioning system.

16400.4.5 LIGHTING PANEL (LP). Provide all conduit, sweeps, support members, grounding equipment, breakers, disconnects, enclosures, conductors and connections, switches, receptacles, and appurtenances as shown on the drawings and as defined in the applicable sections the specifications required for a complete and functioning system. Where lighting fixtures are not called out in the pay item, they are included in the LIGHTING PANEL (LP).

16400.4.6 LIGHTING FIXTURES. Material cost for lighting fixtures and all appurtenances. Note: conduit, wire and switches and included in LIGHTING PANEL (LP) section(s).

16400.4.7 HEATING VENTILLATION AIR CONDITIONING (HVAC). Provide all conduit, sweeps, support members, grounding equipment, breakers, disconnects, enclosures, conductors, switches, receptacles, and appurtenances as shown on the drawings and as defined in the applicable sections the specifications required for a complete and functioning system. Note: conduit, wire and switches and included in LIGHTING PANEL (LP) section(s).

16400.4.8 CONTROL PANELS. Provide all conduit, signal and power conductors and connections, and appurtenances for all control panels including Owner furnished equipment, as shown on the drawings and as defined in the applicable sections of the specifications required to provide a complete and functioning system.

16400.5 BASIS OF PAYMENT

16400.5.1 No separate payment shall be made for furnishing or installing electrical systems, components, or materials required to be installed within the pay limits for a building or enclosure identified in the BID schedule to be furnished by the Contractor.

16400.5.2 When electrical systems, components, or materials are measured for a new building or enclosure as shown on the Bid Schedule, separate payment will be made as listed below.

16400.5.3 When initial installation or replacement of electrical systems, components, or materials is made in an existing building as shown on the Bid Schedule, the accepted quantity will be paid for at the contract price listed below:

PAY ITEM	UNIT
Service Entrance	Lump Sum
Grounding System	Lump Sum
Lighting Panel LP1 & Control Panel	Lump Sum
Lighting Fixtures	Lump Sum
HVAC	Lump Sum
Control Panels	Lump Sum

16410.1 GENERAL

16410.1.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Bussmann.

B. Other acceptable manufacturer: Gould Shawmut, Littlefuse.

C. All fuses shall be of one manufacturer. Fuses shall have a 200,000 ampere RMS symmetrical interrupting rating unless noted otherwise.

16410.1.2 FUSE TYPES AND RATINGS

A. Fuses from 0 to 600 ampere for each circuit serving a single motor shall be UL Class RK5 dual-element Low Peak, LPN-RK (250 volt).

B. All other fuses in the 0 to 600 ampere range shall be UL Class J, dual-element, time delay, low peak, LPJ-SP (250 volt).

C. Fuses larger than 600 ampere shall be UL Class L with time delay, Hi Cap, KRP-C.

16410.2 METHOD OF MEASUREMENT

16410.2.1 This work shall not be measured for separate payment, but shall be considered incidental to other items in the Bid Schedule.

16410.3 BASIS OF PAYMENT

16410.3.1 Complete compensation for the accepted work outlined in this Section shall be included in other bid items.

LIQUID LEVEL SWITCHES — SECTION 17315

17315.1 DESCRIPTION

The Contractor shall furnish, test, install, and place into satisfactory operation the liquid level switches with all spare parts, accessories, and appurtenances as herein specified and as shown on the Drawings.

17315.1.1 RELATED WORK

Section 17000 – Instrumentation & Control, General

17315.1.2 SUBMITTALS

The Contractor shall provide descriptive information which indicates the model number, manufacturer's name, dimensions, measuring range and manufacturer's certification of performance in accordance with the requirements of Section 01300.

17315.2 MATERIALS

17315.2.1 LIQUID LEVEL SWITCHES

1. Device identification: See drawings.
2. Float actuated switch shall be a dry contact type switch
3. Cable shall be 18 AWG, 2 or 3 conductor UL, SJOW, water resistant CPE jacket.
4. The number of floats per level system shall be as shown.
5. The switch rating shall be at least 0.1 A at 125 VAC.
6. Switch set points shall be as shown on the drawings.
7. Mercury switch type capsules are <u>not</u> allowed.
8. As manufactured by:
    a) APG FT-300A
    b) or approved equal.

17315.3 CONSTRUCTION REQUIREMENTS

The Contractor shall provide all materials needed to install equipment in accordance with the manufacturer's recommendations and at the locations shown on the Drawings.

17315.4 METHOD OF MEASUREMENT

Separate measurement of this equipment will not be made.

17315.5 BASIS OF PAYMENT

Separate payment for this equipment will not be made.

General Conditions
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GENERAL CONDITIONS

1. CONTENTS

The following Contract Provisions are general in scope and may refer to conditions, which will not be encountered in the performance of the work, included in this Contract and which are not applicable thereto. Any requirements, provisions or other stipulation of these General Conditions, which pertain to a non-applicable condition, shall be excluded from the scope of the Contract. Where conflict appears, “Special Condition” shall take precedence over "General Conditions". Full compensation for compliance with these General Conditions shall be considered as included in the total and various bid items of the contract and the contract time.

2. DEFINITIONS AND TERMS

When the Contract indicates that work shall be "accepted, acceptable, approve, authorized, condemned, considered necessary, contemplated, deemed necessary, designated, determined, directed, disapproved, established, given, indicated, insufficient interpreted, ordered, permitted, rejected, required, reserved, satisfactory, specified sufficient, suitable, suspended, unacceptable, unsatisfactory," it shall be understood that these expressions are followed by the words "by the City of Sedona".

Wherever the following abbreviations, terms, or pronouns are used in the specifications, plans, or other Contract Documents, the intent and meaning shall be interpreted as follows:

ABBREVIATIONS

AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADOT	Arizona Department of Transportation
AGC	Associated General Contractors of America
AI	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
ANSI	American National Standards Institute, Inc.
ARA	American Railway Association
AREA	American Railway Engineering Association
ARTBA	American Road and Transportation Builders Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATSSA	American Traffic Safety Services Association
A WG	American Wire Gauge
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association

CRSI	Concrete Reinforcing Steel Institute
EIA	Electric Industries Association
FHWA	Federal Highway Administration, Department of Transportation
FSS	Federal Specifications and Standards
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IMSA	International Municipal Signal Association
IPCEA	Insulated Power Cable Engineers Association
ITE	Institute of Transportation Engineers
MAG	Maricopa Association of Governments
MIL	Military Specifications
MUTCD	Manual on Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NIST	National Institute of Standards and Technology
NSF	National Sanitation Foundation (NSF)
SAE	Society of Automotive Engineers
UL	Underwriters Laboratories, Inc.

ADVERTISEMENT - A public announcement inviting proposals for work to be performed or materials to be furnished.

AWARD - The acceptance by the City of a proposal.

BASIS OF PAYMENT - The terms under which "work" is paid, as a designated pay item in accordance with the quantity measured and the pay unit.

BIDDER - Any individual, partnership, joint venture, firm or corporation submitting a proposal for the advertised work, acting directly or through a duly authorized representative.

CALENDAR DAY - Each and every day shown on the calendar, beginning and ending at midnight.

CERTIFIED INVOICE - An invoice from a supplier which has been reliably endorsed by the Contractor guaranteeing that the material was purchased and received for the project and establishing the value of the material.

CLAIM - A written demand or request for additional compensation or additional time submitted to the Engineer that:

A. Contains the words “This is a claim…”, within its Subject line or the first paragraph
B. Cites the contractual basis for the demand or request
C. Relates the Contractual basis cited to factual events occurring or that have occurred within the project.

COMPLETION DATE - The date on which the contract work is specified to be completed

CONTRACT ITEM (PAY ITEM) - A specifically named unit of work for which a price is provided in the Contract. The description, whether general or detailed, the content of the named unit of work shall be as per the project plans and specifications.

CONTRACT CHANGE ORDER - A written order issued to the Contractor by the City covering extra work, additions or alterations to the plans and specifications, and establishing the basis of payment and time adjustment for the work affected by the changes. The Contract Change Order is the only method authorized for changing the Contract.

CONTRACT DOCUMENTS - The following comprise the Contract Documents: Advertisement for Bids, Information for and Instructions to Bidders, Bid Proposal and Bid Guarantee Bond, Construction Contract, Change Orders, Addenda, Performance Bond, Labor and Material Payment Bond, Special Conditions, General Conditions, Technical Specifications, Notice of Award, Notice to Proceed, Drawings, Plans, Standard Specifications and Certificate of insurability. All of these documents together constitute the **CONTRACT.**

CONTRACT TIME - The number of calendar days allowed for the entire completion of the Contract, including authorized time extensions and work required to be complete after substantial completion. Where a calendar date of completion is specified, the Contract shall be completed on or before that date.

CONTRACTOR - Party contracting directly with the City to furnish and perform all work and services in accordance with the Contract Documents.

COUNTY - The County in which the work is to be done.

DAY - Unless otherwise defined shall mean "calendar" day.

ENGINEER - The City Engineer; or his designated representative.

EXTRA WORK - Work not provided for in the Contract as awarded but determined by the City to be essential to the satisfactory completion of the Contract within its intended scope.

FINAL ACCEPTANCE - The acknowledgment by the City that the project or the work has been completed in accordance with the Contract Documents and provides the date at which the warranty or guarantee period begins.

INSPECTOR - A person, persons, or firm authorized by the Engineer to make detailed reviews, observations, reports and determinations of contract performance.

MAY - Used to refer to permissive actions.

METHOD OF MEASUREMENT - The manner in which a pay item is measured to conform with the pay unit.

NOTICE OF CLAIM - **A written notification submitted to the Engineer that a demand or request for additional compensation or additional time may be made. The notification shall**

1. Contain the words “notification of a potential claim” within its Subject line or the first paragraph
2. Describe the occurrence which is the reason that the Notice of Claim is being presented

NOTICE TO PROCEED - Written notice to the Contractor to proceed with the contract work including, when applicable, the date of beginning of contract time. Start of Construction, as defined below, may start at a later date.

PLANS - The drawings and pictures depicting the location and special orientation of the work to be done.

PROJECT - The work to be completed pursuant to this contract.

PROPOSAL - A standard form plus information supplied by the City, which contains spaces for completion by the Bidder which, when completed in its entirety and executed by the Bidder, along with all required additional documents, shall constitute the Bid. Said Bid shall constitute the Contractor's offer to perform all work required as set forth in the Contract Documents for the amount of money stated in the Bid.

PROPOSAL FORM - The documents furnished by the City on which the offer of a bidder is submitted.

PROPOSAL GUARANTY - The security furnished with a proposal to Guaranty that the bidder will enter into the Contract if the proposal is accepted.

RIGHT OF WAY - A general term denoting land, property, or interest therein, acquired for or devoted to the construction of an improvement.

SALVABLE MATERIAL - Material that can be saved or salvaged. Unless otherwise designated or directed by the City or shown on the plans, all salvable material shall become the property of the Contractor.

SAMPLES - Samples are physical examples furnished or constructed by the Contractor to illustrate materials, equipment, workmanship or finishes, and to establish standards by which the work will be judged.

SHALL - Refers to mandatory actions by either the Contractor or the City.

SHOP DRAWINGS - Drawings, diagrams, illustrations, certificates, test reports, schedules, performance charts, brochures, shop layouts, fabrication layouts, assembly layouts, foundation layouts, wiring and piping layouts, specifications and descriptive literature required by the Contract Documents which the Contractor is required to submit for approval.

START OF CONSTRUCTION – The date in which the Contractor begins physical work at the project site. Restrictions on start of construction are provided in the General Conditions and may be specified in the Special Conditions.

SUBCONTRACTOR - Party supplying labor and/or material for work at the site of the project for, and under separate contract or agreement with, the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between the City and any subcontractor.

SUBSTANTIAL COMPLETION - The date when the work is sufficiently completed so it may be safely, conveniently, and beneficially utilized by the City for all of the purposes for which it

was intended. Reduced liquidated damages are chargeable for a project or portions thereof which have separately specified damages, if there are items of work remaining to be performed relative to such work once full substantial completion status has been attained. In such cases the amount of liquidated damages due shall be twenty-five percent (25%) of the unreduced liquidated damage amount stated in the contract.

SUPERINTENDENT - The Contractor's authorized representative in charge of the work.

WORK - The furnishing of all labor, materials, equipment, and all other incidentals necessary to the successful and acceptable completion of all obligations as described in the Contract Documents, and the carrying out of all of the duties and obligations imposed by the Contract.

3. CONTRACTOR'S UNDERSTANDING

A. It is understood and mutually agreed that by submitting a proposal, the Contractor acknowledges that he has carefully examined all documents pertaining to the work, the locations, accessibility, and general character of the site of the work and all existing buildings and structures within and adjacent to the site, and has satisfied himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, subsurface conditions, the character, quality, and equipment, machinery, plant, and any other facilities needed preliminary to and during prosecution of the work, the general and local conditions, the construction hazards, and all other matters, including but not limited to any labor situation which can in any way affect the work under the Contract. It is further mutually agreed that by submitting a proposal, the Contractor acknowledges that he has satisfied himself as to the feasibility and correctness of the Contract Documents for the construction of the work and that he accepts all the terms, conditions, and stipulations contained therein; and that he is prepared to work in peace and harmony with other Contractors performing work on the site.

B. No verbal agreement or conversation with any officer, agent, or employee of the City, either before or after the execution of the Contract, shall affect or modify any of the terms, conditions, or other obligations set forth in any of the Contract Documents.

C. The Contractor understands that, unless specifically stated otherwise in the contract documents, the intent of the contract documents is to provide complete and operable facilities. The Contractor’s bid amount for this project, therefore, shall be and is considered to be for completion in conformity with this understanding, regardless of whether some aspect of the work to be performed is named as a separate bid item or not.

4. DEFECTIVE WORK

A. A City Representative, designated by the City Engineer, shall give written notice of the noncompliance to the Contractor, when, and as often as the City Representative determines through his inspection that procedures, material, equipment or workmanship incorporated in the Project does not meet the requirements of the Contract. Within five (5) working days from the receipt of such notice, the Contractor shall undertake the work necessary to correct such deficiencies, and to bring the work into compliance with the Contract Documents. Should the Contractor not agree with the City Representative’s determination, and as a condition precedent to any request for either additional compensation or time extension, or both, resulting from the City Representative’s determination, the Contractor shall within

three (3) working days provide a Notice of Claim to the Engineer that he may claim additional compensation, time or both, and detailed explanation of the Contractor's position. The Contractor shall document the costs associated with the corrective work with daily records and cost data and shall furnish such information to the Inspector daily. Receipt of cost data shall not be construed to be an acceptance of the corrective work, or an authorization for a Change Order to cover the corrective work. Failure by the Contractor to provide the specified written notice of an intention to make a claim shall be sufficient basis to reject any related claim subsequently submitted.

B. Prior to initial acceptance of the Project, the City may, at its option, retain work, which is not in compliance with the Contract if the City determines that such defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable. The City also may retain defective work, if in the opinion of the Inspector, and with concurrence of the City Engineer, removal of such work is impractical or will create conditions, which are dangerous or undesirable. Just and reasonable value, for such defective work, shall be judged, by the Engineer and appropriate deductions shall be made in the payments due, or to become due to the Contractor. Initial acceptance shall not act as a waiver of the City's right to recover from the Contractor an amount representing the deduction for retention of defective work.

5. NOTICE AND SERVICE THEREOF

Where the manner of giving notice is not otherwise provided for in the Contract Documents, any notice to the Contractor from the City relative to any part of the Contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted to the Contractor at the address given in the Contractor's proposal, or at the last business address known to the City, or delivered in person to the Contractor or his authorized representative on the site or transmitted electronically by facsimile or electronic mail using phone numbers and addresses last provided by the Contractor. It is mutually agreed that such notice shall be sufficient and adequate. The Contractor shall provide the City, upon written request, facsimile phone numbers and electronic mail addresses, in writing.

6. MATERIAL AND EQUIPMENT SPECIFIED BY NAME

When material or equipment is specified by reference to one or more patents, brand names, or catalog numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements, and that other materials or equipment, of equal capacities, quality and function may be considered. The Contractor may offer material or equipment of equal or better quality and performance in substitution for those specified which he considers would be in the City's interest to accept. After the Award of the Contract, the City will consider offers for substitution only from the Contractor and will not acknowledge or consider such offers from suppliers, distributors, manufacturers, or Subcontractors.

Substitutions

The Contractor's offer of substitution shall be made in writing to the Engineer and shall include sufficient data to enable the Engineer to assess the acceptability of the material or equipment for the particular application and requirements. If the offered substitution necessitates changes to or coordination with other portions of the work, the data submitted shall include drawings and details showing such changes. Contractor agrees to perform these changes as part of the

substitution of material or equipment. Within thirty (30) calendar days after the receipt of the offer of substitution, the Engineer will review the material submitted by the Contractor and notify the Contractor if approved for use or objections, if any, to the proposed substitution or if further information is required. Upon notification by the Engineer, the Contractor shall either provide the approved material or equipment, which complies with project specifications, or furnish requested additional information. While the Engineer might not take any objections to the proposed substitution and may approve the same, such action shall not relieve the Contractor from responsibility for the efficiency, sufficiency, quality and performance of the substitute material or equipment, in the same manner and degree as the material and equipment specified by name. Any cost differential associated with a substitution shall be reflected in the Contractor's offer of substitution and the Contract Documents shall be modified by a Change Order.

When the specifications state the construction shall be performed by the use of certain methods and equipment, such methods and equipment shall be used unless other methods are authorized by the Engineer. If the contractor desires to use a method or type of equipment other than those specified, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the method and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with the Contract Documents. If material or equipment is specified by only one patent or proprietary name, or by the name of only one manufacturer, it is for the purpose of standardization, or because the City knows of no equal. If standardization is the reason for using one name to specify any material or equipment, the specifications will so state, and substitutions will not be considered. In other cases, the Contractor may offer substitutions in the same manner as requesting a Change Order for products he considers being equal to those specified.

7. CONTRACT BONDS AND GUARANTEES

A. The Contractor shall provide two surety bonds on the forms provided, each in an amount equal to 100% of the contract price. One shall serve as security for the faithful performance of the work and the other as security for the faithful payment and satisfaction of the persons furnishing materials and performing labor on the work. The bonds shall be issued by a corporation duly and legally licensed to transact surety business in the State of Arizona. Such bonds shall remain in force throughout the period required to complete the work and thereafter for a period of 365 calendar days after final acceptance of the work, plus 365 calendar days following the repair of any work pursuant to the guarantees herein made. The surety's liability on the bonds shall not exceed the underwriting limitations for the respective surety specified in Circular 570, published by the United States Department of the Treasury.

B. Should any surety or sureties be deemed unsatisfactory at any time by the City, notice will be given to the Contractor to that effect and he shall forthwith substitute a new surety or sureties satisfactory to the City. No further payment shall be deemed due or will be made under this Contract until the new surety shall qualify and be accepted by the City.

C. The Contractor guarantees to the City that all materials and equipment furnished under this Contract will be new and of good and sufficient quality, free from faults and defects as is necessary to complete the project as required by the Plans and Specifications.

8. INSURANCE

A. The Contractor, at Contractor's own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly licensed, possessing a current A.M. Best, Inc. Rating of B+6, as minimum and approved and licensed to do business in the State of Arizona with policies and forms satisfactory to the City.

B. All required insurance herein shall be maintained in full force and effect until all work required to be performed under the terms of the Contract is satisfactorily completed and finally accepted - failure to do so may, at the sole direction of the City, constitute a material breach of this Contract.

C. The Contractor's insurance shall be primary insurance, and any insurance or self-insurance maintained by the City shall not contribute to it.

D. Any failure to comply with the claim reporting provisions of the policies or any breach of an insurance policy warranty shall not affect coverage afforded under the policy to protect the City.

E. The policies, except Workers' Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against the City, its agents, officers, officials and employees for any claims arising out of the Contractor's work or service.

F. The insurance policies may provide coverage, which contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to the City under such policies. The Contractor shall be solely responsible for deductible and/or self-insured retention and the City, at its option, may require the Contractor to secure the payment of such deductible or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.

G. The City reserves the right to request and to receive, within ten (10) working days, certified copies of any or all of the herein required insurance policies and/or endorsements. The City shall not be obligated, however, to review same or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed a waiver of, the City's right to insist on strict fulfillment of Contractor's obligations under this Contract.

H. The insurance policies, except Workers' Compensation, required by this Contract shall name the City, its agents, officers, officials and employees as additional insured.

I. The making of progress payments to the Contractor shall not be construed as creating an insurable interest by or for the City or be construed as relieving the Contractor or his Subcontractors of responsibility for direct physical loss, damage or destruction occurring prior to final acceptance.

J. Any insured loss under the policies of insurance required by this Agreement shall be adjusted with the City and made payable to City for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph K of this Article of these General Conditions. City shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged work shall be repaired or replaced, the

moneys so received shall be applied on account thereof, and the work and the cost thereof shall be covered by an appropriate Change Order.

K. City shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within ten (10) working days after the occurrence of loss to City's exercise of this power. If such objection were made, City shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, City shall upon the occurrence of an insured loss, give bond for the proper performance of these duties

L. If City finds it necessary to occupy or use a portion or portions of the work prior to substantial completion of all of the work, such use or occupancy may be accomplished as provided in these General Conditions, provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use or occupancy.

M. REQUIRED COVERAGE

The Contractor shall obtain for itself and provide the City with Certificates of Insurance indicating the scope and extent of coverage as set forth below. Required coverage's may be modified by an amendment to the Contract Documents.

1. GENERAL LIABILITY
   Contractor shall maintain Commercial General Liability insurance with a limit of not less than $3,000,000 for each occurrence with a $3,000,000 Products and Completed Operations Aggregate and $3,000,000 General Aggregate Limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products/completed operations and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of this Contract, which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 000211093 or aI1y replacement thereof. The coverage shall not exclude X, C, U.

   Such policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, or any provision, which would serve to limit third party action over claims.

   The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc.'s, Additional Insured, Form B, CG2010l185, and shall include coverage for Contractor's operations and products and completed operations.

   If required by this Contract, the Contractor subletting any part of the work, services or operations awarded to the Contractor shall purchase and maintain, at all times during prosecution of the work, services or operations under this Contract, an Owner and Contractor's Protective Liability insurance policy for bodily injury and property damage, including death, which may arise in the prosecution of the Contractor's work, service or operations under this Contract. Coverage shall be on an occurrence basis with a limit not

less than $3,000,000 per occurrence, and the policy shall be issued by the same insurance company that issues the Contractor's Commercial General Liability Insurance.

2. AUTOMOBILE LIABILITY
   Contractor shall maintain Commercial Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than $1,000,000 each occurrence and $2,000,000 for more than one person and property damage in the sum of not less than $1,000,000 resulting from any one accident which may arise from the operation, actions or omissions of the Contractor or any Subcontractor in the performance of the project, and with respect to the Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's work. Coverage will be at least as broad as coverage code 1, "any auto", (Insurance Service Office, Inc. Policy Form CA 00011293, or any replacements thereof). Such insurance shall include coverage for loading and offloading hazards. If hazardous substances, materials or wastes are to be transported, MCS 90 endorsement shall be included and $5,000,000 per accident limits for bodily injury and property damage shall apply.

3. WORKERS' COMPENSATION
   The Contractor shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work; and, Employer's Liability insurance of not less than $1,000,000 for each accident, $1,000,000 disease for each employee, and $1,000,000 disease policy limit.

   In case any work is subcontracted, the Contractor will require the Subcontractor to provide Workers' Compensation and Employer's Liability to at least the same extent as required of the Contractor.

   The Contractor shall furnish the City with a Certificate of Waiver of Subrogation under the terms of the Workmen's Compensation insurance. The Contractor shall defend, protect, and save harmless the City from and against all claims, suits, and actions arising from failure of the Contractor or the Subcontractor to maintain such insurance.

4. BUILDERS' RISK (PROPERTY) INSURANCE
   The Contractor shall purchase and maintain, on a replacement cost basis, Builders' Risk insurance in the amount of the initial Contract Amount as well as subsequent modifications thereto for the entire work at the site. Such Builders' Risk insurance shall be maintained until final payment has been made or until no person or entity other than the City has an insurable interest in the property required to be covered, whichever is earlier. This insurance shall include interests of the City, the Contractor, and all Subcontractors and Sub-Subcontractors in the work during the life of the Contract and course of construction, and shall continue until the work is completed and accepted by the City. The insurance shall cover work performed under the Contract and materials, equipment or other items to be incorporated therein, while the same are located at the construction site, stored off-site, or at the place of manufacture. The policy shall cover not less than losses due to fire, mischief, weather, vandalism, malicious mischief, wind, collapse, riot, aircraft, smoke or any other casualty, including but not limited to earthquakes, tornadoes or other cataclysmic events, until the date of initial acceptance of the work. For new construction projects, the Contractor agrees to assume full responsibility for loss or damage to the work being performed and to the buildings under

construction. For renovation construction projects, the Contractor agrees to assume responsibility for loss or damage to the work being performed at least up to the full Contract Amount unless otherwise required by the Contract Documents or amendments thereto.

Builders' Risk insurance shall be on an all-risk policy form and shall also cover false work and temporary buildings and shall insure against risk of direct physical loss or damage from external causes including debris removal, demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's service and expenses required as a result of such insured loss and other " soft costs" as required by the Contract.

Builders' Risk insurance must provide coverage from the time any covered property becomes Contractor's control and/or responsibility, and continue without interruption during construction or renovation or installation, including any time during which the covered property is being transported to the construction installation site, and while on the construction or installation site awaiting installation. The policy will provide coverage while the covered premises or any part thereof are occupied. Builders' Risk insurance shall be primary and not contributory.

If the Contract requires testing of equipment or other similar operations, at the option of the City, the Contractor will be responsible for providing property insurance for these exposures under a Boiler Machinery insurance policy.

The maximum deductible allowable under this policy shall be $5,000. The policies providing this insurance shall name the City, its agents and attorneys, the City Engineer, and the Design Engineer as additional insured as their respective interests shall appear.

5. BLASTING INSURANCE:
   If the Contractor determines that the performance of the project will require use of explosives, the public liability and property damage insurance shall specifically cover all liability arising out of the Contractor's acquisition, storage and use of explosives. If work requiring use of explosives is not discovered until after the commencement of the work, upon discovery, the Contractor shall immediately procure blasting insurance as required by this paragraph. The Contractor shall not undertake any blasting without submission to the City of a Certificate of Insurance covering all liability due to blasting regardless of amount. Any delays incurred by the Contractor in procuring blasting insurance shall not be grounds for an extension of time for completion of the project, nor for any additions to the contract price.

6. OTHER INSURANCE:
   The Contractor shall carry and maintain all other insurance including Flood Insurance as may be required by Federal, State, County and City laws or ordinances. The Contractor may be required to, at the discretion of the City, maintain additional fire and extended coverage with an endorsement for vandalism and malicious mischief in his name and also in the name of the City in an amount of not less than $100,000.00.

   The Contractor may utilize up to $2,000,000 in excess liability coverage to meet the above-required limits for insurance. Any deductibles shall be declared and the City may require deposits be made to it up the amount of such deduction, at its sole discretion.

7. CERTIFICATES OF INSURANCE

Prior to commencing Services under this Contract, Contractor shall furnish the City with Certificates of Insurance, or formal endorsements as required by the Contract, issued by Contractor's insurer(s), as evidence that policies providing the required coverage's, conditions and limits required by this Contract are in full force and effect.

All Certificates of Insurance required by this Contract shall be identified with a bid serial number and title. A $25.00 administrative fee shall be assessed for all Certificates received without the appropriate bid serial number and title. Each of the Certificates of Insurance shall contain a clause substantially in the following words:

It is hereby understood and agreed that if this policy is canceled, a written notice of such cancellation shall be mailed to the City of Sedona within ten (10) working days.

Such insurance coverage obtained by the Contractor other than Workmen's Compensation Coverage, shall name the City, the City Engineer, the Design Engineer, and their directors, officers, principals, agents, attorneys, and employees as Additionally Insured.

Insurance evidenced by these certificates shall not expire, be canceled, or materially changed without fifteen (15) days prior written notice to the City.

All certificates of insurance and endorsements required to be purchased by Contractor pursuant to this Article shall be filed with the City. Certificates shall be acceptable to City. If a policy does expire during the life of the Agreement, a renewal certificate of the required coverage must be sent to the City not less than five days prior to expiration date.

Each certificate of insurance shall include the job site and project number. Coverage shown on certificate of insurance must coincide with the requirements in the text of the Contract Documents.

9. SCHEDULE OF CONSTRUCTION

A. The Contractor shall submit to the City within five (5) days after award of Contract, or as may be otherwise requested by the City, a schedule showing the order in which the Contractor proposes to carry on the work and at a rate sufficient to successfully construct all of the Work set forth in the Contract Documents within the Contract Period. Such schedule shall show the dates at which the Contractor will start and complete the several parts of the Work. The schedule shall identify the following items if applicable:

1. Potholing.
2. Mobilization.
3. Roadway work to be broken down at a minimum, on a street by street basis.
4. Pipeline work to be broken down on a manhole to manhole basis and individual pump station construction or abandonment.
5. Site prep.
6. Drainage improvements prep and construction.
7. Ramp prep, construction and finish.
8. Sidewalk prep, construction and finish.

9. Bridge prep, abutment construction, bridge construction, bridge placement, and finish.
10. Traffic control.
11. Demobilization
12. SWPPP.
13. Other items as applicable and/or listed in the bid schedule.

The schedule shall also show the order of construction and delivery dates at which the Contractor will start and complete the several other parts of the Work, the order of construction and delivery dates of critical materials and equipment along with monthly payment estimates, dates for submittal of working drawings and shop drawing to the Engineer for review, and the name of the project superintendent. The City shall be notified in writing of changes in the project superintendent. The schedule shall be subject to review and comment by the City as per MAG specifications section 108.4. The schedule shall be binding on the Contractor and shall be complied with by the Contractor unless, for good cause shown, a modification of the schedule shall be requested in writing to and approved by the City. The schedule shall also:

1. Be updated with each progress billing.
2. Include a detailed two week look ahead, indicate work requiring inspection, and be updated at each progress meeting.
3. Show work tasks progress in time periods of seven days or less unless otherwise approved by the Engineer.
4. Identify the critical path(s) for the work and task float.
5. Identify tasks corresponding to bid item descriptions when possible. Less comprehensive task designations may be used to comply with 2 above.
6. Conform to any time and location constraints identified in permits and the contract documents.
7. Span the current contract date to the end of the contract time.
8. Be submitted in an electronic format compatible with Microsoft Project Standard 2007, and hard copy format.
9. Identify long lead items.

The schedule format (size, color, type format) shall be such that the different tasks, durations, critical path and durations can be easily distinguished. The Contractor shall also provide a listing of tasks and durations with the schedule. If the schedule and list is being provided prior to a Notice to Proceed it need not include dates for start and completion of tasks. Any schedule and list provided after the Notice to Proceed has been issued shall include dates. A schedule and list shall be provided on the date of the Notice to Proceed. The Contractor shall begin work on the project site within five (5) working days of the Notice to Proceed, unless stated otherwise in specifications. Failure to do so is sufficient cause for termination in addition to other remedies the City may have.

B. Where the City's operations require specific sequencing of the work, such sequencing requirements as provided for in the Contract Documents shall be followed.

C. When progress has not kept pace within two weeks of the schedule or if otherwise requested by the City the Contractor shall update his schedule within five (5) working days of the City’s written request. The revised schedule will include a description of what actions will be done by the Contractor to bring the project back on schedule. **Failure to**

not provide a revised schedule within one week of its request may result in the withholding of $750 from any progress payment due. Each written request by the City shall be considered a separate request and subject to the withholdings specified, provided it is within the following billing cycle from a previous request.

D. The Contractor shall provide the City with a list of emergency phone numbers, addresses, pager numbers, facsimile numbers, and electronic mail addresses for contacting key personnel in the case of any after-hours emergency.

E. The Contractor shall furnish the City with a schedule for hours of work. In it, the Contractor shall note the begin work, begin daily clean-up and daily shutdown times to be followed by the Contractor during the project unless otherwise changed. The Contractor's regular work hours on regular workdays shall be between 7:00 AM and 5:30 PM Monday through Thursday, unless otherwise stated in the specifications. Friday work is permitted between 7:00 AM and 5:30 PM for work that does not require City inspection. This work hours timeframe shall be considered to include start-up of equipment and daily clean-up of the work area. Weekends and Holidays for the City of Sedona shall be considered non-regular work hours. Permission to work non-regular work hours shall be subject to approval by the Engineer and the provisions of General Conditions, Section 39. **The Engineer may deduct $250 per day for work outside of approved work hours after issuance of one written warning during the course of the project.**

The City of Sedona has the following holiday schedule:
New Year's Day, January 1st
Martin Luther King/Civil Rights Day, 3rd Monday of January
President's Day, 3rd Monday in February
Memorial Day, Last Monday in May
Independence Day, July 4th
Labor Day, 1st Monday in September
Veteran's Day, November 11th
Thanksgiving Day, 4th Thursday in November AND the Friday after Thanksgiving Day
Christmas Day, December 25th

10. PROGRESS MEETINGS

Periodic meetings shall be held between the City of Sedona officials, Contractor, and other affected agencies, at a standard time and place, and at a frequency to be established during the pre-construction meeting. These meetings shall be used to discuss scheduling and matters related to the project.

11. TAXES

The Contractor shall be responsible for and shall include in his bid prices all applicable taxes, including but not limited to Federal, State, and Local Taxes.

12. ASSIGNMENTS

The Contractor shall not assign the whole or any part of the Contract or any monies due or to become due hereunder without the written consent of the City and of the Surety on the Contractor's Bond. A copy of such consent of Surety, together with a copy of the assignment,

shall be filed with the City. If the Contractor assigns all or any part of any monies due or to become due under the contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims and liens of all persons, firms, and corporations for services rendered; for the payment of all materials and equipment furnished and for payment of all materials and equipment used or rented in the performance of the Work called for in the Contract; and for the payment of any liens, claims, or amounts due the Federal, State, or local government or any of their funds.

13. SUBCONTRACTING

A. Subcontractors will not be recognized as employees or agents of the City, nor as having any privity of contract with the City. All persons engaged in the work of construction will be considered by the City to be employees of the Contractor. The Contractor will be held responsible for their work and for all materials provided by them, which shall be subject to the provisions of the Contract.

B. Each subcontract shall contain a suitable provision for cancellation or termination thereof should the Subcontractor neglect or fail to conform to every provision of the contract.

C. Subcontractors collectively shall not perform more than fifty percent (50%) of the value of the total work required pursuant to the Contract Documents. **The Contractor agrees that should this percentage be exceeded the City may consider the Contractor in breach of this contract and/or make deductions equal to one half of one percent of the total approved contract value for each one percent of subcontracted work beyond that allowed above.** The Contractor shall perform fifty percent (50%) of the contract work using the Contractor's own organization as construed in ADOT Standard Specifications 2000 Section 108.01.

D. The City of Sedona encourages all contractors to utilize minority and women owned businesses whenever possible.

14. COOPERATION AND COLLATERAL WORK

A. In general, the Contractor shall be responsible for the scheduling and coordination of his work with any other work, which may be, carried on in the construction areas for this project by other parties or by the City simultaneously with his construction work. The contractor shall include in his bid any costs, which may be involved on his part as a result of coordinating his construction with such other activity.

B. \When two or more Contractors are employed by the City in related or adjacent work, each shall conduct his operations in such manner as to not cause any delay or hindrance to the other and shall properly connect and coordinate the execution of their respective work with the other. The City will not be responsible for damage caused by such delays, and such delays will not entitle the contractor(s) to an extension of time. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work.

If the proper execution of any part of the Contractor's work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the City Engineer any discrepancies between the executed work and the drawings or any defects in such work that

render it unsuitable for such proper execution. The failure of the Contractor to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his own work. The exception is for defects, which may develop in the other contractor's work, after the execution of the Contractor's collateral work that would not have been discovered before the Contractor's collateral work began.

C. The contractor shall coordinate his work, and cooperate with any other persons or entities operating on or adjacent to the site of the project.

Where persons employed by other persons or entities are engaged in or near the construction areas for this project, and where such work on the part of said parties results in a delay in performance by the Contractor, and where such delay, in the opinion of the City Engineer, is of such nature that it could not have reasonably been foreseen or anticipated by the Contractor in time for him to take steps to prevent same, then the Contractor shall be entitled to an extension of time.

The Contractor shall promptly make good any injury or damage caused by him that may be sustained by other Contractors or employees of the City. The Contractor shall join his work to that of others and perform his work in proper sequence in relation to that of others.

15. LINES AND GRADES

The Contractor shall be responsible for providing all construction staking and surveying needed to construct the facilities in accordance with the Plans and Specifications, and shall include such costs in his bid for the applicable items of work. The Contractor shall employ a surveyor licensed in the State of Arizona to perform all surveying necessary to construct this project to the lines and grades provided in the plans. The Contractor shall provide to the Engineer the Surveyor's listing of lines, grades, distances, curve information and point data (including northing, easting and elevation) used to actually establish project staking at least two working days prior to establishing subgrade, setting forms, placing pre-cast facilities, pouring concrete, installing pipe, or placing asphalt. The Contractor shall provide a set of as-built plans showing manhole and inlet inverts, rim and grate elevations, gutter elevations at 50-foot intervals, changes of grade, invert and finished grade elevations of concrete structures at the center and corners, and the inlet and outlet ends of pipes. The surveyor shall seal and designate them as as-built plans. This as-built plan is in addition to the Status As-Builts and Record As-Builts required under other provisions of these specifications. The Final contract payment shall not be due until all as-built plans have been submitted and accepted. Any work performed without complying with the Survey requirements in these specifications shall be considered unauthorized work and subject to the provisions of MAG section 105.11. As-Built plans shall be submitted in the following formats: hard copy in the same size as provided by the City to the Contractor for the contract, AutoCAD 2006, and .pdf.

The Contractor shall pothole utility facilities and report results to the Engineer at least two (2) working days prior to excavating for installation of roadways, asphalt patches, catch basins, underground pipes, manholes, footings, vaults, and basins. The report shall indicate any conflicts or inadequate clearances as related to the work to be performed. Failure to perform potholes and report results, as required, will result in the loss of the right to make a claim for changes in compensation and time due to conflicts, interference, protection or other costs related to the utility, as such, a claim would have been mitigated by performing the pothole timely.

16. EXCAVATIONS, UNDERGROUND FACILITIES LOCATION, AND STORMWATER POLLUTION PREVENTION.

The Contractor in the execution of the Work shall conform to all applicable Federal and State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over employment discrimination, wages and working conditions, and the construction of the Work, including but not limited to all construction codes, O.S.H.A. Requirements, and safety codes, which may apply to (1) performance of the Work; (2) protection of adjoining and adjacent property; (3) maintenance of passage-ways, guard fences or other protective facilities; and shall obtain all permits and pay for licenses and approvals necessary for the construction of the Work and give all required notices.

ARS-40-360.22 Excavations: Determining locations of underground facilities; providing information. This statute requires that no person shall begin excavation before the location and marking are complete or the excavator is notified that marking is unnecessary and requires that upon notification, the owner of the facility shall respond as promptly as practical, but in no event later than two working days. The "Blue Stake Center" (1-800-782-5348) was formed to provide a more efficient method of compliance with this statute.

ARS-40-360.23 Making excavations in careful, prudent manner: liability for negligence. This statute states that obtaining information as required does no excuse any person making any excavation from doing so in a careful and prudent manner nor shall it excuse such persons from liability for any damage or injury resulting from his negligence.

ARS-40-360.28 Civil penalty: Liability. If the owner or operator fails to locate, or incorrectly locates the underground facility, pursuant to this article, the owner or operator becomes liable for resulting damages, costs and expenses to the injured party.

Licenses and Permits:
The Contractor shall be required to obtain, at his expense, the appropriate licenses and permits from the City of Sedona before the start of construction. It is the duty of the Contractor to determine that all necessary permits have been obtained. Costs associated with obtaining a license are not waived.

Arizona Pollutant Discharge Elimination System (AZPDES) Permit

A. General requirements:
The Contractor shall comply with the AZPDES Stormwater requirements for construction sites pursuant to the requirement of the Arizona Department of Environmental Quality (ADEQ). The Contractor shall be designated as permittee and shall be responsible for providing the necessary labor and materials, and for taking the appropriate measures to assure compliance with the ADEQ requirements, as well as other Federal, State and local requirements pertaining to storm water discharges. As the permittee, the contractor is responsible for completing, in a manner acceptable to the ADEQ, all documents required including the following:

1. Storm water Pollution Prevention Plan (SWPPP) for the project including certification form. The contractor will be required to submit for approval, update and revise the SWPPP as necessary throughout the construction of the project in order to assure compliance with permit requirements. The completed SWPPP shall be kept on the project

site at all times during construction of the project.

2. Notice of Intent (NOI) to be covered by Arizona General Permit for Arizona including certification of signature.

3. Notice of Termination (NOT) of coverage under AZPDES (upon project completion).

B. Regardless of whether compliance with AZPDES is required the Contractor shall prepare a Storm Water Pollution Prevention Plan. That Plan shall at a minimum address the following issues:
   - Designation, maintenance and clean-up of vehicle storage, fueling, lubrication and maintenance areas
   - Clean up and off-site disposal of excess construction materials including asphalt, concrete, paints, oils, and wrapping materials
   - Daily work day clean-up of debris in work area
   - Prevention of wind born debris/Dust Control Plan
   - Prevention of erosion resulting from rain or watering activities'
   - Measures to prevent silt and debris generated by this project from migrating beyond the construction site boundaries. Measures such as trapping and removing debris and dirt generated, or other measures acceptable to the Engineer, shall be taken.
   - The Contractor shall comply with the City of Sedona General Storm Water Pollution Prevention Guidelines, this includes filing the City Notice of Intent.

C. Submittals:

1. Preliminary copies of the NOI and SWPPP shall be submitted to the Engineer two days prior to the preconstruction meeting. Any necessary revisions to the SWPPP shall be subject to review by the Engineer, prior to implementation.

2. The Contractor shall submit completed, signed NOI forms at least forty-eight (48) hours prior to the initial start of construction on the project to the Arizona Department of Environmental Quality in Phoenix, Arizona (ADEQ, 1110 West Washington Street, Phoenix, AZ. 85007). Generally projects of less than one (1) acre may not be applicable to this requirement at this time. If the project is subject to these requirements, the Contractor shall be designated the permittee.

3. Failure by the contractor (or any of its appropriate subcontractors) to submit the NOI forms within the required timeframe shall result in delay of the start of construction, but shall not prohibit issuance of the Notice to Proceed, at the City's sole discretion. A copy of the completed NOI shall be posted on the construction and a copy of the SWPPP shall be kept on the construction site.

Contractor's Responsibilities:

1. It is the Contractor's responsibility to perform inspection of all storm water pollution control devices on the project on a monthly basis and following each rainfall. The contractor shall prepare reports on these inspections and retain these reports for a period of three years following project completion. Inspection reports shall be submitted monthly to the CITY along with payment requests. The contractor shall maintain all

storm water pollution control devices on the project in proper working order, including cleaning and/or repair during the duration of the project.

2. No condition of either the AZPDES or the SWPPP shall release the contractor from any responsibilities or requirements under other environmental statutes and regulations.

3. Upon total project completion, acceptance, and de-mobilization, the contractor shall submit its completed, signed NOT form to the ADEQ with copies to the same agencies who received copies of the NOI, thereby terminating all AZPDES permit coverage for the project.

D. Payment: There shall be no separate payment made to the Contractor for all material, labor, and other incidental costs relating to the provision, installation, and maintenance of items relating to this permit during project construction. Such incidental costs shall include contractor costs in order to assure proper operation of the pollution-control devices installed including all maintenance, cleaning, and disposal costs associated with clean-up and repair following storm events or other runoff or releases on the project.

17. EXISTING UTILITIES, RIGHTS-OF-WAY, EASEMENTS

A. EXISTING UTILITIES

Because of the nature of this contract, existing utilities are not shown or indicated in these specifications, except to note that their locations are within rights of way, streets and easements throughout the City of Sedona area. The fact that utilities are not shown shall not relieve the Contractor of the following responsibilities:

1. The Contractor shall be responsible for the preservation of all existing water, sewer, storm sewer, buried transmission lines or any cable or utility. If damaged, all costs for the necessary repairs shall be paid by the Contractor.

2. The Contractor shall locate and verify the location of all existing utilities prior to any excavation. This shall be done at least two (2) days prior to excavation for installation of project facilities or ordering equipment or materials for those facilities.

3. The Contractor shall be responsible for the location of all service lines.

4. Continuation of Service - All services shall be maintained to all areas at all times during the construction period, except when it is necessary to shut down a line to make a connection with the new line. Residents shall be given twenty-four (24) hour notice when it is known that the service will be interrupted. The Sedona-Oak Creek Fire District shall be kept advised of the status of all fire hydrants affected by any work on this Project.

5. The Contractor is responsible for as-builting all existing utilities within the improvement area (location, depth, and material).

B. RIGHTS-OF-WAY AND EASEMENTS

The City will furnish land, right-of-way, or easements as shown in the Contract Documents for the performance of the Work under the Contract. Contractor shall confine his operations to the land, right-of-way or easements furnished, and will restore the same to their original conditions to the extent reasonably possible prior to final acceptance of the work. Prior to construction or entry thereon, the Contractor shall obtain copies of and become familiar with any agreements and stipulations used by the City in acquiring temporary or permanent easements.

The Contractor shall remain within easement areas and rights-of-way obtained or owned by the City or easement areas the Contractor has obtained. Disturbed areas shall be reasonably restored upon completion of installation of the project improvements and related appurtenances in the easement. The Contractor shall be responsible to adhere to easement provisions whether the easement was obtained by Contractor or City. A temporary 4-foot high orange fence shall be placed to define the work area for all easements encompassing all work that occurs outside the City right-of-way. Clearing by manual means for the purpose of defining the area to be fenced shall be the only activity allowed on the easement before the fence is placed. City shall provide the Contractor with a copy of the easement agreement with the property owner, upon request. Contractor shall be responsible for all restoration of the easement as described in the easement agreement. Trees and larger vegetaion shall be preserved to the maximum extent practicable.

The Contractor shall be responsible for the preservation of all existing property pins. If disturbed or damaged the Contractor shall be responsible for all costs associated with the restoration of any property pin disturbed by the Construction activities. Any property monuments, which require resetting, shall be reset under the direction of a licensed Surveyor by the State of Arizona and proper documentation recorded with the appropriate County.

Access by Residents: The Contractor shall ensure that all residents have access from the Street to their property each night. When access to a resident's property cannot be maintained during normal working hours (week days), the Contractor must personally notify the affected residents two working days in advance of the closure. Such notification shall be documented in writing to the Engineer. Emergency access shall not be blocked, for any reason without the express written permission from the owner.

Access to Public Facilities: The Contractor shall assure that safe access to facilities including, but not limited to, parking lots, picnic shelters, playgrounds, and pedestrian ways is provided. Any disruption to the public's normal use of said facilities shall not occur without the express written permission from the City.

Intersection and Driveway Maintenance: Once work has commenced in a particular street, the Contractor shall provide and maintain access facilities to all connecting streets, intersections and private driveways by ramping or surfacing with suitable materials to ensure access at all times. If in the opinion of the City, such facilities, or materials used, are not capable of supporting traffic, the Contractor shall remove the materials and provide better-suited materials, including asphalt concrete or similar, as directed by the Engineer. This work shall be considered incidental to the Project, and all costs shall be borne by the Contractor. Failure to comply with these requirements may result in stoppage of the work until corrected as determined by the Engineer, with no time extension being granted for such delay to the Project.

18. OPERATIONS, LAYDOWN YARD AND STORAGE AREAS

A. All operations of the Contractor (including laydown yard, storage of materials, supplies, and equipment) shall be confined to areas authorized by the City. **The City of Sedona does not have available construction staging or material lay down facilities, except as specified otherwise in the specifications.** The Contractor is responsible for arranging and providing for such facilities as is deemed necessary for carrying out the work of this contract. The City does not warrant or represent in any way the availability of staging or material lay down areas within the City or vicinity of the project. It is the Bidder's responsibility to make such determinations. The price paid for mobilization shall include all costs for and associated with providing construction staging and material lay down facilities necessary for constructing the project. If a mobilization item is not included in the specification, the cost for compliance with item shall be considered as included in the unit price (s) bid for the various items of work. The Contractor shall be liable for all and any damages caused by him to such premises.

The Contractor shall comply with the following, regarding laydown yards:

- Any use of vacant property adjacent to or near the project used for parking or servicing equipment and/or storing of material will require the Contractor to provide written approval from the property owner, homeowner associations as applicable, and the filling of a temporary use permit from the City of Sedona.
- A copy of the property owner's approval shall be submitted to the Engineer, stating the use of the laydown yard for use during the construction of this project is acceptable.
- The Contactors yard shall be enclosed with a six (6) foot temporary fence.
- Storage of Gasoline will require Fire Department approval.
- Clearing or grading of the site in excess of fifty (50) CY of soil will require a grading permit. No grading will be allowed which changes the drainage path for the parcel without the approval of the City Engineering Department. All existing pipes and drainage facilities at the laydown yard will be maintained in working order at all times.
- A stabilized construction entrance will be required if the vacant property laydown yard is not already gravel or pavement. The laydown yard shall be adequately maintained to control dust and mud from leaving the property.
- Work in the laydown yard shall be scheduled so as to comply with any City noise or light Ordinances and these specifications.
- Equipment, materials, etc., shall be located so as to minimize impact to adjacent properties.
- Before any grading of any laydown yard, property corners will be located for the parcel. Any property pins disturbed by the Contractors operations will be replaced prior to final acceptance of the project.
- The Contractor shall obtain a written release from the property owner, homeowner's associations or similarly concerned parties after completion of use. A copy of the release shall be presented to the Engineer.
- Equipment and material shall not be stored in the right-of-way and/or street easement during non-work hours without permission of the Engineer. Such permission shall be subject to finding that it is impractical to move the equipment or material because of size or that permission has been granted to close the right-of-way to all traffic, including local traffic. Lack of construction yard or other staging

area shall not be considered as reason to grant permission. Such permission, if granted, shall be subject to conditions determined at the sole discretion of the Engineer.

B. The Contractor shall hold and save the City free and harmless from liability of any nature or kind arising from any use, trespass, or damage occasioned by his operations on the premises of third persons.

C. The Contractor shall be wholly responsible for the care, compliance with law, and storage of materials, supplies or equipment delivered on the work site or purchased for use thereon. Stored materials, supplies, or equipment shall be carefully and continuously protected from damage or deterioration and so located so as to facilitate inspection by the City. The responsibility for the care and storage of materials, supplies, or equipment shall be with the Contractor whether such materials, supplies, or equipment are furnished by the Contractor or by the City. Storage of materials, supplies, or equipment shall not unduly interfere with the progress of the Contractor's Work or the work of any other contractor.

D. Traffic Control:
Adequate traffic flow shall be maintained at all times, all barricading and temporary signage for detours and traffic control must meet the standards set by the Manual of Uniform Traffic Control Devices (MUTCD) and the City Engineer. If traffic control is not a separate bid item; then, it is considered incidental to the work and shall be included as appropriate in the Contractors bid. The Contractor must also take responsibility for public safety, meaning:

1. That, except for alleyways, one lane of the roadway for each direction must be kept open at all times; OR

2. Certified flaggers must be provided to properly channel traffic at all times when two separate lanes (one each direction) cannot be maintained open; OR

3. Total closure of a roadway shall only occur with the written permission of the City Engineer. For all rights-of-ways requiring closure for any work therein, appropriate permits shall be obtained. Prior to start of construction, the Contractor shall provide the Engineer with planned traffic control methods and procedures for this project. A notice of closure for residents, along with a map showing the planned area of distribution shall be included as part of the planned methods and procedure. Proper traffic control and advance warning signage shall be in place prior to any road closure.

4. When detours or road closures are implemented an overall map showing anticipated flow of traffic shall be provided.

5. The Contractor shall have a designated person responsible for overall traffic control on-site at all times.

6. A Traffic Control Plan shall be submitted for review. The plan is intended to be a guide; Contractor shall submit any proposed revisions for approval by the Engineer.

7. Pedestrian traffic must be maintained at all times, on at least one side of the road.

8. The Contractor shall supply a Public Announcement showing closures and detours.

E. Water Use

1. All water used by Contractor for testing, compaction, dust control, or other uses related to construction, shall be obtained by the Contractor from an approved water source. The Contractor shall be responsible for all deposits, charges and fees.

   Reclaimed water is available to the Contractor for dust control and other on-site construction uses at no cost to the Contractor (other than testing costs noted below), according to the following limitations (any required water outside these limitations shall be provided by the Contractor from an approved source):

   a. Reclaimed water will be available for use by the Contractor Monday – Friday. It shall be the Contractors's responsibility to apply for and obtain a Type 2 General Water Reuse Permit (Class A+ Reclaimed Water) from ADEQ for dust control and other construction uses. Contractor shall also be responsible for the cost of fecal coliform testing. The cost of testing is $50 for each day that water is taken for construction use.
   b. Water shall be provided from the effluent pump station wetwell at the Wastewater Treatment Plant using contractor-provided submersible pump.
   c. Contractor is responsible to supply conveyance and storage facilities for water made available by the City. Contractor shall record and report to the City on a weekly basis the date and amount of water used.

F. Dust and Debris Control

1. **The contractor shall cover all trucked loads of soil, rock and material that may drop from, be sifted from or blown from the vehicle. The City may require that trucks arriving with uncovered loads not be allowed to deliver material to the project, regardless of whether or not the truck is the contractor's, a subcontractor's, a service provider's, or a material supplier's vehicle. If trucks leave the site with uncovered loads the City reserves the right to do one or more of the following:**

   a. The truck will not be allowed on the site
   b. The contract compensation will be reduced by $150 per observed uncovered load. The contract time will be reduced by one day
   c. The Police Department may issue a citation.

2. Pine slash and/or cut down pine trees shall be removed from the City within 24 hours, including any non-working days, of being broken or cut. This measure is to minimize pine bark beetle infestation in Sedona.

3. The contractor shall take measures to prevent blowing debris and/or dust from the site.

4. Dust Control shall comply with the following:
   a. Dust control shall be maintained at all times on the project. Spray nozzles shall be used as necessary on equipment to reduce dust. Mist shall be visible when standing adjacent to the equipment.
   b. A Dust Control Plan shall be submitted prior to Start of Construction.
   c. Cleanup and Dust Control shall be in compliance with MAG Section 104.1.3 and 104.1.4.

5. The contractor shall clean any dirt tracked from the project work area from streets and sidewalks using equipment and methods that will not create excessive dust. Sweeping is the preferred cleaning method. Washing of streets and/or sidewalk and other paved areas will require special permission from the Engineer and shall be subject to conditions imposed by the Engineer. The City reserves the right to require that the Contractor to cease work that is resulting in excessive tracked mud and/or dirt from and within the project area, and to require cleaning prior to allowing the ceased work to continue. The exercise of the City's right and impacts there from shall not provide a basis for claim by the contractor. Failure of the Contractor to cease work shall be sufficient reason for the City to reduce the contract time by one calendar day per incident, at the City's sole discretion.

6. Dirt, debris, wastewater and other debris shall not be disposed of in stormwater facilities and/or natural drainage channels. The City may require inspection of stormwater facilities and/or natural drainage channels prior to and during the work to verify compliance with this requirement. The City may require the contractor to clean stormwater facilities and/or natural drainage channels if the contractor has disposed of material to them. Final Completion will not be issued until all stormwater facilities have been inspected and approved.

G. Open Trenches

MAG Specification Section 601.2.10 is modified to limit the length of open trench to 1100 feet within the project. An open trench includes any longitudinal excavated area 3 inches or more below adjacent land which has settled or been left lower intentionally. All open trenches shall properly marked and protected so as to warn pedestrians and vehicular traffic of a low area.

19. RIGHT-OF-ENTRY

Contractor shall provide to the City, Architect-Engineer, or representative of the Federal, State, County, District and Municipal governmental officials and services, the proper facilities for access to the Work, whenever it is in preparation or progress.

20. ACCESS AND DRAINAGE

The Contractor shall keep a sufficient clear area around fire hydrants to permit their full and effective use in case of fire. The Contractor shall keep natural drainage and watercourses unobstructed by spoil piles, material storage, or any other operations, or provide for other equal courses effectively placed.

21. SANITARY CONVENIENCES

The Contractor shall furnish the necessary sanitary conveniences, properly secluded, for the use of work persons during construction, and these conveniences shall be maintained in a manner that will be inoffensive and in compliance with Federal, State and local health and sanitation requirements.

22. CLEANUP PRACTICES

A. The Contractor shall at all times during the progress of the work maintain a reasonably clean job site, this includes, but is not limited to, keeping signs clean and legible, minimizing mud, rock, and dirt on roadways, and keeping ditches free of trash and construction materials. If in the opinion of the Engineer, excessive dust, mud or debris exists at the job site, the Contractor shall immediately remove said material as directed. All costs associated with this work shall be borne by the Contractor. The location of debris and material stockpiles shall be as directed by the Engineer.

B. The Contractor shall begin his daily clean-up process at a typical time agreed to by the City at the pre-construction meeting. If the Contractors operations and daily shut-down exceed a forty hour work week or eight hour day then the City will be entitled to withhold a portion of the Contractors progress payment for City "overtime" work pursuant to Section 32 and 39, unless authorized by the Engineer.

C. The site shall be kept clean of trash and debris including but not limited to, loose construction materials, such as sand, cement, lime, wood pieces, building paper, and other miscellaneous paper. All trash and debris shall be placed in an appropriate number of approved containers and moved and disposed of off the site daily in a location where it will not be possible to be dispersed. No burning of trash or debris will be permitted on the site, except where designated by the Engineer. The laydown yard shall have a minimum of one container of appropriate size at all times.

When site daily clean-up has not been kept up as requested in writing by the City the Contractor shall bring the site into compliance with the City within 24 hours or the City shall withhold $350 for each day out of compliance.

D. Before final payment, the Contractor shall remove all rubbish, excess materials, temporary structures, and equipment. All parts of the work shall be left in a neat and presentable condition. Excess mounds of earth shall be leveled and ruts and depressions filled, such that the completed work is attractive. If in the opinion of the Engineer, the Contractor does not maintain the Construction Site in a safe and clean condition, or does not adequately clean up the site at the completion of the work, or rectify any valid complaints of damage to property resulting from the Construction, the City may clean up or rectify damage and charge the costs thereof to the Contractor.

E. The Contractor shall be responsible for locating sites and making arrangements for disposal of all material removed from the site. This includes concrete, asphalt, unsuitable or unstable trench material and any other trash, rubbish or debris generated as a result of construction. Asbestos, hazardous substances or materials, hazardous waste or any other regulated substances or materials shall be disposed of in accordance with all applicable federal, state and local regulations.

F. All vegetation and improvements removed from easements by the Contractor shall be removed or repaired by the Contractor in accordance with the easement agreement with the property owner, the same being done at no additional cost to the City.

23. PLANS AND SPECIFICATIONS

A. The City will provide the Contractor with four (4) sets of plans, drawings, and specifications after the execution of the Contract. If additional plans, drawings, and specifications are required, the Contractor shall compensate the City for it.

B. When, in the opinion of the City, revised partial plans, drawings and specifications are required to clarify or reflect authorized changes or additional work the City shall provide four (4) copies of such revisions to Contractor. The Contractor must pay for any additional copies. Contractor shall immediately post such revisions to his record set of Contract Documents.

C. The plans, drawings, and specifications are the property of the City, and are furnished to the Contractor for the construction of Work under the Contract only.

D. The data given in the specifications and shown on the plans and drawings is believed to be accurate but the accuracy is not guaranteed. The Contractor must confirm all levels, locations, measurements, and verify all dimensions on the job site prior to construction and adapt his Work into the exact limits of construction. Scale measurements taken from plans are only for reference.

E. Drawings showing the details of the Work specified are designated "plans" or "drawings" and together with the specifications form an integral part of the Contract Documents.

24. CORRELATION OF DOCUMENTS

A. Plans, drawings, and specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by the plans or drawings, may not be included in the specifications and portions best described by the specifications may not be depicted on the plans or drawings. All items necessary or incidental to completely construct or erect the Work specified shall be furnished, whether called for in the specifications or shown on the plans or drawings. Unless otherwise stated the plans and specifications shall be considered to require construction or erect of a complete and operable facility.

B. Special Conditions shall take priority over Technical Specifications, which shall take priority over General Conditions; large-scale drawings shall take precedence over small-scale drawings. In case of a disagreement between the plans, drawings, and specifications, or within a document itself, the better quality and the greater quantity of work shall be estimated and included in the bid and contract sums and the matter drawn to the City's attention for further decision, and possible issuance of an addendum.

25. SHOP DRAWINGS, SAMPLES, AND OPERATOR'S INSTRUCTION

A. The Contractor shall furnish all Shop Drawings and Samples required by the Contract Documents. Shop Drawings of equipment and devices offered by the Contractor for approval of the City shall be in sufficient detail to adequately show construction and operation. The above material shall be submitted to the City for review in electronic format (.pdf and/or .dwg). Shop drawings submitted as herein provided by the Contractor and approved by the City for conformance with the design concept shall be executed in conformity with the Contract Documents unless otherwise required by the City.

B. Work performed in connection with the fabrication, manufacture, shipment, or purchase of material or equipment prior to approval as specified shall be at the Contractor's sole risk and responsibility.

C. Shop Drawings and Samples shall be accompanied by a letter of transmittal indicating that the Contractor has reviewed and approved the submittal. The transmittal shall give a list of the numbers and dates of the submittal, and shall be in the form required by the City. Any re-submittals shall show numbers and dates of previous submittals. Shop Drawings shall be complete in every respect and bound in sets.

D. The Contractor shall submit all Shop Drawings and Samples (submittals) sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking to avoid any delay in progress of the Work. In no case however shall this time be less than five (5) working days without the consent of the Engineer. In the case of submittals for pump installations and similarly complex equipment the minimum timeframe shall be twenty (20) working days. This timeframe shall also apply to resubmittals. If more than five (5) submittals are made in a week the minimum City review time shall be extended by five (5) days for each submittal. The Contractor shall be solely responsible for delays and costs related to resubmittals or untimely submittals.

E. Shop Drawings or Samples submitted shall be marked with the name of the Project, numbered, and bear the stamp of approval of the Contractor as evidence that the Shop Drawings and Samples have been checked by the Contractor. Any shop drawings or samples submitted without this stamp of approval shall not be considered and shall be returned to the Contractor for resubmission. If the Shop Drawings or Samples show variation from the requirements of the Contract, the Contractor shall call such variation to the City's attention in his letter of transmittal in order that, if acceptable and City gives written approval to the variation, suitable action may be taken for proper adjustment.

F. By approving and submitting shop drawings and samples, the Contractor thereby represents that he has determined and verified all field dimensions and measurements, field construction criteria, materials, catalog numbers, and similar data, and that he has checked, and coordinated such submittals with the requirements of the Work and the Contract Documents.

G. If a Shop Drawing or Sample, as submitted, indicates a departure from the Contract requirements which the City finds to be in the interest of the City and to be so minor as not to involve a change in the contract price or time for performance, it may approve the Drawings or Samples; provided, however, such departure is slight in nature and does not affect the design concept of the Work.

H. All items of standard equipment shall be the latest model at time of delivery.

I. When Shop Drawings are submitted for the purpose of showing the installation in greater detail, their approval shall not excuse the Contractor from requirements shown on the plans and specifications.

J. Shop Drawing and Sample submittals not conforming completely with the above requirements shall be returned to the Contractor, without action, for re-submittal and the resulting delay shall be entirely the responsibility of the Contractor.

K. The City's check and approval of Shop Drawings and Samples, specifications, and descriptive literature submitted by the Contractor shall be only for general conformance with design concept, as otherwise provided, and shall not be construed as:

1. Permitting any departure from the Contract requirements;
2. Relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise that may exist in such submittals;
3. Constituting a blanket approval of dimensions, quantities, or details of the material or equipment shown; or
4. Approving departures from additional details or instruction previously furnished by the City. Such check or approval shall not relieve the Contractor of the full responsibility of meeting all of the requirements of the Contract Documents.

L. One (1) electronic copy and four (4) sets of bound operator's instructions and maintenance manuals shall be furnished by the Contractor for equipment furnished under the Contract that is specially listed or that is considered to be of a special or complex nature. Operator's instruction and maintenance manuals shall include, in part, detailed lubrication drawings showing type and frequency of lubrication. Detailed parts drawings shall show location, name and catalog numbers of parts.

M. One (1) electronic copy and four (4) sets each of bound service parts manuals shall be furnished by the Contractor for all items of standard manufacture.

N. All operator instructions, maintenance, and parts manuals shall be bound in permanent binders satisfactory to the City and shall be furnished to the City before final acceptance of the installation by the City.

O. Four (4) copies of any manufacturer's guaranty/warranty or certificate for any type of material or equipment provided shall be submitted to the City prior to final acceptance of the Work by the City.

26. DRAWINGS SHOWING CHANGES DURING CONSTRUCTION

Throughout the progress of construction, the Contractor shall maintain a careful up-to-date record of all changes on the plans and drawings during actual construction. *With each progress payment invoice the Contractor shall provide a "Status As-Built" showing all work completed to date.* Callouts will identify type, size and quantity of each item installed. The Contractor shall annotate all sewer taps stationing upstream to downstream using swing ties from adjacent manholes or other method the Engineer may approve in writing. Upon completion of Work, and prior to acceptance by the City, the Contractor shall file with the City one set of complete contract drawings with all changes and Contractor's field construction notes neatly and legibly recorded thereon. Such drawings shall include but not be limited to, the exact routing and clearances, if changed from drawing location, of sewer, water, gas, oxygen supply, condenser water lines, fuel oil tanks and lines, fire protection lines, and any other major buried utility lines and routing of buried electrical feeder lines and changes to routing of conduit runs which are buried or concealed in concrete slabs. The Contractor shall furnish such As-Built utility and drainage invert and rim elevations as well as gutter, top of curb shots and horizontal location of valves and hydrants placed as a part of this construction. This information is for use by the City in the preparation of record "As-Built" Drawings. Curb and gutter shots shall be spaced no

further than 50 feet apart and shall include any significant bends, drops or other deviations from a straight horizontal or vertical alignment.

27. MATERIALS, EQUIPMENT, SUPPLIES, SERVICES, AND FACILITIES

A. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, equipment rental, water, heat, light, fuel, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the Work in a workman like manner within specified time.

B. No materials, equipment, or supplies for the Work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

C. Equipment shall be properly equipped with safety devices including but not limited to spark arrestors, back up alarms, reflectors, signage, labeling, and lights.

D. At least one (1) set of all appropriate Material Safety Data Sheets shall be maintained in a common location on the project site at an identified location during all working hours.

28. WORKMANSHIP, MATERIALS, AND EQUIPMENT

A. All material and equipment furnished by the Contractor shall be new and unused and shall strictly conform to the Contract Documents. Competent labor, mechanics and tradesmen shall be used on the Work. Experienced manufacturer's representatives shall be used to supervise the installation of equipment as may be required by the City. Any special tools or equipment, which may be required, shall be provided by the Contractor.

B. The acceptance at any time of materials or equipment by or on behalf of the City shall not be a bar to future rejection if they are subsequently found to be defective, inferior in quality or uniformity to the material or equipment specified, or are not as represented to the City.

29. QUALITY OF MATERIALS IN ABSENCE OF DETAILED SPECIFICATIONS

A. Where the Contract requires that materials or equipment be provided or that construction work be performed, and detailed specifications of such materials, equipment or construction work are not set forth, the Contractor shall perform the work using materials and equipment as described in the specifications. Constructed or installed as described therein, and shall follow standard practices in the performance of construction work. The work performed shall be in conformity and harmony with the intent to secure a good, serviceable standard of construction.

B. All tests and re-tests unless otherwise provided, shall be in accordance with the pertinent sections of the latest edition of the standards applicable to the material or devices to be tested. A partial list of the principal societies referred to and their Abbreviations follows:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction

ANSI	American National Standards Institute
ASTM	American Society of Testing Materials
AWWA	American Water Work Association
CPI	Clay Pipe Institute
CS	Commercial Standards
FS	Federal Specifications
NEC	National Electric Code
TMCA	Tile and Marble Contractors of America

30. VARIATIONS FROM ESTIMATED QUANTITIES

When unit prices are utilized in the Contract Documents, it may be reasonably expected that there could be variations in final quantities from the estimated quantities by reason of actual conditions and/or change orders. An adjustment in compensation may be allowed only to the following extent:

A. For a decrease greater than twenty percent (20%) in either the total cost of the contract or the total cost of a major item and when a reasonable cost analysis supports an increase in the pro rata share of fixed cost chargeable to this item in total, an adjustment in the monies due the Contractor may be made. The total amount, including any adjustment, will not exceed eighty percent (80%) of the original lump sum contract amount or, for a unit price item, the total amount, including adjustment, will not exceed eighty percent (80%) of the original extended unit bid price.

B. For an increase greater than twenty percent (20%) in either the total cost of the contract or the total cost of a major item, any adjustment made will only apply to that cost in excess of one hundred twenty percent (120%) of the original bidding schedule. If either party presents a reasonable cost analysis that shows a change in the pro rata share of fixed costs chargeable to this item in total, an increase or decrease adjustment may be made. This increase or decrease adjustment will be made on such basis as is necessary to cover a reasonable estimate of cost, plus an allowance, not to exceed ten percent (10%), for overhead and profit.

C. A major item is an item whose total cost, determined by multiplying the bidding schedule quantity and the contract unit price, is equal to or greater than the amount indicated below. A major item will remain a major item unless it is completely eliminated. Compensation for a completely eliminated major item shall be limited to the amounts indicated, but not to exceed the amount demonstrated by information provided to show the cost impact of the deletion, not including anticipated profit.

Total Contract amount as awarded equal to or greater than (in dollars)	But is less than (in dollars)	A major bid item Shall be equal to or greater than the following amount (in dollars)	If the item is completely eliminated compensation shall be limited to no more than (in dollars)
$0.00	$1,000,000	$50,000 or 10% of the Contract amount as awarded	$2,000

$1,000,000	$5,000,000	5% of the Contract amount as awarded	$5,000
$5,000,000	$20,000,000	2.5% of the Contract amount as awarded	$7,500

D. For either an increase or decrease in cost, no claim shall be made by the Contractor for any loss of anticipated profits.

31. PROGRESS PAYMENTS

A. When monthly progress payments are authorized, the Contractor shall, on the date determined during the pre-construction meeting, submit to the City an itemized application for payment, supported by "Status As-Builts" and such data substantiating the Contractor's right to payment as the City may require, on forms acceptable to the City. Progress payments shall be made no more than once each calendar month and provided that there are a minimum fifteen (15) calendar days between payments, unless otherwise authorized on a payment-by-payment basis by the City Engineer or City Manager. Progress payments are subject to retainage of ten percent (10%) with possible reduction to five percent (5%) in accordance with the provisions of Arizona Revised Statues.

B. The Contractor shall provide to the City at the time of payment, a waiver and release to date from the Contractor and each and every Subcontractor and material supplier whose work or materials are included in the application for payment, evidencing that said Contractor, Subcontractor or material supplier has been paid in full to date.

C. Unless otherwise provided in the Special Provisions, payment will not be made on account of materials or equipment not incorporated in the work, at the time of a request for payment, but delivered and stored at the site. Similarly, payment will not be made for materials or equipment stored at some other location unless agreed upon in writing. If payment is allowed per the Special Conditions, payment for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the City to establish the City's title to such Materials or equipment or otherwise to protect the City's interest, including applicable insurance and transportation to the site for those materials and equipment stored off-site.

D. The Contractor warrants that title to all materials, supplies, and equipment covered by an application for payment, whether incorporated into the Work or not, shall pass to the City, upon receipt of payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances; and that such materials, supplies or equipment furnished or installed comply with the applicable requirements of the Contract Documents.

E. The passing of title to the City as herein provided shall not be construed as relieving the Contractor of the sole and complete responsibility for:

1. The care and protection of the materials, supplies, equipment, and Work for which payment has been made.

2. The restoration of any damaged or destroyed Work, materials, supplies or equipment. Such responsibility shall continue until all Work under the Contract has been completed and accepted by the City.

F. Under no circumstances shall payment constitute a waiver of the City's right to require the Contractor to fulfill all of the terms and conditions of this Contract.

G. INVOICE PROCESSING: The City will not accept inaccurate, illegible, or incomplete invoices (requests for payments). Invoices shall be hard copy, with original signature. Electronic or facsimile signatures are not acceptable on the invoice.

1. The City distributes payments on every other Friday, beginning on 01/05/17 for calendar year 2017, unless holidays dictate otherwise.
2. The Engineer must receive an acceptable, correct invoice with required supporting documentation not later than close of business on the Wednesday, nine (9) calendar days prior to the expected check distribution day.
3. For projects longer than sixty (60) calendar days duration, each request for payment shall be accompanied by a progress schedule, effective through the invoice period. The City shall not release a payment until the contractor provides an acceptable, accurate, and updated project schedule.

32. PAYMENT WITHHELD

A. The City may decline to certify payment on account of subsequently discovered evidence or observations, may nullify the whole or any part of any payment certificate previously issued to such extent as may be necessary to protect the City from loss on account of any one or more of the following:

1. Defective Work not remedied.
2. A reasonable doubt that the Contract can be completed for the balance then unpaid.
3. Unsatisfactory prosecution of the Work.
4. Not maintaining a current project schedule.
5. Not providing adequate progress payment “Status As-Builts”.
6. Deductions for not conforming to daily clean-up requirements.
7. Deductions for reimbursement of City overtime inspection.
8. Liquidated damages payable by the Contractor.
9. Disputed Work or Materials.
10. Failure to comply with other material provisions of the Contract.
11. Third-party claims filed or reasonable evidence that a claim will be filed.
12. Failure of the Contractor or Subcontractor to make timely payments for labor, equipment, and materials.
13. Damage to the Owner.

In addition, the City reserves its rights under ARS Sections 32-1129.01 and 34-221I.

B. When any of the above problems are resolved, payment shall be made for amounts withheld pursuant to Article 31.

33. MEASUREMENTS

A. The itemized Application for Payment will be used by the Engineer as a basis for evaluating requests for payment, except in cases where unit prices have established the basis for payment shall include as a minimum the following items:

1. Separate cost itemizations for mechanical, piping, structural, electrical instrumentation, painting, pre-engineered structures, and architectural finish work.
2. Separate cost line items, showing both purchase and installed cost, for the major equipment items listed in the bidding schedule.
3. A separate line item for mobilization not to exceed ten percent (10%) of the total Contract amount. This limitation shall apply even when a bid item for mobilization is shown in the bid schedule, unless the Engineer has assigned a fixed cost for the item. Amounts excess of this limitation shall be included on the final payment.
4. A separate line item for demobilization, not to exceed one-half of one percent (0.5%) of the total Contract amount. This limitation shall apply even when a bid item for demobilization is shown in the bid schedule, unless the Engineer has assigned a fixed cost for the item. Amount in excess of this limitation shall be included on the final payment.
5. Separate line items for earthwork, demolition and clearing and grubbing, where appropriate. Measurement and payment for the various items shown by the Contract Drawings and described in the construction Specifications, and comprising the completed work, shall be subject to this Article.

B. The contractor may subdivide any of the lump sum bid items in the proposal as necessary to identify items per (A) above, however the neither the total bid or the total of any subdivided bid item line shall exceed the total in the bid proposal as awarded.

C. Payment for each item shall constitute payment in full for the furnishing of all materials, equipment, appurtenances, labor, plant and tools necessary to provide a complete workmanlike, finished, and satisfactory project, as shown by the Contract Drawings and described in the Specifications. Each item shall be completed with all necessary connections, testing, painting and related work accomplished to provide for the satisfactory use and/or operation of the item. No additional payment will be made for work related to each item, unless specifically noted or specified.

D. No additional payments will be made for work related to any item unless specifically noted and called for in the Bid Proposal. Payment will be made at the unit price or lump sum price bid in the Bid Proposal.

E. Measurement will be on the completed work in place, with no allowance for waste, and as may be more particularly described in the description of the various items set forth in the Specifications and as shown by the Contract Drawings.

F. The quantities set forth in the Bid Proposal are used for the purpose of determining the basis of the Award of the Contract, and may be varied by the Engineer to conform to the requirements of the work as set forth in the Contract Drawings, and the Contractor agrees to perform the work on the basis of the prices bid for the items contained in the Bid Proposal regardless of whether or not the items or units are decreased or increased.

G. The Engineer shall have the right to order omitted from the Contract any item or a portion of the estimated quantity for any item found unnecessary to the work without violating the Contract or Performance Bond.

H. Except in cases where unit prices form the basis for payment under the Contract, the Contractor shall, within twenty (20) days of receipt of the notice to proceed, submit a breakdown of the Contract price showing the value assigned to each part of the work including an allowance for profit and overhead. In submitting the breakdown, the Contractor certifies that it is not unbalanced and that the value assigned to each part of the work represents his estimate of the actual cost, including profit and overhead, of performing that part of the work. The breakdown shall be sufficiently detailed to permit its use by the Engineer as one of the bases for evaluating requests for payment.

H. Mobilization and Demobilization: Payment for Mobilization shall include the cost for setting up Project offices and moving Equipment to the site, storage facilities, obtaining permits, and all other items required to prepare the Project site for commencement of construction activities. Demobilization shall include removal of Contractor's facilities and Equipment, and final cleanup, and all other items required to complete Demobilization.

Payment for mobilization shall be in accordance with Section 901 of ADOT Standard Specifications for Road and Bridge Construction (most current edition), except as modified by this section and General Conditions Section 18, 33, and 66. Retention shall apply to mobilization payments. The first payment for mobilization shall be contingent on providing:

1. A traffic control plan that has been approved by the Engineer
2. The Storm Water Pollution Control Plan provisions are in place per the SWPPP in the Civil Plans
3. The Contractor shall have a City of Sedona or ADEQ NOI for stormwater pollution prevention
4. The Project Sign has been posted
5. A complete project schedule as required by the General Conditions, Section 9.

I. Excavation-Generally: The excavation rates shall include the amount for working in such a manner as not to interfere with the stability of adjacent structures and properties, for the costs of all timbering or other support required, for all necessary measures to keep the excavation free from water and sewage whether affected by floods, storms or otherwise, for working space, refilling, consolidating and disposal of surplus material from temporary spoil heaps or disposal as directed by the Engineer. The rate shall apply to the excavation in any material, including rock.

No extra payment will be made if the position of the work as set out will not allow the use of a mechanical plant or necessitates the cartage to temporary spoil heaps of excavated material and the reloading and cartage back for refilling of excavations or disposal.

34. PAYMENT, USE OR OCCUPANCY OF WORK

A. No progress or final payment, nor any partial or entire use or occupancy of the Work or improvement, nor acceptance thereof, by the City shall be evidence of the performance of the Contract or construed to be acceptance of defective work or improper materials, either

wholly or in part. The Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute.

B. The City shall have the right to take possession of, use, or occupy any completed or partially completed portions of the Work, notwithstanding the time for completing the entire Work or any portions, may, or may not, have expired. Such taking possession, use or occupancy shall not be deemed an acceptance of any Work until all Work has been completed in accordance with the Contract Documents. If such prior use or occupancy increase the cost, or delays the Work, the Contractor shall be granted such extra compensation or extension of time, or both, as City may determine.

C. Consent of Surety and endorsement from the insurance carrier or carriers permitting prior occupancy or use of any completed or partially completed portions of the Work by the City shall be secured by the Contractor. Contractor and his Surety and enforcement from the insurance carrier or carriers permitting prior occupancy or use of any completed or partial completed portions of the Work by the City shall be secured by the Contractor. Contractor and his Surety and insurance carrier hereby agree that such consent shall not be unduly withheld.

35. CLOSEOUT PROCEDURE

When the Contractor considers that the Work, or a portion thereof which the City has allowed to be accepted separately, is substantially complete, the Contractor shall prepare a letter stating the work, or a portion of the work, is substantially complete and submit to the City a comprehensive list of items to be completed or corrected. Substantial completion shall not operate to change the contract time to which liquidated damages are applicable. Reduced liquidated damages are chargeable for a project or portions thereof which have separately specified damages, if there are items of work remaining to be performed relative to such work once full substantial completion status has been attained. In such cases the amount of liquidated damages due shall be twenty-five percent (25%) of the unreduced liquidated damage amount stated in the contract, and shall not begin until after the contract completion date.

The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the City will make an inspection to determine whether the Work or designated portion thereof is substantially complete. The City Engineer shall have the sole right to determine if a Work or portion thereof is substantially complete. If the City's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the City. The Contractor shall then submit a request for another inspection by the City to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the City will prepare a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Contractor and City for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix a reasonable time within which the Contractor shall finish all items on the list accompanying the Certificate. If the Contractor does not complete the items within the time fixed by the City, the City, upon ten (10) working days notice, shall have the option to complete the uncompleted Work for the Contractor and deduct the cost from any amount due to the Contractor, whether or not the contract completion date has passed.

The Contractor may request a written statement from the City Engineer of what constitutes substantial completion by writing a letter of "Notice Of Intent to Declare Substantial Completion." The letter shall be sent no later than fifteen (15) working days prior to the anticipated date of Substantial Completion. The letter shall state what items the Contractor intends to complete prior to declaring substantial completion and what date substantial completion is anticipated by. The City Engineer shall respond to the letter within ten (10) working days accepting or adding to the list of items to complete prior to substantial completion. The City Engineer's response to the list shall not prevent the City Engineer from amending the list within a reasonable time prior to the anticipated date of substantial completion, or from considering factors not known at the time the response was prepared.

36. FINAL PAYMENT

A. Prior to receiving final payment, the work shall be completed according to the Contract Documents, as determined by the City. Retention shall be as provided in A.R.S. §34-221. This includes, but is not limited to, submittal of complete as constructed documents.

B. The acceptance of final payment by the Contractor shall operate as a release to the City of all claims by the Contractor for all things done or furnished in connection with the Contract and for every act and neglect of the City, and others relating to or arising out of the Work under the Contract, except for claims made in writing and still unsettled, and specifically itemized at the time the final payment request is made.

C. No payment, final or otherwise, shall operate to release the Contractor or his Surety from any obligations under the Contract or under the Performance Bond or Labor and Materials Payment Bond, including, but not necessarily limited to anyone or more of the following:

1. Obligations arising from or relating to latent defects.
2. Faulty or defective work or material, which does not comply with the requirements of the Contract.
3. Failure of the construction, equipment, or fixtures to perform properly in accordance with the requirements of the Contract Documents.
4. Unsettled claims.
5. Claims for non-payment of laborers, mechanics, material men, or suppliers, or for equipment used or rented.
6. Claims under the maintenance requirements of the Contract Documents or any special warranties provided for in the Contract Documents.

37. SUPERVISION BY CONTRACTOR

A. The Contractor or his designated representative will be required to give personal attention to the fulfillment of this Contract and to keep the work under control and in accordance with the Schedule for Completion. The contractor shall provide a competent Representative with full authority to receive and execute such instructions, orders or directions as the Engineer, or his agents or representatives may issue in connection with the Contract.

The Contractor will supervise and direct the work at all times. He has the obligation to determine the means, methods, techniques, sequences and procedures of construction, except in those instances where the City, to define the quality of an item of work, specifies in the

Contract a means, method, technique, sequence or procedure for construction of that item of work. The Contractor shall be responsible to perform the Work so that the quality of the Work conforms to the plans and the specifications while in progress and as finally completed.

B. Instructions and information given by the City, Engineer, or his agents or representatives to the Contractor's representative on the work shall be considered as having been given to the Contractor. Before any work is done at the job site, the Contractor shall give written notice to the Engineer stating the name, home address and telephone number of the Contractor's representative. The Contractor shall also inform the Engineer in writing prior to any change of representative. A statement naming more than one person to be in charge depending upon which one is present at the time will not be acceptable.

C. The Contractor shall file with the Engineer the names, addresses, and telephone numbers of representatives who can be contacted at any time in case of emergency. These representatives must be fully authorized and equipped to correct unsafe or excessively inconvenient conditions immediately on order of the Engineer.

D. The Contractor shall pay and cause his Subcontractors to pay any and all accounts for labor, services, equipment, and materials used by the Contractor and his Subcontractors during the performance of work under this Contract, including all applicable taxes and insurance. Such accounts shall be paid as they become due and payable within the time limits set forth by law. The Contractor shall furnish proof of payment of such accounts to the City.

E. The plan or method of work suggested by the City or the Engineer to the Contractor but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor. The City and the Engineer assume no responsibility therefore and in no way will be held liable for any defects in the work which may result from or be caused by the use of such plan or method of work.

38. WEATHER

A. During periods when weather or other conditions are unfavorable for construction, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work where acceptable quality or efficiency will be affected by unfavorable conditions shall be constructed while those conditions exist. It is expressly understood and agreed by and between the Contractor and the City that the Contract time for completion of the work described herein is a reasonable time taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

B. The Contractor shall not be assessed liquidated damages, nor the cost of engineering and inspection during any delay in the completion of work caused by Acts of God, acts of the public enemy, acts of a public agency or owner, or a utility to provide for removal or relocation of existing utilities, unless such delay is caused in whole or in part by Contractor or any of its Subcontractors.

C. A rain, windstorm, high water or other natural phenomena for the specific locality of the work, which might reasonably have been anticipated from historical records of the general

locality of the work, shall not be construed as abnormal. It is hereby agreed that rainfall greater than the following cannot be reasonably anticipated:

1. Daily rainfall equal to, or greater than, one inch during a month when the monthly rainfall exceeds the normal monthly average by fifteen percent or more.
2. Daily rainfall equal to, or greater than one and one-half (1-1/2) inch at any time.

Rainfall data shall be collected at the job site by the Contractor.

39. OVERTIME

Any Work necessary to be performed after regular working hours, on Sundays, or legal holidays, shall be performed without additional expense to the City unless otherwise provided in the Contract Documents.

The Contractor is responsible for completing his work activities within regular working hours. Should the Contractor elect to run his crews more than a typical 10-hour day, he may elect to with prior coordination with the City. Any inspection, which is required beyond the City of Sedona's Standard 10-hour work day due to extended work hours or late daily cleanup, is subject to a withholding by the City from the Contractors progress payment for the cost of the overtime inspection during that period. The amount withheld shall be itemized by person and reflect any overtime premiums paid.

40. INDEMNIFICATION

A. To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the City, its agents, officers, officials and employees from and against all tortuous claims, damages, losses and expenses (including but not limited to attorney fees, court costs, and the cost of appellate proceedings), relating to, arising out of, or alleged to have resulted from the acts, errors, mistakes, omissions, work, and/or services of the Contractor, its agents, employees or any tier of Contractor's subcontractors in the performance of this Contract. Contractor's duty to defend, hold harmless and indemnify the City, its agents, officers, officials and employees shall arise in connection with any tortuous claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use resulting there from, caused by Contractor's acts, errors, mistakes, omissions, work or services in the performance of this Contract including any employee of the Contractor, any tier of Contractor's subcontractor or any other person for whose acts, errors, mistakes, omissions, work or services the Contractor may be legally liable. The Contractor shall, with respect to all work which is covered by or incidental to this Contract, indemnify and hold the City, Engineering Dept., all officers, employees, attorneys, agents of the City and the City Engineer, harmless from and against all of the following made by any person or entity not a party to this Agreement:

1. Any claim, liability, loss, damage, costs, expenses, including reasonable attorneys' fees, expert witness fees, court costs and other expenses of litigation, awards, fines, or judgments, arising by reason of the death or bodily injury to persons, injury to property, design defects (if design originated by Contractor only) or other loss, damage or expense, including any of the same resulting from any alleged or actual negligent or intentional acts or omissions of the Contractor, the Subcontractors, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless

of whether it is caused in part by a party indemnified by this Contract and regardless of whether said acts or omissions of such party are active or passive.

2. Any claim, liability, loss, damage, costs, expenses, including reasonable attorneys' fees, expert witness fees, court costs and other expenses of litigation, awards, fines, or judgments, arising out of any dispute regarding the Contract or any work performed under the Contract.

3. Any claim, liability, loss, damage, costs, expenses, including reasonable attorneys' fees, expert witness fees, court costs and other expenses of litigation, awards, fines, or judgments, arising out of any dispute regarding the Contract or any work performed under the Contract by any Subcontractor.

4. Any loss or damage that may happen to the work or any part thereof, and any loss or damage to any of the materials or other property used or employed in performing the work, including any loss or damage during transit or storage of any property or materials, including any property or materials furnished by the City, including reasonable attorneys' fees, awards, fines, or judgments.

B. However, the Contractor shall not be obligated under this Contract to indemnify the City with respect to the sole negligence or willful misconduct of the City or its agents or employees or Design Engineer.

C. The indemnity obligations of this Contract shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which otherwise exists by statute or under the common law of the State of Arizona, except those in conflict with the express terms of these General Conditions. The law of comparative negligence, as adopted by the State of Arizona, shall be binding upon the relationship between the parties, except as set forth herein.

D. The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

41. ACCIDENT PREVENTION - EMERGENCY - AUTHORITY TO ACT

After the Contract Notice to Proceed has been issued through final acceptance of the Contractor's work, it shall be the Contractors responsibility for protection and safety of the public and workers twenty-four (24) hours a day, seven (7) days a week. This responsibility will also be placed on the Contractor after final acceptance when the Contractor is on site performing any Guaranty/Warranty work.

Whenever, in the opinion of the Engineer, the Contractor has not taken sufficient precaution for the safety of the public or the protection of the work to be constructed under this Contract, or of adjacent structures or properly, and whenever, in the opinion of the Engineer, an emergency has arisen and immediate action is considered necessary, then the City, with or without notice may provide suitable protection by causing work to be done and materials to be furnished and placed. The cost of such work and materials shall be borne by the Contractor, and if the same is not paid on presentation of the bills, such costs will be deducted from any amounts due or to become due to the Contractor. The performance of such emergency work shall not relieve the Contractor of responsibility for any damage that may occur.

42. PROTECTION OF WORK

The Contractor, at no additional expense to City, shall at all times safely guard and protect his own Work; provide, erect, and maintain suitable barriers around all improvements, work areas, excavations, or obstructions to prevent accidents; and provide, place, and maintain during the night sufficient lights, signals, and signs for this purpose on or near the Work. The Contractor shall at all times, until its completion and final acceptance, protect his Work apparatus, equipment, and material from accidental or any other damage; and make good any damages thus occurring at no additional cost to the City.

43. PROTECTION OF PROPERTY

A. The Contractor, at no additional expense to the City, shall at all times (1) safely guard the City's property and abutting or adjacent property from injury, loss, or damage in connection with the Contract; (2) protect by false work, braces, shoring, or other effective means all buildings, foundations, walls, fences, property pins and other property along his line of Work, or affected directly by his Work, including, but not limited to the City's property, against damage; (3) cover or otherwise protect stockpiles of materials to avoid damage to any property from such materials; and/or (4) repair, replace, or make good any such damage, loss or injury, unless such is caused directly by the City or his duly authorized representatives.

B. The Contractor shall exercise care to protect from injury all water lines, sanitary sewer lines, gas mains, telephone cables, electric cables, services pipes, and other utilities or fixtures which may be encountered during the progress of the Work. All utilities and other service facilities or fixtures if damaged, shall be repaired by the Contractor without additional compensation.

C. The Contractor shall personally check and verify utility information on the plans. Where existing utilities or structures are shown on the plans or drawings, they are believed to be accurate but are not guaranteed to be such or that these are the only utilities or structures in the construction area. Protection is completely the responsibility of the Contractor and he must satisfy himself as to the existence and location of all utilities and structures.

D. The Contractor shall give written notice of at least forty-eight (48) hours before breaking ground, to all persons, superintendents, inspectors, or those otherwise in charge of property, streets, water, gas, or sewer pipes, telephone or electrical cables, railroads, or otherwise who may be affected by the Contractor's operation in order that they may remove any obstruction for which they are responsible and have a representative on the site to see that their property is properly protected.

44. PROTECTION OF PERSONS

A. The Contractor shall:

1. At all times protect the lives and health of his employees under the Contract.
2. Take all necessary precautions for the safety of all persons on or in the vicinity of the Work site.
3. Comply with all applicable provisions of Federal, State, and Municipal safety laws and building codes.

4. Comply with all pertinent provisions of the "Manual of Accident Prevention on Construction" issued by the Associated General Contractors of America, Inc., latest edition, to prevent accidents or injury to persons, on, or adjacent to the premises where the Work is being performed. The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of persons and shall post danger signs warning against the hazards created by such features of construction as protruding nails, rod hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, and falling materials; and he shall designate a responsible member of his organization on the Work site whose duty shall be the prevention of accidents.

B. The Contractor shall comply with all provisions of the "Occupational Safety and Health Act" (OSHA), including any amendments thereto and rules and regulations issued pursuant thereto, applicable to the Work and performance of the Contract. Whereas state in which Work is performed has passed legislation bearing on Occupational Safety and Health, such legislation and amendments thereto, together with rules and regulations issued pursuant thereto shall be complied with by the Contractor.

45. POTENTIALLY DANGEROUS WORK

A. When the use of explosives, driving, or removal of piles, wrecking, excavation Work or other similarly potentially dangerous Work is necessary for the prosecution of the Work, the Contractor shall exercise the utmost care so as not to endanger life or property. The Contractor shall be fully responsible for any and all damages, claims, and for the defense of any actions against the City resulting from the prosecution of such Work in connection with or arising out of the Contract.

B. The Contractor shall notify each private and public utility company or other owner of property having structures or improvements in proximity to the site of the Work, of his intent to perform potentially dangerous Work. Such notice shall be given sufficiently in advance to enable the companies or the owners of property to take such steps as they may deem necessary to relieve the Contractor of responsibility for all damages, claims, or the defense of any actions against the City resulting from the performance of such Work in connection with or arising out of the Contract.

C. All explosives shall be stored in a secure manner and all storage places shall be marked clearly "EXPLOSIVES-KEEP OUT", and shall be in the care of competent watchmen at all times. Blasting Permits must be obtained from the Sedona-Oak Creek Fire District, 2860 Southwest Drive, Sedona, AZ 86336 (602) 282-6800.

D. If blasting is required, building inspection reports must be conducted for properties within 150-feet of the proposed blasting area. For affected structures that are to remain after the construction, the report shall consider and document the existing structural and architectural condition of those structures. The intent of this report is to document the condition of such structures before construction, obtain agreement with the property owner, and use for comparison purposes after construction is completed, to ensure the structure was not damaged from construction activities. Blasting will only be considered if rock excavating equipment equal to or better than that provided by “drum-cutters” (see www.drumcutters.com), would not be effective for excavation.

46. PATENTS, COPYRIGHTS, AND ROYALTIES

A. The Contractor shall assume all costs arising from the use of any patented article, material, device, equipment or process used or furnished by him in connection with, or incorporated in the Project. The Contractor shall save, and hold harmless the City and all officers and agents thereof from all damages, costs and expenses in law or equity (including attorneys' fees, expert witness fees, court costs, and other expenses of litigation) that may come at any time, arise or be set up by reason of any infringement or alleged infringement of any patent rights as a consequence of the installation or use of any such article, material, device, equipment or process in or about the Project. The Performance Bond required by Arizona Revised Statutes Section 34-221 shall be deemed to apply expressly to this provision of the Contract.

B. Should the Contractor, his agent, employer or any of them be enjoined from furnishing or using any invention, article, material or plans supplied or required to be supplied or used under this Contract, the Contractor shall promptly pay such royalties and secure the requisite licenses; or, subject to acceptance by the City, substitute other articles, materials or appliances in lieu thereof which are of equal efficiency, quality, finish, suitability and market value to those planned or required under the Contract. Descriptive information of these substitutions shall be submitted to the Engineer for determination of general conformance to the Design concept and the Construction Contract. Should the City elect to refuse a substitution, the Contractor agrees to pay such royalties and secure such valid licenses as may be requisite for the City, his representatives, agents and employees or any of them, to use such invention, article, material or appliance without being disturbed or in any way interfered with by any proceeding in law or in equity on account thereof.

47. CHANGE ORDERS FOR CHANGED OR EXTRA WORK

A. The City reserves the right at any time during the progress of the Work to make necessary alterations of, deviations from, additions to, or deletions from the Contract, or may require the performance of extra Work neither covered by the specifications nor included in the Proposal, but forming a part of the Work contracted for; provided however, the Contractor shall not proceed with any such change or extra Work without a written Change Order approved by the City. Until a resolution is reached by the City and the Contractor, the Contractor is to continue work on the project. Additional time may or may not be added to the projected (and approved) contract end date. Such changes or extra Work shall in no way injuriously affect or invalidate the Contract or the Contractor's bond, but the difference in cost shall be added to or deducted from the amount of the Contract, as the case may be. Adjustments, if any, in the amounts to be paid to the Contractor by reason of any such change or extra work shall be determined by one of the following methods in the order as listed:

1. Method A Unit prices contained in the Contract Documents for the same type or class of work.
2. Method B By an acceptable unit price proposal from the Contractor.
3. Method C By an acceptable lump sum price proposal from the Contractor.
4. Method D If neither Method “B" or “C" can be agreed upon before the change or extra work is started, then the Contractor shall be paid the "actual field cost" of the work plus eighteen percent (18%) or twelve percent (12%) as stated herein below.

B. Whenever any change or extra work is to be done, for which unit prices for the same type or class of work are contained in the Contract Documents, such work shall be done and shall be measured and paid for pursuant to Method A herein above set forth and the other applicable portions of the Contract Documents, subject to Article 30 of the General Conditions. Full compensation for taxes, overhead and other costs shall be considered as included in the unit prices bid.

C. Methods B and C shall include an itemized cost breakdown including overhead and profit. In determining the amount payable to the Contractor, an additional five percent (5%) may be added to the amount payable to a Subcontractor, but no "pyramiding" or additional percentage shall be authorized for any work done by a Subcontractor. This percentage may be increased to seven percent (7%) if the Contractor provides proof that it is paying transaction taxes for the subcontractor. The subcontractor percentage shall be considered as compensation for taxes paid on the subcontracted work, and any other costs or profit associated the subcontracted work. The taxes shall not be separately shown as a cost in the amount to which the seven percent (7%) is applied. Full compensation for taxes, overhead and other costs shall be considered as included in the unit price or lump sum price accepted whether such items are explicitly itemized or not.

D. When any change or extra work is performed under "Method D", the term "actual field cost" of such change or extra work is hereby defined to be and shall include:

1. The actual wages paid to all the Contractor’s workmen such as foremen, equipment operators, mechanics, and laborers, for the time actually performing the change or extra work. Superintendents are considered as compensated for in the overhead.
2. All of the Contractor’s materials and supplies incorporated in the change or extra work, unless the total cost for a particular material or supply is less than twenty dollars ($20). Materials and supplies with a total cost of less than twenty dollars ($20) will be considered as compensated for in the overhead and profit allowance.
3. All machinery and equipment for the time actually employed or used in the performance of the changed or extra work shall be based on the submitted and approved schedule of equipment rates, unless the hourly cost for the machinery or equipment is less than twenty-five dollars ($25.00) per hour or one hundred fifty dollars ($150) per day. Items with rates less than twenty-five dollars ($25.00) per hour or one hundred fifty ($150) per day will be considered as compensated for in the overhead and profit allowance. The contractor shall submit machinery and equipment rates for approval prior to Start of Construction.
4. Any transportation charges necessarily incurred in connection with any equipment authorized by the City for use on said change or extra work, but which is not already on site provided the transportation cost exceeds twenty-five dollars ($25.00).
5. All power, fuel, lubricants, water, and similar operating expenses as well as other expendable materials.
6. Incidental expenses incurred as a direct result of such change or extra work, including payroll taxes and a pro rata portion of premium in the Performance Bond and Labor and Materials Payment Bond, and where the premiums therefore are based on payroll costs, on Public Liability and Property Damage insurance, Workmen's Compensation insurance, and Occupational Disease Disability insurance, Builder’s Risk, and other insurance required by the Contract. **In order to be allowed these amounts shall be provided in writing when submitting the first request for a progress payment. These amounts**

payable by the City shall not change for the duration of the contract. The twelve percent (12%) mark-up shall not apply to these items.

7. No repairs, replacements, or other forms of overhead expense shall be included in "actual field costs".
8. The Engineer may adjust the amount due under this method based upon a reasonable estimate of the actual cost of performing deleted work in the case of a change in work method or work material. In this case the amount due shall be the difference between the estimated cost to perform work per the original method based on conditions known at the time of the change to the extent such conditions are not the basis for a change, and the method proposed to be used plus the unit bid price for the original method.

E. The Engineer may direct the form in which the accounts of the actual field costs shall be kept and may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment, if required, which shall be used in the performance of any change or extra work under method "D". In the event that machinery and heavy construction equipment are required for such change or extra work, the authorization and basis of payment for the use thereof shall be stipulated in the written Change Order.

F. The twelve percent (12%) or eighteen percent (18%) of the "actual field cost" to be paid to the Contractor shall cover and be full compensation for the Contractor's profits, overhead, superintendence, and field and home office expense, and all other elements of cost not embraced within the "actual field cost" as defined herein. Eighteen percent (18%) shall be payable for Contractor costs for that portion of total change orders less than or equal to thirty thousand dollars ($30,000). For that portion exceeding thirty thousand dollars ($30,000) the twelve percent (12%) factor shall be applied to Contractor costs. In determining the amount payable to the Contractor, an additional percentage per C above may be added to the amount payable to a Subcontractor, but no "Pyramiding" or additional percentage shall be authorized for any work done by Subcontractors.

G. No claim for any change or extra work of any kind shall be allowed unless the work is ordered and approved in writing by the City in the form of a Change Order.

H. No anticipated profits shall be allowed for work deleted.

I. If the City has work accomplished by other sources due the Contractor’s failure to perform required work it may deduct an additional five hundred dollars ($500) or five percent (5%) of the cost of accomplishing the work, whichever is greater, in addition to the cost of accomplishing the work using other sources. The City shall consider this additional amount as compensation for overhead and administration.

J. The Contractor shall furnish satisfactory bills, payrolls, and vouchers covering all items of cost and when requested by the City, give the City access to accounts relating thereto.

K. Any Change or extra work shall be considered a part of the Contract, subject to all of its terms, conditions, stipulations, review, guaranties, and tests may be performed without notice to the surety on the Contractor's bond. The Contractor and surety hereby agree to these provisions.

L. The following language shall apply to all change orders:

"THIS CHANGE ORDER CONSTITUTES FULL, FINAL, AND COMPLETE COMPENSATION TO THE CONTRACTOR FOR ALL COSTS, EXPENSES, OVERHEAD, PROFIT, AND ANY DAMAGES OF EVERY KIND THAT THE CONTRACTOR MAY INCUR IN CONNECTION WITH THE WORK DESCRIBED IN THIS CHANGE ORDER, INCLUDING ANY IMPACT ON THE DESCRIBED WORK OR ON ANY OTHER WORK UNDER THE CONTRACT, ANY CHANGES IN THE SEQUENCES OF ANY WORK, ANY DELAY TO ANY WORK, ANY DISRUPTION OF ANY WORK, ANY RESCHEDULING OF ANY WORK, AND ANY OTHER EFFECT ON ANY OF THE WORK UNDER THIS CONTRACT. BY THE EXECUTION OF THIS CHANGE ORDER, THE CONTRACTOR ACCEPTS THE CONTRACT PRICE CHANGE AND THE CONTRACT COMPLETION DATE CHANGE, IF ANY, AND EXPRESSLY WAIVES ANY CLAIMS FOR ANY ADDITIONAL COMPENSATION, DAMAGES OR TIME EXTENSIONS, IN CONNECTION WITH THE DESCRIBED WORK."

M. The Contractor shall not be entitled to adjustments in contract price or contract time related to submittal of any cost estimates.

48. PROCEDURE FOR REQUESTING CHANGE ORDERS –EXTRA

A. In case any instructions, either oral or written, appear to the Contractor to involve a change or extra work for which, in his opinion, he should receive extra compensation, he shall make a written request to the Engineer for a written Change Order authorizing such change or extra work. Should a difference of opinion arise as to what does or does not constitute a change or extra work, or concerning the payment thereof, and the City insists on conformance, the Contractor shall proceed with the work after presenting written notice of claim for extra cost to the City and shall keep an accurate account of the "actual field cost" thereof as provided for in Method "D" under "Changed or Extra Work". The Contractor shall thereby not waive any right he might have to compensation for the claimed "extra cost" in connection with a change or extra work. The matter shall be submitted to the City for final determination as to whether or not a change or extra work was involved, and if so, the amount due to the Contractor.

B. Any claims for extra cost pursuant to this section, together with supporting documents and receipts, must be filed within ten (10) consecutive calendar days after performing the work for which extra cost is claimed. The City shall have the right to reject any claim for extra cost if the foregoing procedure is not followed.

C. In giving instructions, the Engineer shall have the authority to make minor changes that do not involve extra cost or time of performance and are not inconsistent with the design concept and purposes of the contracted work; but otherwise, except in an emergency endangering life or property, no change or extra work shall be performed unless authorized by a written "Change Order" approved by the City Council or its designee in accordance with the City Code, and no claim for extra cost shall be valid unless so approved, except as otherwise provided herein.

49. PROCEDURE FOR REQUESTING CHANGE ORDERS--EXTRA TIME

A. The Contract time may be changed only by a change order either alone or in conjunction with other changes. Any claim for an extension of Contract time shall be based on written notice delivered to the Engineer within seven days of the occurrence of the event giving rise to the

claim. Notice of the extent of the claim with supporting data shall be delivered within forty-five days of such occurrence unless Engineer allows an additional period of time to ascertain more accurate data. Notice of the extent of the claim must state the cause of the delay, the date of occurrence causing the delay, and the amount of additional time requested. Requests for extensions of time shall be supported by all evidence reasonably available or known to the Contractor, which would support the extension of time requested. If the Contractor is requesting an extension of time because of weather, he shall supply daily written reports to the Engineer describing such weather and the work which could not be performed that day because of such weather or conditions resulting there from and which he otherwise would have performed. The Engineer's acceptance of the daily reports shall not be deemed an admission of the Contractor's right to receive an extension of time or waiver of the City's right to strictly enforce the time provisions contained in the Contract Documents. Requests for extensions of time failing to include the information specified in this Article and requests for extension of time which are not received within the time specified above shall result in the forfeiture of the Contractor's right to receive any extension of time requested. Any change in the Contract time resulting from any such claim shall be incorporated in a change order. The percentages specified in Section 38 and 47 G above shall be considered to include full compensation for each day or portion thereof of extra time.

B. The Contract time will be extended in an amount equal to time loss due to delays beyond the control of Contractor if a claim is made there for as provided in paragraph A. Such delays shall include, but not be limited to, acts or neglect by City or others performing additional work, or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or act of God. No extension of the Contract time will be granted where the delay is attributable to a Subcontractor, manufacturer, fabricator, supplier or distributor or any other party performing services or furnishing material or equipment on behalf of the Contractor unless such party's delay is attributable to one of the above enumerated causes. Time limits concerning substantial completion and final completion as stated in the Contract Documents are of the essence.

C. An extension of time may be granted by the City after the expiration of the time originally fixed in the Agreement or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration. However, such extension shall not be deemed to be a release of any of the City's rights under the Contract Document unless expressly stated as such.

50. DIFFERING SITE CONDITIONS

If conditions or objects are encountered at the site which are (1) sub-surface or otherwise concealed and which differ materially and substantially from those indicated or anticipated in the Contract Documents or (2) are of an unusual nature, which differ materially and substantially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice, in writing, by the Contractor shall be given to the City promptly before conditions are disturbed and in no event later than 24 hours after first observance of the conditions. The City shall promptly investigate such conditions and, if they differ materially and substantially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the work, shall provide an equitable adjustment in the Contract Amount or Contract Period, or both as per Sections 47 through 49 of these General Conditions. If the City determines that the conditions at the site are not materially and substantially different from those indicated in the Contract

Documents and that no change in the terms of the Contract is justified, the City shall so notify the Contractor in writing, stating the reasons. No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment has been made under this agreement. Weather, and the effects of weather on surroundings, surface, or subsurface are to be anticipated and do not constitute a differing condition. No contract change, which results in a benefit to the Contractor, shall be allowed unless the contractor has provided the required written notice. No contract adjustment will be allowed under this section for any effects caused on unchanged work.

51. WARRANTY PERIOD

A. Besides guarantees required elsewhere, the Contractor shall and hereby does guarantee all work for a period of two (2) years after the date of final acceptance of the work by the City and shall repair and replace any and all work together with any other work, which may be displaced in so doing, that may prove defective in workmanship or materials within the two-year period from the date of final acceptance, without expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted. If the Contractor is required to repair or replace any portion of the Project pursuant to the two-year guarantee provided by this section, the repair or replacement shall similarly be guaranteed for an additional one-year period from the date of completion of the repair. In the event of failure to comply with the above mentioned conditions, within a week (seven consecutive days) after being notified in writing by the City, the City is hereby authorized to proceed to have the defects repaired and made good at the expense of the Contractor, who hereby agrees to pay the cost and charges therefore immediately upon demand by the City. In case of emergency, where, in the opinion of the City, delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor and the expenses in connection therewith shall be charged to the Contractor.

B. The Contractor guarantees to the City that all materials and equipment furnished under this Contract will be new and of good and sufficient quality, free from faults and defects as is necessary to complete the project as required by the plans and specifications.

C. The City and the Contractor agree that the guarantee on the equipment possessed and used by the City, in accordance with Article 34 of these General Conditions, shall commence on the date that the City takes possession of the equipment and so notifies the Contractor in writing. City and Contractor further agree that such taking possession and use shall not be deemed as acceptance of any part of the work. Take-over of equipment may occur when such equipment can be put into routine service on a permanent basis at City's discretion.

52. AUTHORITY OF ENGINEER

A. The Engineer shall furnish engineering services during construction of the work to the extent provided in the Contract Documents. He shall observe and review the work in the process of construction or erection. Compliance with the Contract Documents shall be the Contractor's responsibility notwithstanding such observation or review. The Engineer has authority to recommend suspension of the work when it appears such suspension may be necessary to accomplish the proper implementation of the intent of the Contract Documents. The authority to observe, review, or recommend suspension of all or any portion of the work, or exercise such other authority as may be granted by the Contract Documents, shall not be construed or interpreted to mean supervision of construction, which is the Contractor's responsibility, nor make the Engineer responsible for providing a safe place for the performance of work by the

Contractor or by the Contractor's employees or those of suppliers or subcontractors or for access, visits, use, work, travel, or occupancy by any other person. The provisions of MAG Sections 104.1.4 and 104.2.5 as contained in the 2012 edition apply to this contract.

B. The Engineer shall have authority to reject any or all work, materials, or equipment, which do not conform to the Contract Documents, and to decide technical questions, which arise in the execution of the work. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of work, materials, equipment, and supplies which are to be paid for under the Contract and shall decide all questions which may arise in relation to said work and the construction thereof. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise expressly provided. In case any question shall arise between the parties to the Contract relative to the Contract Documents, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under the Contract affected in any manner or to any extent by such question.

53. DECISIONS OF THE CITY

If the Contractor is not in agreement with any final decision of the Engineer, then he may appeal, in writing, such decisions to the City Manager, who shall within a reasonable time after presentation, make decisions in writing on claims properly made by the Contractor. The appeal shall contain the final decision of the Engineer as an attachment, or in the absence of such final decision a copy of a certified letter sent to the Engineer, at least fifteen (15) working days prior to the appeal, requesting such a final decision in writing. The decision of the City Manager shall be regarded as final.

54. TEMPORARY SUSPENSION OF THE WORK

A. The City Manager may, upon the recommendation of the Engineer, or by the Manager’s own determination, suspend the work.

B. Should the discovery of a potential archaeological or historic resource occur during construction, the Contractor shall cease work at that site, immediately notify the Engineer, and shall not proceed until instructed to do so by the City. In the event such a suspension of the work occurs, the provisions of Article 49 shall apply to extend the time for final completion of the work.

55. AUTHORITY AND DUTIES OF CITY‘S FIELD REPRESENTATIVE

A. Inspectors may be placed on the work to keep the City informed as to the progress of the work and the manner in which it is being done; to keep records; act as liaison between the Contractor and the City; and to call the attention of the Contractor to any deviations from the Contract Documents. However, failure of the inspector to call the attention of the Contractor to faulty work or deviations from the Contract Documents shall not constitute acceptance of said work.

B. The inspector cannot control how the material is used; therefore, the responsibility for its safety and proper use shall be the Contractor's. Until the job is finally completed, the Contractor may do work that changes or modifies work previously done, and even though at any given time, a piece of work might be well done and acceptable in quality, the

responsibility for keeping it in that condition until the work is complete is the sole responsibility of the Contractor. For this reason, it is impossible to accept, finally, any portion of a project until the project as a whole is accepted and control of said project is transferred from the Contractor by final official written acceptance by the City.

C. Any personal assistance which an inspector may give the Contractor will not be construed as the basis of any assumption of responsibility in any manner, financial or otherwise, by the inspector or the City.

D. The inspector is not and does not purport to be a Safety Engineer and is not engaged in that capacity by the City and shall have neither authority nor the responsibility to enforce construction safety laws, rules, regulations, procedures, or the safety of persons on and about the construction site.

E. The presence or absence of an inspector on any job will be at the sole discretion of the City, and such presence, or absence of an inspector will not relieve the Contractor of his responsibility to obtain the construction results specified in the Contract Documents.

F. The inspector is not authorized to approve or accept any portion of the work or to issue instructions contrary to the Contract Documents. Approvals, acceptance or instructions, when given, must be in writing and signed by the City. The inspector shall have authority to reject defective materials; however the failure of the inspector to reject defective material or any other work involving deviations from the Contract Documents shall not constitute acceptance of such work.

G. Nothing in this subsection shall in any way be so construed as to require or to place responsibility for the method, manner or supervision of the performance of the work under this Contract upon the inspector, or the City. Such responsibility rests solely with the Contractor.

56. CHARACTER OF WORKERS, METHODS, AND EQUIPMENT

A. The Contractor shall at all times employ sufficient skilled labor in accordance with Federal, State and local labor laws; and the proper equipment for completing the project in the manner and time required by the Contract. All equipment, which is proposed to be used on the project, shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be used such that it will not damage property adjacent to the work area.

B. Any person employed by the Contractor or any Subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed from the work by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Engineer. Should the Contractor or Subcontractor fail to remove such person as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until such orders by the Engineer are followed by the Contractor. The Contractor or Subcontractor shall hold the City harmless from damages or claims for compensation that may occur in the enforcement of this section.

C. The City may require submittal of Certified Payrolls at any time from the Contractor showing the employee names, addresses, Social Security Numbers, rates of pay, payments received, payroll deductions, occupational classification(s), and hours per day worked in such classification(s) for work performed on this project by employees. The contractor shall retain such records for the minimum time required by law or three (3) years after project completion, whichever is longer. The Contractor shall also be responsible to produce upon request from the City such payroll records from its subcontractors.

57. WARRANTY OF COMPLIANCE WITH STATE AND FEDERAL LAW

CONTRACTOR understands and acknowledges the applicability to it of the Americans with Disabilities Act, the Immigration Reform and Control Act of 1986 and the Drug Free Workplace Act of 1989. CONTRACTOR must also comply with A.R.S. § 34-301, "Employment of Aliens on Public Works Prohibited," and A.R.S. § 34-302, as amended, "Residence Requirements for Employees."

A. Under the provisions of A.R.S. § 41-4401, CONTRACTOR hereby warrants to CITY that CONTRACTOR and each of its subcontractors will comply with, and are contractually obligated to comply with, all Federal Immigration laws and regulations that relate to their employees and A.R.S. § 23-214(A) (hereinafter "Contractor Immigration Warranty").

B. A breach of the Contractor Immigration Warranty shall constitute a material breach of this contract and shall subject CONTRACTOR to penalties up to and including termination of this contract at the sole discretion of CITY.

C. CITY retains the legal right to inspect the papers of any contractor or subcontractor employee who works on this contract to ensure that the contractor or subcontractor is complying with the Contractor Immigration Warranty. CONTRACTOR agrees to assist CITY in regard to any such inspections.

D. CITY may, at its sole discretion, conduct random verification of the employment records of CONTRACTOR and any subcontractors to ensure compliance with Contractor's Immigration Warranty. CONTRACTOR agrees to assist CITY in regard to any random verification performed.

E. Neither CONTRACTOR nor any subcontractor shall be deemed to have materially breached the Contractor Immigration Warranty if CONTRACTOR or any subcontractor establishes that it has complied with the employment verification provisions prescribed by sections 274A and 274B of the Federal Immigration and Nationality Act and the E-Verify requirements prescribed by A.R.S. § 23-214, Subsection A.

F. The provisions of this article must be included in any contract that CONTRACTOR enters into with any and all of its subcontractors who provide services under this contract or any subcontract. "Services" are defined as furnishing labor, time or effort in the State of Arizona by a contractor or subcontractor. Services include construction or maintenance of any structure, building or transportation facility or improvement to real property.

58. QUALITY CONTROL AND TESTING

A. The Contractor will support the Testing Company when contracted by the City for Quality Control and testing for specification compliance and assurance.

B. During the progress, the work shall be subject to the review and observation of the City. The Contractor shall afford every reasonable facility and assistance to the City to make such review. If any work is covered up without approval or consent of the City, it will be uncovered for examination at the Contractor's expense.

C. The fact that the City is on the job site shall not be taken as an acceptance of the Contractor's work or any part of it. The Contractor shall notify the City upon completion of his Contract, and the work shall be given final construction review by the City, and any tests and re-tests shall be witnessed by the City or his representative. If all parts of the work are acceptable and substantially comply with the intent of the Contract Documents, initial acceptance shall be made by the City. If parts of the work are not acceptable and require additional work or rework by the Contractor to complete the Project, such costs shall be borne by the Contractor.

D. Contractor shall submit to the City, ten (10) days in advance of construction and without charge, samples or specifications of materials he proposes to use and shall not use these materials until he has received approval from the City.

E. Contractor shall furnish tests and reports on tests of all materials, equipment and installations called for in the Contract Documents. The testing laboratory must be approved by the City and the Contractor shall pay the cost of the tests, and necessary re-tests, including all transportation charges unless otherwise provided by the Contract Documents.

F. Required certificates of inspection, testing, or compliance shall be secured by the Contractor and promptly delivered by him to the Engineer. Certificates shall be provided within five (5) working days after the test is conducted. Each report shall indicate compliance with the specifications.

G. The City reserves the right to perform additional inspections and testing deemed appropriate with their own forces or with outside consultants or testing agencies. Should such inspection or testing reveal work that is not in compliance with Contract Documents, such costs of inspection or testing, and any required rework shall be borne by the Contractor.

H. Following is a summary of minimum frequency of testing the city shall require. If there are conflicts in the frequency of testing between this Section and the Technical Specifications, the stricter of the two will govern. This list is a partial list of major items of work, if an item is a part of the project and not listed the Contractor shall provide testing for that item. The Contractor shall provide the appropriate tests for the activities a part of the project. The City reserves the right to request a greater frequency for the testing.

The following frequencies are based on a maximum of 8” lifts. When the lifts are greater than 8”, the frequency of testing shall increase proportionately with the increased depth of lift.

Activity	Frequency
Roadway Fills	1 each 300 ft per lift
AB Subgrade	1 each 300 ft per lift
AC Pavement	1 each 300 ft per lift
Trench Backfill	1 each 300 ft per lift

Concrete Curb & Gutter	4 cylinders per 50 cy concrete
Concrete Sidewalk	4 cylinders per 50 cy concrete

59. TERMINATION OF CONTRACT

A. The City may, at any time, terminate the Contract at the City's convenience and without cause. Such termination shall be effective upon receipt by Contractor of written notice from the City of such termination for the City's convenience. Contractor shall cease operations as directed by the City in the notice of termination and take actions necessary, or that the City may direct, for the protection and preservation of the work. In the event of a termination for convenience, the Contractor shall be paid only the direct value of its completed work and materials supplied as of the date of termination, and Contractor shall not be entitled to anticipated profit or anticipated overhead or any other claim of damages from the City. Further, in the event a termination of the Contractor for cause is determined to have been without legal right, then the termination shall be deemed to have been a termination for convenience.

B. If the Contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure its completion within the time specified herein, or any extension thereof granted in the manner specified herein, or fails to complete the work within such time, or if the Contractor fails to comply with any written order of the Engineer or the City or fails to timely pay Subcontractors, material, men, or laborers, or if the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he or any of his Subcontractors should violate any of the provisions of the Contract, then the City may serve written notice upon the Contractor and his surety of its intention to terminate the Contract and, unless within ten (10) days after the service of such notice such violations of the Contract cease and satisfactory arrangements for the corrections thereof are made, the Contract shall without further notice, upon the expiration of said ten (10) days or such extensions thereof as may be expressly granted by the City in writing, cease and terminate.

C. In the event of any such termination, the Contract shall be deemed terminated and not rescinded. Following such termination of the Contract, the City will take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the Project by whatever method the City may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished, or completion is permanently suspended by the City. If the unpaid balance of the Contract price exceeds the direct and indirect costs of completion of the project, including compensation for additional professional service, including but not limited to fees charged by the City's attorney, such excess shall be paid to the Contractor. If such costs or liquidated or actual damages as provided by this Contract exceed such unpaid balance, the Contractor shall pay the difference to the City. Such additional costs and any liquidated or actual damages due to the City under this Contract will be determined by the City Manager and be submitted to the City Council in the form of a Change Order to the Contract.

D. Any extensions of time granted by Change Order or other extensions granted by the Council do not constitute a waiver of the City's right to terminate the Contract pursuant to this section for the Contractor's failure to complete the Project within the time specified in the Contract

and any authorized extensions thereto, nor do such extensions constitute a waiver of the City's right to collect liquidated damages.

E. If the work is stopped by order of a court, public authority, or the City for a period of ninety (90) calendar days or more, through no act or fault of the Contractor, anyone employed by such Contractor or his Subcontractors, then the Contractor may terminate the Contract in accordance with these Contract Documents.

60. TIME IS OF THE ESSENCE

It is mutually understood and agreed by and between the parties to the Contract that in the execution of the same, time is an essential element of the Contract, and it is important that the work progress vigorously to completion.

61. LIQUIDATED DAMAGES

For each and every calendar day that work shall remain uncompleted after the time specified for the completion of the work in the Contract, or as adjusted by a change order, the sum per calendar day, as stipulated in the Advertisement for Bids, shall be deducted from any money due or to become due to the Contractor, not as forfeit or penalty, but as liquidated damages. This sum is fixed and agreed upon between the parties because the actual loss to the City and to the public caused by delay in completion will be impractical and extremely difficult to ascertain and determine. It is agreed that the City has made a good faith attempt to estimate the loss caused by any delays and that the estimate is incorporated in the sum, which is agreed to be reasonable. If the City allows the Contractor to complete or attempt to complete the work subsequent to the date of completion specified herein, such action shall not constitute a waiver by the City of the imposition of the liquidated damages provision as specified herein.

62. CITY'S REMEDIES CUMULATIVE AND NONWAIVER

No right or remedy conferred upon or reserved to the City by the Contract shall be considered exclusive of any other remedy or contractual right, but the same shall be distinct, separate, and cumulative, and shall be in addition to every other remedy existing at law or in equity or by statute; and every remedy given by the Contract to the City may be exercised from time to time as often as the occasion may arise, or as may be deemed expedient. No delay or omission on the part of the City to exercise any right or remedy arising from any default on the part of the Contractor shall impair such right or remedy or shall be construed to be a waiver of any such default or an acquiescence thereto, or otherwise affect the right of the City to enforce the same in the event of any subsequent breach or default by the Contractor.

63. SEVERABILITY CLAUSE, DISPUTE RESOLUTION, APPLICABLE LAW

A. This Contract shall be governed by the laws of the State of Arizona, and venue for any litigation arising out of this Contract shall be in the Superior Court of the State of Arizona in and for the County of Coconino or the County of Yavapai, depending upon the location of the work, if the amount in dispute is in excess of $5,000.00. If the amount in dispute is less than $5,000.00, jurisdiction and venue shall lie in the nearest Justice of the Peace Court of the appropriate county. Arbitration shall not be an alternative method of settling disputes unless separately agreed upon in writing by the parties. This Contract shall not be construed to create any contractual relationship of any kind between the Engineering Dept., and the

Contractor or any Subcontractor, or between the City and any Subcontractor. During any dispute arising hereunder, the Contractor shall continue to perform all work in accordance with the Contract Documents. In the event of any dispute arising hereunder, the prevailing party in the resolution of such dispute shall be entitled to recover its attorney's fees and costs incurred.

B. The provisions of this Contract shall be deemed to be severable, and if any term, phrase or portion of the Contract shall be determined to be unlawful or otherwise unenforceable, the remainder of the Contract shall remain in full force and effect.

C. Any and all disputes relating to this Contract shall be subject to the provisions of Chapter 3.10 of the Sedona City Code. The City Code can be viewed on the City of Sedona website, as well as, the City Clerk's Office, City Hall, Sedona, Arizona.

D. Notwithstanding the mediation provisions set forth in Paragraph 62.C above, either party may submit, by demand letter, correspondence or notice, to the other party, any claim, counterclaim, dispute or other matter in question between the Contractor and the City arising out of or relating to this Contract, the Contract Documents, the Plans, the Project or the work, or breach thereof, and such claim, counter claim, dispute or other matter in question shall be subject to and decided by arbitration in accordance with the Rules for Non-Administered Arbitration of Business Disputes (the "Rules") of the Center for Public Resources ("CPR") currently in effect, except as provided herein and except where modified by the provisions hereof.

E. Any arbitration arising out of this Contract, the Contract Documents, the Plans, the Project or the work, or any breach thereof may include, by consolidation or joinder, or in any other manner, at the discretion of either the Contractor or the City, any other entities or persons whom the Contractor or the City, as the case may be, believes to be substantially involved in a common question of law or fact.

F. All demands for arbitration and all responses thereto that include any monetary claim, must contain a statement that the total sum or value in controversy as alleged by the party making such demand or response is not more than $150,000.00 (exclusive of interest and arbitration fees and costs). The arbitrators will not have jurisdiction, power or authority to consider or make findings except the denial of their own jurisdiction concerning any controversy where the amount at issue is more than $150,000.00 (exclusive of interest and arbitration fees and costs) or to render a monetary award in response thereto against any party which totals more than $150,000.00 (exclusive of interest and arbitration fees and costs). Notwithstanding the foregoing provisions, the parties may mutually agree to waive the jurisdictional limitations set forth in this sub-paragraph. In the event of such mutual waiver, all other provisions in this sub-paragraph shall apply.

G. Demand for arbitration shall be filed with the other party in accordance with Rules. A demand for arbitration shall be made within a reasonable time after the claim, dispute, or other matter in question has arisen. In no event shall the demand for arbitration be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question could be barred by the applicable statute of limitations.

H. In the event the amount in controversy is less than $50,000.00 a sole arbitrator shall be appointed in accordance with Rules. In the event the amount in controversy is $50,000.00,

the demanding party shall appoint one party-appointed arbitrator in its notice demand for arbitration. The responding party may within ten (10) days, appoint a second party-appointed arbitrator. The party-arbitrators shall appoint a third arbitrator in accordance with the Rules. If the party-arbitrators fail to appoint a third arbitrator, the third arbitrator shall be appointed in accordance with the Rules. If the responding party fails to appoint a second party-appointed arbitrator within the time so provided, selection of the second arbitrator shall be in accordance with the Rules.

I. The decision of the arbitrators shall be in accordance with laws of the State of Arizona and the United States. The arbitrators shall prepare written findings of fact and conclusions of law upon which the decision and award shall be based. The arbitrators may award compensatory damages and attorneys' fees and costs to the prevailing party. The arbitrators shall have no authority to award consequential damages or punitive damages, and the parties hereby waive any claim to those damages to the fullest extent allowable by law.

J. The demanding party shall select the locale of arbitration, but shall not choose a location greater than twenty-five (25) miles from the Project site.

K. This agreement to arbitrate shall be specifically enforceable by either party under the prevailing laws of the State of Arizona and the United States. Any award rendered by the arbitrators shall be final and enforceable by any party to the arbitration, and judgment shall be made upon it in accordance with the applicable laws of any court having jurisdiction thereof. The arbitrators' decision shall be final and conclusive as to the facts. Either party may appeal manifest errors of law to a court of competent jurisdiction within fifteen (15) days of the award.

L. Unless otherwise agreed in writing, and notwithstanding any other rights or obligations of either of the parties under the Contract, the Contractor and the City shall carry on with the performance of their respective duties, obligations and services hereunder during the pendency of any claim, dispute or other matter in question giving rise to arbitration or mediation, as the case may be. The City shall be under no obligation to make payments to the Contractor on or against such claims, disputes or other matters in question giving rise to arbitration or mediation, during the pendency of such arbitration or mediation or other proceedings to resolve such claims, disputes or other matters in question.

64. POTHOLING REQUIREMENTS

The Contractor shall pothole all existing utilities 1,000 feet ahead of trenching activities to allow adequate time and distance to allow for the adjustment of grade or location of the construction activities. The contractor shall pothole at least two (2) working days ahead of installing facilities such as manholes, sidewalks, storm drainage inlets, footing, headwalls, and similar non-longitudinal installations. The Contractor shall backfill the pothole after verifying the depth, size and location of the utility. If a potential conflict is encountered, temporarily plating the potholed utility will be allowed for review and coordination of a resolution of the conflict with the City and affected utilities representatives.

The City requests a minimum of five (5) working days notification of a potential conflict for marked utilities. This requirement does not relieve the Contractor of the responsibility to make the City aware of conflicts timely of the Contractor’s awareness. If potholing 1,000 feet in advance of trenching activities has not been kept up and a conflict creates down time or delays in

work no extension of time or compensation for down time will be considered for that conflict.

65. UNMARKED UTILITY REPAIR

If in the course of work, a conflicting utility line that was not shown on the plans is discovered, the Contracting Agency will either negotiate with the owner of the Utility for relocation, change the alignment and grade of the trench or roadbed, provide encasement or sleeving, relocate the utility, or as a last resort, declare the conflict as "extra work" to be accomplished by the Contractor in accordance with Section 47 of these General Specifications. In the case of unmarked or incorrectly marked utilities the Contractor shall consider that responsibilities are per Arizona State Statutes Section 40 –360.

The Contractor shall contact the City and utility affected immediately upon damaging or breaking an unmarked utility. If an unmarked utility is found the Contractor shall take every precaution to not damage the utility and work around the conflict with the City and Utility representatives. No interpretation of this provision that changes the responsibility for non-located and improperly located utilities per Arizona State Statutes Section 40 –360 shall be valid.

66. UTILITY SEPARATION

The Contractor shall maintain as a minimum one (1) foot of vertical clearance and three (3) feet of horizontal clearance for all utility crossings. Water/sewer minimum separations will be two (2) feet vertical clear and six (6) feet horizontal clear. If less than one (1) foot but more than six (6) inches clearance is all that can be accommodated concrete encasement shall be provided.

67. NOTIFICATION TO RESIDENTS & COMMUNITY RELATIONS

The Contractor shall inform the residents along the construction area of the proposed work. This notification and community relations shall include, but not necessarily be limited to:

A. Mailings
The Contractor shall prepare a letter for mailing to the residents located adjacent to the project. This mailing will include a description of work to be done, work hours, date's for begin and end construction, Contractor representative contact name and phone number. The cost for the mailings shall be incidental to the project.

B. Informational Signage
The Contractor shall provide and install advance information signs and project information signs before beginning construction to inform the public of the forthcoming project, construction dates, and suggested alternate routes. Sign layout shall be as approved by the Engineer. Signs shall not be constructed or installed prior to approval by the Engineer for the designs, sizes and locations. The Contractor shall maintain the signs as necessary and update the information as requested by the Engineer. The information signs shall be shown on the traffic control plan. The cost for this work shall be included in the unit bid price for Mobilization.

C. Meetings
The Contractor may be requested to attend and participate in a pre-construction public meeting if deemed necessary by the Engineer. Meeting time, location and agenda will be determined by the Engineer. The cost for this meeting if held shall be incidental to the

project.

D. Driveway impact notification
The Contractor shall notify any resident or business of any access restrictions at least 48 hours prior to access restriction. Notification to residents is considered incidental to the projects activities and included in the unit price of the various activities.

HYDRO DYNE ENGINEERING
DESIGNED TO PROTECT. BUILT TO PERFORM.™
Tel: 813-818-0777 Fax: 813-818-0770

Represented Locally By:
JBI Water
Attn: Joe Wolfer
Number: 623-308-5151

January 12th, 2017

To: Sunrise Engineering Inc.
Attention: Tyson Glock P.E.

Ref: Sedona, AZ – Sedona WWTP
Specification: Section 11250

Hydro-Dyne Engineering Scope of Work 12853-5

Hydro-Dyne Engineering is pleased to offer this Scope of Work for the equipment detailed below in accordance to the specifications and addendum(s) stated above. Where clarifications to the specifications are necessary, they will be listed below.

Hydro-Dyne Specification Section	Description	Quantity
2.2	Bull Shark Through Flow Screen	2
2.3	Screenings Transfer Sluice	1
2.4	White Shark Washing Compactor	1
2.5	Freeze Protection Package	1
2.6	Spare Parts	See 2.6
2.7	Accessories	See 2.7
2.8	Controls	2

FREIGHT
F.O.B shipment point with freight costs included.

NOT INCLUDED
This scope of work is limited to the specification sections and addendum(s) referenced above. Any other documents are not included. Concrete work, installation, plumbing, wiring connections, valves, strainers, level sensor mounts, bonds, liquidated damages, and anything else not specifically detailed as included by the manufacturer in the specification above will be construed as NOT INCLUDED, whether or not inclusion is specifically acknowledged.

VALIDITY
Price quoted is firm provided:

1. Written acceptance is received at the factory within thirty (30) calendar days of the date of this offering.

2. Purchaser agrees to accept shipment 12 to 16 weeks from date of receipt of approved drawings and authorization to proceed with manufacture. Purchaser is allowed not more than 45 calendar days for review and return of submittals for approval.
3. Shipments delayed by the purchaser or his agents will be escalated at a rate of 1-1/2% per calendar month, compounded, of the value of the unshipped portion.

TAXES

Applicable sales or use taxes, fees, permits, and licenses are not included.

COMMISSIONING SERVICE & CUSTOMER TRAINING

- This service will not exceed one (1) trips and two (2) eight-hour working days.
- Each additional trip will be figured at $2,000 and each additional day onsite will be figured at $1,200. It is agreed and understood that all necessary utilities such as water, electric, air, etc. be connected and functional prior to the arrival of our servicemen.
- A complete job of checking, adjusting, etc. of the equipment and installation cannot be accomplished unless the plant is ready to operate at the time this service is to be performed.
- Our servicemen are non-union technicians and any extra cost for other assisting personnel as required by local union regulations is not included in this proposal.
- Advance notification of at least fifteen (15) working days prior to the date start-up service is required.

WARRANTY

The equipment and all appurtenances including, but not limited to: frame, supports, covers, and mechanisms manufactured by Hydro-Dyne Engineering are warranted for a period of 2 years against defects in materials and workmanship. Items supplied to Hydro-Dyne Engineering shall be covered under original manufacturer's warranty. Hydro-Dyne Engineering reserves the right to repair or replace warranted equipment at installation or factory, F.O.B. Hydro-Dyne.

STANDARD PAYMENT TERMS AS QUOTED

25% upon receipt of approved shop drawings due before release for manufacture
25% upon completion for testing due before shipment
45% due 30 calendar days upon delivery
5% due upon completion of startup and approval of O&M manuals NOT to exceed 60 calendar days from date of delivery.

ALTERNATE PAYMENT TERMS ADDER OF 1.25% TO TOTAL PURCHASE ORDER

95% net due 30 calendar days upon delivery
5% net due upon completion of startup and approval of O&M manuals NOT to exceed 60 calendar days from date of delivery.

- Past due balances will be subject to a service charge of 1-1/2% per month on the unpaid balance and services, including shipping and startup, will not be scheduled until account is current.

For additional information, please contact our local representative listed above or me personally.

Sincerely,

John Walsh
Regional Sales Manager
Hydro-Dyne Engineering, Inc.

BULL SHARK THROUGH FLOW SCREEN & WHITETIP SHARK WASHING COMPACTOR TECHNICAL SPECIFICATIONS

Part 1 GENERAL

1.1 SCOPE - Supply all labor, materials, equipment and incidentals required to install and place into operation the fine screening system as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS - The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.

A. AICS, American Institute of Steel Construction
B. AISI American Iron and Steel Institute
C. ANSI, American National Standards Institute
D. ASCE, American Society of Civil Engineers
E. ASME, American Society of Mechanical Engineers
F. ASTM, American Society of Testing and Materials
G. AWS, American Welding Society
H. IBC, International Building Code
I. IEC, International Electric Code
J. IEEE, Institute of Electrical and Electronics Engineers
K. NEC, National Electrical Code
L. NEMA, National Electrical Manufacturers Association
M. Underwriters Laboratory (UL and cUL)

1.3 SUBMITTALS - Submittals shall be provided to the engineer that includes all the following information:

A. Compliance Statement: With each submittal, include a Compliance Statement listing each Specification Section and Part 1, 2, and 3 Sub-Sections, stating paragraph-paragraph, compliance with the Specifications, each minor nonconformity that is within the intent of the Specification and proposed nonconformities. Provide short descriptions of minor nonconformities, and detailed explanation and drawings of other nonconformities.
B. Certified shop drawings showing all important details of construction, dimensions, and anchor bolt locations.
C. Descriptive product literature.
D. Schematic electrical wiring diagram and electrical controls information.
E. Complete motor and drive data.
F. The total weight of the equipment.
G. A complete bill of materials of all equipment.

1.4 QUALIFICATIONS

A. All the equipment specified under this Section shall be supplied by a single manufacturer involved in the manufacture of the screening equipment. Qualified manufacturers shall have a minimum of ten (10) years' experience with wastewater screening systems, specifically including through flow continuous belt screens and Washing Compactors, for consideration.

B. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.

C. If patents protecting equipment are not owned by supplier then an affidavit must be supplied stating owner of design and expiration of licensing agreement.

1.5 DESIGN REQUIREMENTS

A. System Description

1. The screen will have a continuous stainless steel belt that automatically rotates within the internal guide system of the static frame.

2. The screen herein specified will be of the straight through type that will present a clean screening grid to the influent flow at all times.

3. The solids will collect as a mat on the front face of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks.

4. The solids will be automatically removed at the top of the screen into an internal hopper and be fed to the screening handling system.

5. The continuous belt will be directly driven by drive sprockets that shall support and rotate the grid assembly.

6. The screen will be totally enclosed and have access covers that will be lightweight and easily removable for maintenance.

7. The Washing Compactor will be positioned next to the screening channels and will be fed by a sluice system.

8. The Washing Compactor will be adequately sized to handle all the screenings and wash water that will be generated by the screen at peak flow. The system will be required to wash the screenings to reduce the organic content and compact the remaining solids into a dry plug.

9. The Washing Compactor will generally comprise of a screw auger rotating within the washing and drainage trough, a wash water system, a compaction zone and an outlet chute arrangement.

10. All stainless steel (including frame, grid, and drive components) mentioned below as stainless steel shall be T316 stainless steel. All hardware shall be T316 stainless steel.

B. System Performance - The fine screening system will be designed to meet the following design parameters:

1.	Number of screens	2
2.	Peak flow per screen	6.91 MGD
3.	Average flow to screen	2 MGD
4.	Velocity through the grid	6.68 ft/s

5.	Screen grid opening	6 mm
6.	Head loss at peak flow	11 inches @ 30% blinding and 48 inches upstream water level
7.	Structural design differential of frame/grid	48 inches minimum @ 100% blinding
8.	Drive design differential (operating)	48 inches minimum
9.	Screen grid supporting drive sprockets	2 minimum – all stainless steel
10.	Channel width	18 inches
11.	Channel depth	72 inches
12.	Number of Washing Compactors	1
13.	Diameter of screw	8 inches
14.	Minimum diameter of shaft	2.875 inches
15.	Compactor discharge height above grade	60 inches
16.	System wash water requirements	22 GPM @ 60 PSI

Part 2 PRODUCTS

2.1 MANUFACTURER

A. The equipment shall be the Continuous Belt Through Flow Screen and Washing Compactor as provided by Hydro-Dyne Engineering, Inc., Clearwater, FL. Other than the named supplier, all manufacturers proposing equipment described herein, will provide a detailed submittal package, which will consist, at a minimum, of all information and details prescribed in section 1.3, 1.4 and Part 2 of this specification. All pre-qualification submittals will be submitted to the Engineer at least 15 days prior to the bid date.

B. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Manufacturer will be responsible for all engineering costs of redesign by the Engineer, if necessary.

2.2 THE CONTINUOUS BELT THROUGH FLOW SCREEN

A. Laced Link Grid - The Continuous Screening Belt

1. The screenings belt will consist of heavy duty stainless steel laced links connected in parallel and separated by Delrin spacers to maintain specified opening. Each laced link hook element shall be fabricated from 14 gauge (minimum) stainless steel. Each straight element shall be fabricated from 16 gauge (minimum) stainless steel. All elements shall be a minimum of 1 inch wide forming a slotted opening of the specified width and minimum 1 inch deep in the direction of flow. Hooks on elements shall form horizontal lifting trays or shelves for removing large solids and rags every 8 inches.

2. Links, hooks and screening lifting members must be manufactured out of stainless steel. Plastic is not acceptable.

3. The stainless steel laced links will be connected by heavy duty stainless steel axles every 8 inches to form a continuous belt that will rotate within the frame's guide system. Axle diameter shall be a minimum 5/8 inch. The axle design will allow the row of laced links to pivot. The links shall support the screening grid and bear tension loads across the entire width and length of the screen belt.

4. The axles will be extended to fix a UHMWPE guide link to the side of each row of laced link elements. These guides will interlock to create a continuous guide link system that will slide within the frame.

5. Guide links shall be precision machined from solid virgin UHMWPE. Injection molded links are not acceptable.

6. The heavy duty guide links will be minimum 2 inches thick to protect against undue wear from grit and will be specially machined to form a closure seal between the rotating belt and the static frame.

7. The seal shall be continuous from grade level through the water flow forming an uninterrupted closure between the traveling screen grid and the stationary frame. The seal shall be fixed to the screen frame and be adjustable so that it will remain in contact with the rotating screen belt at all times.

8. Guide systems that use rollers, stainless or hardened steel chains will not be acceptable.

9. Grid sealing systems that use neoprene seals or stainless steel hinges will not be acceptable.

10. Grid to frame sealing systems that use adjustable UHMWPE strips attached to the frame will not be acceptable.

11. The bottom of the grid shall be sealed with a replaceable front lower seal brush with a stainless steel holder and polypropylene bristles.

12. Intermittent stainless steel laced link elements that form sharp hooks will be regularly placed along the face of each row of the grid to effectively remove larger particles.

B. The Frame

1. The continuous belt will rotate within a heavy duty stainless steel static support frame that shall stand at a 75 degree angle in the channel.

2. The screen will not be fixed within the channel to allow the entire machine, including screen grid, to pivot/lift out of the channel for repair or bypass. All routine maintenance will be achieved without removing the screen from the channel and shall be performed at grade level.

3. The guide link system will travel around a guide wear track that is integral to the support frame.

4. The design will ensure that the support frame meshes with the closure seal on each guide link to prevent passage of screening material and grit particles.

5. All components of the lower wear tracks shall be bolt in, field replaceable and manufactured from stainless steel.

6. The frame shall accommodate stainless steel protective covers designed to prevent leakage and contain spray wash. All access covers for maintenance will be lightweight

and easily removable. Screens with covers requiring neoprene, rubber or plastic seals are not acceptable.

7. If required the screen manufacturer will supply the stainless steel angled filler plates with neoprene seals to connect from the upstream corners of the support frame to the channel walls.

C. The Offloading of Screenings

1. A stainless steel spray wash header will be located in the head space of the screen to offload the screenings from the continuous belt.

2. The spray bar will incorporate brass nozzles at 2 inch spaces that can easily be replaced or removed for cleaning.

3. The spray bar will be positioned behind the rotating belt and will backwash the solids into a discharge hopper manufactured from stainless steel. The wash water will be used to continuously flush the screenings from this hopper into the extended sluice or directly into the Washing Compactor.

4. The addition of a mechanically rotating brush system to aid offloading will not be acceptable.

D. Screen Drive Mechanism

1. Each screen will have a maximum 1 hp, inverter duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. The motor will be TEFC NEMA rated. The motor will be located outside of the screen covers and above the top of the channel.

2. The gear reducer shall be directly coupled to a heavy duty shaft machined from stainless steel.

3. The continuous belt will be supported and rotated around heavy duty stainless steel sprockets located on the drive shaft in the head space of the screen.

4. These sprockets will have lugs that transmit torque directly from the gear reducer to notches on the underside of the UHMWPE guide links. Driving forces shall be transmitted to areas located behind the screen’s grid to prevent solids from contacting drive surfaces.

5. Chain driven systems or screens with wheels submerged in the wastewater are not acceptable.

6. Drive systems that use an external track and pinion to drive or push the band against grid weight supporting wear tracks will not be acceptable. Drive shall lift, and be capable of bearing, the full weight of the grid.

2.3 THE SCREENINGS TRANSFER SLUICE

A. The manufacturer will design and supply a screenings launder sluice system that will collect screenings and wash water from the discharge hopper of the screen and transfer them into the washing compactor.

1. Collected screenings will transfer through the sluice by means of gravity. Mechanically driven conveyors will not be acceptable.

2. The manufacturer shall supply a solenoid valve that will be plumbed into the back plate of the sluice. The contractor will connect to a local plant water supply, and the water supply will provide supplementary transport water.

3. The sluice will be manufactured from stainless steel. It shall comprise of U-shaped lengths of trough that will be flange connected to the desired overall length.

4. A change in direction will be achieved using long swept bends that will prevent blockages from occurring. An additional solenoid will be provided here also.

5. The sluice system will be designed with a splitter that diverts flow into 1 of 2 compactors (provided at a different date).

    a. The splitter will be fitted with a manual removable gates to divert into any branch of the sluice

6. The sluice system will include the support leg structure manufactured from stainless steel. The legs will be suitable for anchoring to a concrete floor.

7. Covers will be lightweight, no more than 6 feet long and bolted for easy removal by a single operator.

2.4 THE WASHING COMPACTOR

A. The main body will be the washing trough that will receive screenings and wash water directly from the end of the screenings transfer sluice.

B. The washing trough will house the screw auger and provide a dedicated section to reduce organic content. It will comprise of angled side walls manufactured from 10 gauge stainless steel that will direct the screenings on to the screw auger, and a drainage section in which the screw auger will ride.

C. The stainless steel drainage section will be slots with 5 mm openings. This drainage section shall be removable and easily replaceable in the field with no special tools. The flights of the screw will be fitted with a stiff nylon brush that will maintain contact with the drainage section, preventing blockages. The replaceable brushes will be supplied in pre-coiled lengths with stainless steel removable clamps.

D. The underside of the washing trough will be a catch pan chute that will divert the water that passes through the drainage section, back to the influent flow with dual outlet plain end pipe connections. The unconnected pipe side will be capped with a rubber compression cap so that it can be removed and the drain piping can we cleaned if necessary.

E. The stainless steel screw auger will sit in the washing trough. Washing compactors with shaftless screws are not acceptable as a shaft is required to support the flight and provide

necessary torque and compaction. Carbon steel screws are unacceptable due to corrosion probability.

F. The auger will be a varied pitch screw supported at the compaction end by AMS 5848 hardened stainless steel wear and anti-rotation bars designed to prevent the compacted screening from spinning within the compaction zone.

G. The end of the screw shall be reinforced with a stainless steel gusset welded behind the final screw flight to provide protection in this high wear/high torque area and to assist in compression of the screenings.

H. The screw will rotate allowing wash water and free organic/fecal material finer than trough openings to escape and return to the plant flow. The wash water system will flush the separated organic material through the drainage section in solution or as small particles.

I. A portion of the washing water will enter the washing trough with the screenings. This will be supplemented by spray nozzles that will direct water on to the screenings prior to compaction. They will be individually set at different angles to maximize the washing opportunity. The nozzles will be recessed into the side wall of the washing trough to protect from ragging and blockage.

J. The compacted screenings will be pushed through the compaction zone and pass through an elbow into an outlet chute. The outlet chute will be tapered at 1 degree to allow for screening expansion and will elevate the dewatered screenings to discharge by gravity into a waste receptacle (by others).

K. Each Washing Compactor will have a maximum 3 hp, continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. The motor will be TEFC NEMA rated.

2.5 FREEZE PROTECTION

A. Each equipment item will be outfitted with a freeze protection package that is designed to automatically start based on ambient temperatures.

B. The freeze protection package is specifically designed for highly corrosive and wet treatment plant environments.

C. The heat will be provided via Class 1 Div. 2 energy efficient, self-regulating, low temperature copper cable with a wearable jacket suitable for a single phase 120V power supply.

D. Power is supplied via NEMA 7 junction boxes specifically designed for heat trace systems.

E. Insulation will be a minimum 1” thick ultra-low water absorption melamine fully enclosed with minimum 18 gauge thick stainless steel covers. The covers must allow unhindered access for inspection and maintenance without requiring removal or electrical disconnection of the freeze protection package.

F. The equipment manufacturer will supply a ground fault interrupt breaker to be installed in the control panel and a NEMA 7 thermostat to be mounted by the contractor in the vicinity of the equipment.

G. The equipment manufacturer will provide a step down transformer that delivers single phase 120V power supply installed inside or adjacent to the control panel.

2.6 SPARE PARTS - The manufacturer will supply the following spare parts, per screen supplied, with the equipment:

A. Ten (10) hook links and elements spacers
B. Two (2) grid axles
C. Two (2) guide links
D. One (1) brush for the screw

2.7 ACCESSORIES - The manufacturer will supply the following accessories, with the equipment:

A. Up to Five (5) 1" NEMA 7 brass body solenoid valves
B. Two (2) 1.5" wash water strainers
C. Two (2) wash water pressure gauges

2.8 ELECTRICAL CONTROLS AND ANCILLARY COMPONENTS

A. General Information - The manufacturer will supply two (2) UL listed main control panels that shall automatically control the equipment offered in this section.

B. The Main Control Panel – NEMA 4X stainless steel enclosure for outdoor installation – Each control panel shall consist of the following components for each screening system:

1 - Enclosure, NEMA 4X, 304 Stainless Steel, Wall mounted
1 - Main Disconnect, Fused Type w/ door handle
1 - VFD, Altivar 312, w/ Branch Circuit Protection
1 - Motor starters, Non-Reversing, w/ overload
1 - Current monitor [Compactor]
1 - Control power transformer, 500VA minimum, 480-120VAC
1 - Panel heater with thermostat
1 - PLC, AB MicroLogix 1400 w/ Ethernet and Required IO
1 - HMI, AB PanelView 800, 4" Color Touch Screen
1 - Ethernet Switch, N-Tron Un-Managed
1 - Fiber Optic Converter, N-Tron 102MC-SC-MDR
1 - Lot, Push buttons, NEMA 4X [As Required]
1 - Lot, Pilot lights, NEMA 4X, Transformer type [As Required]
1 - Lot, Selector switches, NEMA 4X [As Required]
1 - Lot, Control relays, socket type
1 - Barrier Relay [Float switch]
1 - Lot, Terminal blocks
1 - Lot, Dry contacts for SCADA monitoring [(2) Run, (2) Fault]

C. Ancillary Control Components -

2 - Float switch with 20' cable
2 - HydroRanger 200 Differential Level Assembly which includes:
    1 - HydroRanger 200 HMI, NEMA 4X Fiberglass
    2 - Transducers, STH, NEMA 7 w/ **10m cable**
2 - Ambient Thermostat, NEMA 7 [Hazardous]

2 - Heat Trace Power Circuit 120VAC, w/ Breaker [1800 Watts Max] [Power by HDE control panel]

Part 3 SURFACE PREPARATION AND PAINTING

A. All stainless steel materials, including hardware, flanges and piping shall be pickled by means of a four tank system that is in accordance with ASTMs A380 and A967. This process is for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to the stainless steel surfaces. Stainless steel components must be fully submerged in the tanks for complete coverage. Electro-chemical wanding is acceptable on weld finishes that cannot be submerged due to size. Sandblasting, pickling pastes and abrasive cleaners will not be accepted as forms of metal finishing.

1. Tank 1 – Detergent bath for the removal of soils, greases, oils and dirt
2. Tank 2 – Rinsing process to remove detergent and residual soils
3. Tank 3 – Two part acid solution for the removal of tightly adhere oxide films
4. Tank 4 – Final rinse process to remove all residual acid

B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.

C. Motors and gearboxs shall be surface prepared to withstand humid/wet environments for superior corrosion protection.

1. Coating structure will be four total parts: Dip primer, Epoxy primer, Epoxy top coat, Acrylic clear coat added for UV protection.
2. Total coating thickness will be a minimum of 6 mils.

Part 4 EXECUTION

4.1 WARRANTY - The Manufacturer of the equipment supplied under this specification shall provide a warranty for a period of two years commencing on acceptance and/or beneficial occupancy by the Owner but no later than 90 days from the date of shipment by the Manufacturer. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

4.2 FACTORY TESTING

A. The screening system and all components shall be factory assembled and tested for a minimum of 24 hours prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.

B. During the factory test period the screening system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled screening system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

4.3 DELIVERY AND STORAGE

A. The screening system shall be appropriately crated and delivered to protect against damage during shipment.

B. An authorized representative of the Contractor shall inspect the screens on delivery to the jobsite and shall report any damage or missing components to the Manufacturer and the Engineer within 72 hours of receipt of the shipment.

4.4 INSTALLATION - The installation of the equipment shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

4.5 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

A. The equipment shall be shipped completely factory assembled. Contractor shall verify all access dimensions, channel dimensions, and any interior building dimensions to ensure equipment may be installed as a factory assembled units.

B. After completion of the installation, the equipment shall be inspected and certified by an authorized representative of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.

C. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.

D. Manufacturer shall state field service rates for a Service Engineer to Owner and Contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, and the requirement for additional time is beyond the manufacturer's responsibility, additional time shall be purchased by Contractor to correct deficiencies in installation, equipment, or material without additional cost to Owner.

E. The Contractor shall include in his bid, the cost of the above referenced authorized service representative for a minimum of one (1) trip totaling two (2) eight hour days onsite to complete the certifications and training described in this specification section. The trips and days are detailed as follows:

1. 1 trip and 2 days on-site for start-up/commissioning and training

End of Section