

CITY OF RENO
UTILITY SERVICES DEPARTMENT

**PROPOSAL, CONTRACTS AND
SPECIAL PROVISIONS
FOR**

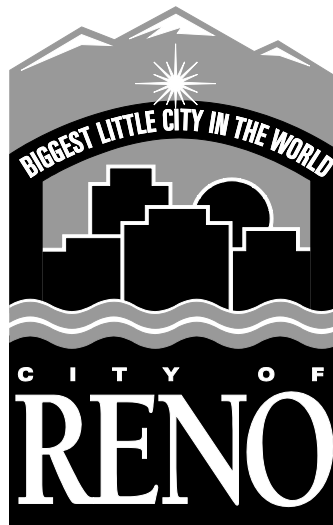
**TRUCKEE MEADOWS WATER RECLAMATION
FACILITY**

**2023 STEAMBOAT REUSE METER VAULT
ADDITION**

CONTRACT NO. I100133

PWP WA-2024-020

NOT REPRODUCIBLE



Director of Utility Services
Trina Magoon, P.E.

SECTION 010 – NOTICE TO CONTRACTORS

**Proposals Requested
By
CITY OF RENO – UTILITY SERVICES DEPARTMENT

TMWRF STEAMBOAT REUSE METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

Proposals via PlanetBids will be received until 2:00 P.M. Local Time on Wednesday, October 18, 2023, for Contract Number I100133.

Said Proposal shall include all labor, tools, implements, machinery, materials, and any incidentals necessary to complete the work in the manner and time prescribed, and in strict conformity with the Contract Documents to the satisfaction of the City Engineer. In general, the major work items include:

Shutdown and dewatering of the reuse system section that includes the existing Steamboat vault, demolition of existing 30-inch piping, installation of new mechanical equipment and piping, demolition of existing electrical equipment, installation of new electrical equipment, and other miscellaneous work as outlined in the plans and specifications.

The Bidders attention is directed to Nevada Revised Statutes 338.01165, enacted by the Nevada Legislature by passage of Senate Bill No. 207, setting forth the requirements for the use of apprentices on public works which requires a contractor or subcontractor to comply with certain requirements relating to the use of apprentices on public works.

Digital copies of the plans, specifications and related documents are available through PlanetBids (Invitation #USD-2023-05) for downloading from the City of Reno's website <http://reno.gov/business/bids-rfps>. Only those bidders who have registered and are included in and appear on the prospective bidders list may submit a bid.

A mandatory pre-bid meeting will be held at the Truckee Meadows Water Reclamation Facility, located at 8500 Clean Water Way, in Reno, Nevada at 10:00 A.M. on Thursday, October 5, 2023 on site at the location of the existing Steamboat vault. Prospective bidders must have a representative attend the pre-bid meeting to be eligible to bid the project.

The contact person for this project is Matt Smith, PE, with the City of Reno, and may be reached at (775) 399-0149 smithm@reno.gov.

Adv. Reno Gazette-Journal – September 27, 2023 & October 4, 2023
1 Proof

SECTION 015 – INSTRUCTIONS TO BIDDERS

**TMWRF STEAMBOAT METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

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The contact person for this project is Matt Smith, PE, with the City of Reno, and may be reached at (775) 399-0149 smithm@reno.gov.

All Proposals shall be subject to, and must be uploaded using the City of Reno Proposal Forms provided in the Contract Documents. Failure to submit the Proposal on the forms or without all forms in the Proposal completed will be grounds for the Proposal being rejected.

Some errors in printing have been observed from contractors printing from Apple or Mac computers. Please check your documents to ensure that documents are displaying correctly prior to submittal.

All bidders shall appear on the official planholder list.

The City reserves the right to reject any or all Proposals.

The attention of Bidders is directed to the State Contractor's License Law (NRS Provision 624.700 as amended to date).

A certified check, cashier's check, bid bond or cash, in the amount of five percent (5%) of the total bid must accompany each Proposal, as a guarantee that if awarded the Contract, the Bidder will execute the Contract, give the two (2) bonds required, and present evidence of the required liability insurance and being licensed under the provisions Chapter 4.04 of the Reno Municipal Code. Said check shall be made payable to the City of Reno, and said bond shall be executed by an approved surety, if used. The

provision of any such bond, check, or cash is conditioned to the effect that should the Bidder to whom the Contract is awarded fail to enter into the Contract in accordance with the Proposal, give the two (2) bonds required by said Contract, present sufficient evidence of required liability insurance and being licensed under the provisions of Chapter 4.04 of the Reno Municipal Code within ten (10) calendar days after notice of such award, the surety company shall forthwith pay the City of Reno the sum set forth in the bid bond, and the City shall be entitled to deposit the cash or check as liquidated damages.

The Bidder's attention is especially directed to NRS 338.125, NRS 338.130 and NRS 613.250.

For projects which are estimated to exceed \$2.5 million in accordance with the engineer's estimate, Bidders must be prequalified pursuant to NRS 338.1382(1)(a) to bid on the project. Bidders at the time of submission of the bid must be qualified by the State of Nevada Public Works Board and be on the State Public Works Board Qualified Bidder List. A bidder not prequalified is not an eligible bidder.

In order to claim the benefits of NRS 338.147 or 338.1389, the bidder must attach a Certificate of Eligibility at the time of the proposal submittal and complete and submit the Affidavit Regarding Preference in bidding within 2 hours after completion of the opening of the bids.

Contractors who appear on the Nevada State Office of the Labor Commissioner's Disqualified Contractor list or the Federal Government General Services Administration (GSA) System for Award Management (SAM) with an exclusion will not be eligible for award of the contract.

Bidders shall hold a valid State of Nevada Contractor's License of a class corresponding to the work to be performed at the time the Proposal is submitted to the City of Reno. Failure to possess the appropriate contractor's license at the time the Proposal is submitted will result in the Proposal being rejected.

The successful Bidder must possess a valid City of Reno and City of Sparks Business License prior to the award of any Contract. RMC 4.04.020 applies to subcontractors as to Business License requirements.

NRS 338.072 provides that any subcontractor of the successful bidder who is awarded the contract must also hold a state business license issued pursuant to Chapter 76 of the Nevada Revised Statutes.

Bidders are advised that they must have in place a drug and alcohol policy applicable to workers who will be employed on this project. The policy must be an approved Federal drug and alcohol policy/program which provides, at a minimum, that the use of alcohol, and use, possession, transfer, and sale of illegal drugs, narcotics, or other unlawful substances are prohibited while working on any site in connection with work performed under this contract and assurances that the contractor's subcontractors are required to cooperate with the contractor's policy. Each contractor shall demonstrate compliance by submitting with its bid the certification form found within this document under penalty of perjury that the policy is in place, that it will be actively enforced and that workers who will be employed on the project will be subject to this policy.

The successful Bidder shall furnish to the City of Reno, the appropriate insurance certificates and bonds as outlined hereinafter, prior to execution of the Contract as set forth in Section 100.14 - Insurance. Bidders must execute the Acknowledgement of Insurance Requirements. Bidders are to submit any requests for information as to insurance requirements prior to submitting a bid.

If the Unit Bid Item prices and/or schedule of values of a prospective bidder's bid are determined by the City to be unbalanced, either in excess or below the reasonable cost analysis values, the Bid may be rejected. A bid may be rejected if the City of Reno determines that the lack of balance poses an unacceptable risk to the City of Reno.

The minimum wages to be paid for labor shall not be less than the prevailing wages scale for Washoe County as determined by the Labor Commissioner of the State of Nevada. The provisions of NRS 338.010 through NRS 338.090 shall apply.

The Bidders attention is directed to Nevada Revised Statutes 338.01165, enacted by the Nevada Legislature by passage of Senate Bill No. 207, setting forth the requirements for the use of apprentices on public works which requires a contractor or subcontractor to comply with certain requirements relating to the use of apprentices on public works.

A person who bids on this contract may file a notice of protest regarding the awarding of the contract in accordance with NRS 338.142. The protestant must comply with all requirements set forth in NRS 338.142. Further, the protestant will be required, at the time of filing the protest, to post a bond or submit other security, in a form approved by the City and in the amount as set forth in NRS 338.142(3). The protest must be directed to the attention of the Director of Utility Services and must be delivered to the Clerk's Office, One East First Street, Second Floor, Reno, Nevada 89501.

Minority and Women Business Enterprises will be afforded full opportunity to submit bids in response to this notice, and will not be discriminated against on the grounds of race, color, or national origin in consideration for and award of any contract entered into pursuant to this advertisement. The City of Reno affirms its interest in and encourages the different contracting communities to actively pursue participation and utilization of Minority and Women Business Enterprises on City projects.

A bidder may submit to the City of Reno requests for approved equals or clarifications on items that have been included in the specifications or on an addendum to the specifications. Any such request must be received, in writing, not less than seven (7) calendar days before the date of the scheduled bid opening. Any request for substitution must be submitted with technical data, test results, or other information as evidence that the substitute offered is equal to or better than what is specified.



Jonathan Simpson, P.E.
Engineering Manager

SECTION 030 – PRINCIPAL CONTRACTOR

Principals:

Name:	Title:
<u>Joshua Twist</u>	<u>President</u>
<u>Lisa Twist</u>	<u>Vice President</u>
_____	_____

The following principal(s) is/are authorized to enter into contract

For: TNT Industrial Contractors, Inc.
(Prime Contractor Company Name)

Principals not listed above:

Name:	Title:
_____	_____
_____	_____
_____	_____

CHECK ONE: ☒ CORPORATION ☐ PARTNERSHIP ☐ INDIVIDUAL-OWNED

I, Joshua Twist, certify that the above list includes all owner and financial partners of the above-mentioned company-corporate structure to the best of my knowledge.


Contractor's Signature

10/18/2023
Date

TOTAL VALUE OF THE WORK TO BE COMPLETED BY THE PRIME CONTRACTOR
\$ 185,100.

MUST BE 25% OR GREATER OF THE TOTAL BASE BID WITHOUT FORCE ACCOUNT.

SECTION 070 – CONTRACT

CONTRACT

This agreement, made and entered into this _____ day of _____, 2023, in Reno, Nevada, by and between the City of Reno, hereinafter called the City, and _____, hereinafter called the Contractor.

Witnesseth, that the Contractor agrees with the City, for the consideration and agreements hereinafter mentioned and contained to be made and performed by the City, and under the conditions expressed in two (2) bonds bearing even date with these presents, approved by the City Attorney and hereunto annexed, that they, the Contractor, shall and will at their own proper cost and expense, do all the work and furnish all the materials, necessary for the substantial construction and completion and to the satisfaction of the City,

**TMWRF STEAMBOAT METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

together with incidental items necessary to complete the work in strict conformity, in every part and particular, with the annexed plans, special provisions and technical specifications which are made a part hereof (Contract Documents), and in full compliance with the terms of this agreement.

And the Contractor hereby further agrees to receive and accept the unit prices set forth in the "Schedule of Prices" forms hereto annexed and hereby made a part of this agreement, as full compensation for furnishing all materials and labor, and the doing of all work, to the satisfaction of the City and in the manner and under the conditions hereinafter specified.

The City hereby promises and agrees with the Contractor, to employ, and does hereby employ, the Contractor to provide the materials and to complete all the work according to the terms and conditions herein contained and referred to, for the prices in the Proposal Schedule of Prices Bid form, and hereby contracts to pay the said Contractor at the time, in the manner, and upon the conditions set forth in the Contract Documents, and the said parties themselves, their heirs, executors, administrators, successors, and assigns, do hereby agree to the full performance of the covenants herein contained.

The Contractor further agrees that no monies payable under this contract shall be assigned by power of attorney, or otherwise, except upon written consent of the City.

The Contractor covenants and agrees to conform to and comply with all requirements contained in Wage and Equal Opportunity requirements hereto annexed and hereby made a part of this Agreement. The Contractor further agrees that they shall promptly repair, replace, restore or rebuild, as the City may determine, any finished work in which defects of materials or workmanship may appear or to which damage may occur, because of such defects, during a one-year period subsequent to the date of final acceptance.

It is further expressly agreed, by and between the parties hereto, that should there be any conflict between the Contract Documents and the Proposal of said Contractor, then Contract Documents shall

control and nothing herein shall be considered an acceptance of the said terms of said proposal conflicting therewith.

Furthermore, the components of the Contract Documents shall be assigned the following hierarchy, with the items listed in order of decreasing control as follows:

- Executed Change Orders
- Contract
- Addenda
- Special Provisions or Technical Specifications
- Supplemental General Provisions
- Proposal
- City of Reno Standard Detail Drawings
- Standard Specifications for Public Works Construction

In the event of a conflict between the Specifications and the Drawings, the more restrictive shall prevail.

The Contractor hereby further agrees to receive and accept the Contract Sum of

_____ Dollars

(\$_____), as full compensation for furnishing all materials and labor, and the doing of all work, to the satisfaction of the Owner, and in the manner and under the conditions specified in the Contract Documents.

And the said Contractor hereby further agrees that the payment of the final amount due under this Contract shall release the City from any and all claims or liability on account of work performed under this Contract other than such claims, if any, as may be specifically excepted by the Contractor in writing at the time final payment is made.

In witness whereof, the parties to these presents have hereunto set their hands and seals the year and date first above written.

ATTEST:

City of Reno, Nevada

City Clerk, City of Reno

Hillary L. Schieve, Mayor

I hereby certify that I have examined the written contract and find the same to be in accordance with the Reno Municipal Code.

By: _____
(Deputy City Attorney)

CONTRACTOR'S ACKNOWLEDGEMENT

(Company Name)

(Principal Signature)

(Principal Printed Name)

CONTRACTOR'S NOTARY:

State of _____

County of _____

_____,
(Name of party signing this affidavit & Proposal Form)

known to me to be the _____ of
(Title)

_____,
(Company Name)

acknowledged to me that he executed the above instrument.

Sworn to before me this _____ day of _____, 2023.

(Notary Public)

(Stamp/Seal)

SECTION 100 – SUPPLEMENTAL GENERAL PROVISIONS

CITY OF RENO – UTILITY SERVICES DEPARTMENT

SUPPLEMENTAL GENERAL PROVISIONS

**TMWRF STEAMBOAT METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

100.00.01 – STANDARD SPECIFICATIONS

All materials furnished and work performed shall be done in accordance with the 2012 edition of "Standard Specifications for Public Works Construction" (Orange Book) and any revisions thereto if not covered by the Supplemental General Provisions and the contract documents. The "Standard Specifications for Public Works Construction" are herein referred to as "Standard Specifications". In the event of conflict, error, ambiguity or discrepancy between provisions of the Supplemental General Provisions and/or the contract documents and the Standard Specifications hereinbefore mentioned, the Supplemental General Provision and the contract documents shall take precedence. The Supplemental General Provisions are additions to the Standard Specifications unless specified as a deletion or replacement.

Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code or laws or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated in these contract documents. The contract documents shall take precedence over any provisions of any such laws or regulations applicable to the performance of the work unless the interpretations of the contract document provisions would result in violation of such law or regulation.

100.00.02 – STANDARD DETAILS

The City of Reno "Supplemental Standard Drawing Details" and any revisions thereto, herein referred to as "Standard Details" shall apply to this contract except as modified in the Improvement Plans and/or by these Specifications.

100.00.03 – SCOPE OF WORK

The scope of work includes the shutdown and dewatering of the reuse system section that includes the existing Steamboat vault, demolition of existing 30-inch piping, installation of new mechanical equipment and piping, demolition of existing electrical equipment, installation of new electrical equipment, and other miscellaneous work as outlined in the plans and specifications.

Contract prices in the "Schedule of Prices" forms shall be considered full compensation for all labor, materials, tools, equipment, overhead profit, insurance bonding, taxes, and all other incidentals necessary to complete the construction as shown on the Improvement Plans and/or as specified in Contract Documents under this Contract. Actual installed quantities of each item proposed on a unit price basis will be determined during construction in the manner set up for each proposed item in these Specifications. Payment for all items in the "Schedule of Prices" forms will constitute full compensation for all work shown and/or specified to be performed under this project.

100.00.04 – CONTRACTOR COOPERATION

Special Construction phasing/order of work shall be per Section 100.21 of these specifications. The Contractor should note that, in addition to this Contract, there may be other contractors executing construction contracts for other agencies in the area. In the event of concurrent work, it shall be the responsibility of the Contractor to coordinate operations in such manner so that all requirements, restrictions and stipulations specified in these Contract Documents are met.

100.01.11 – CONTRACT TIME

The Contractor shall begin executing contract work on the date when the Contract Time commences to run, with the exception that no physical work shall be performed at any site prior to both the Contract Time commencing and completion of tasks identified in Section 100.21. The Contract Time shall commence as set forth in the "Notice to Proceed". The Contractor shall begin work no later than the date set forth in the "Notice to Proceed" and shall diligently prosecute the same to completion before the expiration of **one hundred eighty (180) calendar days** from that date. Failure to complete the above work within the specified time requirements will subject the Contractor to liquidated damages in accordance with Subsections 100.21.01 and 100.39 of these Specifications. The Contract time includes up to three (3) weather days. In the event of additional weather delay exceeding the three (3) allocated, one calendar day will be extended to the contract and the contract end date will extend.

Where used within this document, the following definitions shall apply to the hours and days of operation:

Normal Working Hours and Days: From 7:00 AM to 6:00 PM, Monday through Friday , excluding holidays. This applies to equipment start up and operation of all equipment.

Night Time Hours: From one-half (1/2) hour after sunset to one-half (1/2) hour before sunrise.

This applies to the startup and operation of all equipment.

Weekend Working Hours: From 7:00 PM Friday to 5:00 AM Monday, excluding Holidays.

Weather Day: A weather day will be defined as delays caused by the effects of rains or other inclement weather conditions, related adverse soil conditions or suspension of operations that prevent the Contractor from productively performing controlling items of work resulting in:

1. The Contractor being unable to work at least 50% of the normal work day on pre-determined controlling work items; or
2. The Contractor must make major repairs to work damaged by weather, provided that the damage is not attributable to the Contractor's failure to perform or neglect; and provided that the

Contractor was unable to work at least 50% of the normal workday on pre-determined controlling work items.

If the Contractor intends to seek approval to perform contract work outside normal working hours and/or working days such approval must be obtained from the City's Project Manager at least twenty-four (24) hours prior to commencing such work.

If the Contractor intends to seek approval to perform contract work on Saturday or Sunday, approval must be obtained by the Monday preceding work on the Saturday or Sunday for which work is planned. If the Contractor intends to seek approval to perform work on a legal holiday, they must obtain such approval from the City's Project Manager at least seven calendar days in advance.

The contractor may work in excess of 8 hours in each work day, however the Contractor must pay overtime wages according to the laws governing public works construction.

The Contractor shall be responsible for any services, costs, overtime, etc., incurred by City for work performed on legal holidays and outside the normal working hours and days.

100.01.17 – HOLIDAYS

Delete Standard Specification section and replace with the following:

No contract work shall be performed on the following legal holidays recognized by the City unless approved by the City's Project Manager:

- New Year's Day (January 1)
- Martin Luther King Day (3rd Monday in January)
- President's Day (3rd Monday in February)
- Memorial Day (Last Monday in May)
- Juneteenth (June 19)
- Independence Day (July 4)
- Labor Day (1st Monday in September)
- Nevada Day (Last Friday in October)
- Veteran's Day (November 11)
- Thanksgiving Day (4th Thursday in November)
- Day after Thanksgiving Day (4th Friday in November)
- Christmas Day (December 25)
- Other days declared by the President of the United States, Governor of Nevada

100.05.01 – EXAMINATION OF PLANS AND SITE

Delete Standard Specification section and replace with the following:

Each Bidder shall visit the site of the proposed work and become fully acquainted with conditions relating to construction and labor so that the Bidder may fully understand the vehicle and pedestrian traffic volumes, special access requirements to businesses, existing conditions relating to lateral locations, facilities, difficulties, and restrictions attending the execution of the work under the Contract. Bidder shall thoroughly examine and be familiar with the drawings and Specifications. The failure of any Bidder to receive or examine any form, instrument, addendum or other document or to visit the site and become

acquainted with conditions there existing shall in no way relieve any obligations with respect to the Bidder's proposal or to the Contract.

Contractor is responsible for reviewing, for installation of, and for verifying new/replacement of piping and demolition of existing piping within the Steamboat Meter Vault. The meter vault does have known physical constraints and is a confined space.

100.05.02 – SUBSURFACE INVESTIGATION

A geotechnical investigation was not performed with this project. Contractor will perform all required excavation activities to complete the work with no additional payments from the City. The Contractor is cautioned that they may encounter large boulders, hard rock excavation and/or ground water during trench excavation. Special construction techniques and additional permanent asphalt patching/surface restoration may be necessary and will be considered normal for this construction.

100.11 – AWARD OF CONTRACT OR REJECTION OF PROPOSALS

Delete Standard Specification section and replace with the following:

If the award is made, the City will award the contract to the lowest responsive and responsible bidder who complies with the instructions in these contract documents. The award, if made, will be within ninety (90) calendar days after the opening of the proposal. The City may award the base bid, or base bid plus additive alternates as budget will allow to the bidder who submits the best bid pursuant to the requirements of Chapter 338.147 of the NRS. Any Alternatives awarded will be in the order listed.

The City reserves the right to reject any or all proposals. The competency and responsibility of Bidder as evidenced by the information accompanying the proposal, which will be subject to verification, will be considered in making the award. The proposal may be rejected if the unit prices contained in the proposal are unbalanced, either in excess or below reasonable cost analysis.

The City reserves the right to waive requirements relating to minor irregularities in the proposal documents when it is deemed to be in the best interests of the City to do so.

Before any contract is awarded, the bidder may be required to furnish a complete statement of origin, composition, and manufacture of any or all materials to be used in the construction of the work, together with samples, if required by the Specifications to determine their quality and fitness for the work.

100.11.01– PREFERENCE IN BIDDING

Pursuant to Chapter 338 of the Nevada Revised Statutes 338.0117 and 338.147, to qualify to receive a preference in bidding a contractor must submit within 2 hours after the completion of the opening of the bids, a signed affidavit which certifies that for the duration of the project the following will be:

At least 50 percent of all workers employed on the public work, including, without limitation, any employees of the contractor, applicant or design-build team and of any subcontractor engaged on the public work, collectively and not on any specific day, will hold a valid driver's license or identification card issued by the Department of Motor Vehicles of the State of Nevada;

All vehicles used primarily for the public work will be:

- (1) Registered and partially apportioned to Nevada pursuant to the International Registration Plan, as adopted by the Department of Motor Vehicles pursuant to NRS 706.826; or
- (2) Registered in this State;

At least 50 percent of the design professionals working on the public work, including, without limitation, any employees of the contractor, applicant or design build team and of any subcontractor engaged on the public work, collectively and not on any specific day, will have a valid driver's license or identification card issued by the Department of Motor Vehicles of the State of Nevada;

The contractor, applicant or design-build team and any subcontractor engaged on the public work will maintain and make available for inspection within this State his or her records concerning payroll relating to the public work.

A failure to comply with any requirement of NRS 338.0117 entitles the public body to a penalty pursuant to Subsections 5 and 6 of NRS 338.0117.

100.12 – CONTRACT, PROJECT CONSTRUCTION COORDINATION

The Bidder to whom award is made shall execute a written Contract with the City of Reno within ten (10) calendar days after the date on which the Contract is awarded.

At the preconstruction meeting, the Contractor shall designate a representative who will be on the job or available for communication at all times during construction. The Contractor's representative shall be available twenty-four (24) hours a day by mobile telephone, home telephone, answering service, pager, or other means acceptable to the City's Project Manager. The representative shall be the contact person representing the Contractor and shall be capable of giving direct field orders as the need arises and addressing property owner concerns. Official job communication shall be conducted between the Contractor's representative and the City's Project Manager. It is the intent of this Contract that the Contractor's representative shall be the same person for the entire duration of the project. A proposed change of the Contractor's representative during the course of the project is subject to approval by the City.

100.13 – CONTRACT SECURITY

The successful bidder shall, at the time of signing the Contract, furnish the following listed bonds of a surety company or companies authorized to do business in the State of Nevada and satisfactory to the City of Reno. The bonds shall be made payable to the City of Reno.

100.13.01 – PERFORMANCE BOND

A bond in an amount equal to 100 percent of the full amount of the Contract, as surety for the faithful performance of the Contract, and for the fulfillment of such other requirements as may be provided by law shall be required. The faithful performance bond shall remain in effect for one (1) year after final payment has been accepted by the Contractor.

100.13.02 – LABOR AND MATERIALS BOND

A bond in an amount equal to 100 percent of the full amount of the Contract as surety for the payment of materials and labor costs for which the Contractor has obligated themselves will be required.

100.14 – INSURANCE

Delete Standard Specification section and replace with the following:

Each insurance policy shall bear at least thirty (30) day written notice of cancellation to the certificate holder for any reason other than non-payment of premium which shall bear at least ten (10) day written notice of cancellation.

If the city is notified prior to completion of this contract, that any required insurance is or will be no longer in effect or is scheduled to be cancelled, the city will issue a notice that if insurance is not reinstated prior to expiration of the policy the work will be suspended. It will be the sole responsibility of the contractor to re-establish any and all insurances no longer in effect and provide a copy of current insurance to the City's Project Manager before contractor is allowed to continue work on the jobsite. The insurance must be the same coverage as the original insurance required by this contract. The contractor is not allowed to do any work until it receives a written notice from the city to resume work. The city will not bear any costs associated with the work stoppage due to the lapse in insurance, nor any costs associated with any mobilization or de-mobilization incurred by the contractor due to the insurance lapse. Working days will remain in effect during this time and will continue to count as if the contractor was still working.

If the insurance is not re-established prior to the cancellation date, the contractor will be considered in breach of contract and the contract will be terminated pursuant to Section 100.28.

100.14.01 – LIABILITY INSURANCE

Delete Standard Specifications section and replace with the following:

At all times during the agreement term, Contractor shall procure and maintain, at its sole expense, the following insurance coverage unless waived in writing:

Commercial General Liability at least as broad as Insurance Services Office Commercial General Liability Coverage "occurrence" form CG 00 01 04 13 or an equivalent form. The Comprehensive General Liability Coverage shall include, but is not limited to, liability coverage arising from premises, operations, independent contractors, products and completed operations, personal and advertising, injury, blanket contractual liability and broad form property damage.

The following coverage shall not be limited, by endorsement or otherwise:

1. Contractual liability coverage, including the definition of "Insured Contract" and the contractual liability exception to the employer's liability exclusion.
2. Completed operations coverage, including the subcontractor exception to the "damage to 'your work'" exclusion.
3. The provisions of Subparts (5) and (6) of the "damage to property" exclusion pertaining to "that particular part..." in ISO form CG 00 01 04 13.

If any underground work will be performed, the policy limits shall be no less than \$2,000,000 per occurrence, \$4,000,000 general aggregate and \$4,000,000 products-completed operations aggregate and shall be endorsed to include electronic data liability coverage form CG 04 37 (or equivalent). The City waives this requirement for this project only.

In addition, Explosion, Collapse, Pollution and Underground coverage must be reflected in the insurance certificates and shall be no less than \$2,000,000 per occurrence, \$4,000,000 general aggregate and \$4,000,000 products-completed operations aggregate. The City waives this requirement for this project only.

The Contractor shall maintain limits of no less than \$2,000,000 per occurrence, \$4,000,000 general aggregate and \$4,000,000 products-completed operations aggregate, or the amounts customarily carried by the Contractor, whichever are greater. The general aggregate limit shall apply on a per project or location basis.

The policy shall include the City of Reno and the City of Sparks, including its elected officials, officers, employees, agents and volunteers as additional insureds with respect to liability arising out of the activities performed by or on behalf of the Contractor, including the insured's general supervision of the Contractor, products and completed operations of the Contractor and for premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the additional insureds.

The Additional Insured Endorsements for General Liability shall be at least as broad as the unmodified ISO CG 20 10 04 13 and ISO CG 20 37 04 13 endorsements, or equivalent, including additional insured coverage for the Contractor's premises, operations products and completed operations exposures. The certificate shall confirm Excess Liability is following form.

The Contractor shall obtain and maintain Completed Operations Liability Insurance through the statute of repose after completion of the Project. The limit of Completed Operations Liability Insurance coverage shall be the same as the limit for General Liability.

The Contractor's insurance coverage shall be considered primary insurance. Any insurance or self-insurance maintained by the City shall be excess of the Contractor's insurance and shall not contribute in any way.

The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

Any failure by the Contractor to comply with reporting provisions of the policies shall not affect its obligations to the additional insureds.

The Contractor shall furnish the City a policy or certificate of liability insurance issued by an authorized representative of the insurance carrier including policy forms and endorsements confirming the required coverage. The contract number and name of contract for this project shall be included on the certificate.

This contract includes work that may result in exposure to "hazardous material" as this term is defined by applicable law, including, but not limited to waste, asbestos, fungi, bacterial, and mold.

Automobile Coverage at least as broad as Insurance Services Office Business Auto Coverage form CA 00 01 10 13 or an equivalent form covering Automobile Liability Symbol 1 "Any Auto". In lieu of a separate Business Auto Liability Policy, the City may agree to accept Auto Liability covered in the General Liability Policy, if non owned and hired auto liability are included.

The Contractor shall maintain limits of no less than \$1,000,000 or the amount customarily carried by the contractor, whichever is greater, combined single limit per accident for bodily injury and property damage. No aggregate limit may apply.

The Contractor's policies shall be endorsed to provide a thirty (30) day written notice of cancellation to the certificate holder for any reason other than non-payment of premium which shall bear at least ten (10) day written notice of cancellation.

Certificate Holder:	City of Reno	City of Sparks
	P.O. Box 1900	431 Prater Way
	Reno, NV 89505	Sparks, NV 89431

Acceptability of Insurers: Insurance is to be placed with an A.M. Best Company, Inc. rating level of **A-** or better, financial size category of **VIII** or better, or otherwise approved by the City in its sole discretion. City reserves the right to require that Contractor's insurer be a licensed and admitted insurer in the State of Nevada, or on the Insurance Commissioner's approved but not admitted lists.

The Contractor shall include all subcontractors as insureds under its policy or it shall require its subcontractors to maintain separate liability coverages and limits as set forth herein.

100.14.01 – PROPERTY INSURANCE

The Contractor shall purchase and maintain property insurance upon the entire work at the site for the full cost of replacement at the time of loss. This insurance shall include the interests of the Owner, the Contractor, subcontractors, and sub-subcontractors in the work. This insurance shall be written as a builder's risk, all-risk, or equivalent form to cover all risks of physical loss except those specifically excluded by the policy and shall insure at least against the perils of fire, theft, vandalism and malicious mischief, lightning, explosion, windstorm, and hail, smoke, aircraft and vehicles, riot and civil commotion, debris removal, flood, earthquake, earth movement, water damage, wind, testing, if applicable, collapse however caused, and damage resulting from defective design, workmanship or material.

The Contractor shall purchase and maintain property insurance for his property located at the project site.

This policy shall provide for a waiver of subrogation in favor of the City and Contractor.

The insurance shall remain in effect until final acceptance by the City.

Partial occupancy or use of any building shall not commence until the Contractor has secured the consent of the insurance company or companies providing the coverage required in this paragraph. Prior to commencement of the work, the Contractor shall provide certificates of insurance for the property policy or policies obtained in compliance with this section.

Acceptability of Insurers: Insurance is to be placed with an A.M. Best Company, Inc rating level of **A-** or better, financial size category **VIII** or better, or otherwise approved by the City in its sole discretion. City reserves the right to require that Contractor's insurer be a licensed and admitted insurer in the State of Nevada or on the Insurance Commissioner's approved but not admitted lists.

100.14.02 - WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

The Contractor shall purchase and maintain Workers' Compensation and Employer's Liability insurance at least as broad as National Council on Compensation Insurance (NCCI) policy form WC 00 00 00 B 07/11, or equivalent, providing coverage meeting the requirements of the Workers' Compensation law of the State of Nevada.

The policy shall include an endorsement waiving the insurance company's rights of subrogation against the City. This endorsement shall be at least as broad as National Council on Compensation Insurance (NCCI) Waiver of Our Right to Recover from Others Endorsement form WC 00 03 13.

It is understood and agreed that there shall be no Worker's Compensation and Employer's Liability coverage provided for the Contractor or any subcontractor by the City. The Contractor, and any subcontractor(s), shall procure, pay for and maintain required coverage. The Contractor agrees, as a precondition to the performance of any work under this Contract and a precondition to any obligation of the City to make any payment under this Contract, to provide the City with certificates issued by an insurance company that shows compliance with this Contract and Nevada Revised Statutes (NRS) 616B.627 and 617.210, respectively. Should the Contractor be self-funded, the Contractor shall so notify the City in writing prior to the signing of a Contract. The City reserves the right to accept or reject a self-funded Contractor and to approve the amount of any self-insured retentions. The Contractor agrees that the City is entitled to obtain additional documentation, financial or otherwise, for review prior to entering into a contract with the self-funded contractor.

Upon completion of the project, the Contractor shall, if requested by the City, provide the City with a Final Certificate for itself and each subcontractor showing that the Contractor and each subcontractor had maintained the required insurance by paying all premiums due throughout the entire course of the project. If the Contractor or subcontractor is a sole proprietor, coverage for the sole proprietor must be purchased and evidence of coverage must appear on the Certificate of Insurance and Final Certificate.

Worker's Compensation and Employer's Liability: Workers' Compensation coverage shall be provided with statutory limits in the State of Nevada. Employer's Liability limits of \$1,000,000 each accident, \$1,000,000 each employee for disease and \$1,000,000 policy limit for disease.

If the Contractor fails to make payment for the workmen's compensation insurance, the City will immediately make payment and deduct the cost thereof from the payment then or thereafter due the Contractor.

100.14.03 – ACCIDENT PREVENTION AND SAFETY

This Section specifies procedures for complying with applicable laws and regulations related to worker safety and health. It is not the intent of the City to develop, manage, direct, and/or administer the safety and health programs of Contractors or in any way assume the responsibility for the safety and health of their employees. It is required that all Contractors adhere to applicable federal, state, and local safety and health standards.

The Contractor shall comply with the Federal Contract Work Hours and Safety Standards Act, as set forth in Title 29, CFR. Copies of the regulations may be obtained at ecfr.gov.

The Contractor shall comply with the provisions of the State of Nevada Occupational Safety and Health Act and Federal Occupational Safety and Health Act, as amended.

The Contractor shall provide all safeguards, safety devices, and protective equipment and take any other needed actions, on their own responsibility, reasonably necessary to protect the life and the health of employees on the job, the safety of the public, and to protect property in connection with the performance of the work covered by this contract.

It is not the intent of the City to list and identify all applicable safety codes, standards, and/or regulations requiring compliance by the Contractor and their Subcontractor groups. Contractors and their Subcontractors shall be solely responsible for identifying and determining all safety codes, standards, and regulations which are applicable to the work.

Sewer treatment facilities do contain areas that are considered confined spaces and are subject to federal, state, and local regulations governing confined space entry and safety procedures. Confined spaces are not identified on the plans. It is the responsibility of the contractor to coordinate and verify all confined spaces and include provisions for entering all confined spaces to complete the work as a part of their bid.

The Contractor should anticipate that a wide spectrum of infectious disease-producing organisms can be present at the sewer treatment facility. In addition to the requirements set forth in the regulations described above, the Contractor shall provide the following:

1. Instruction in appropriate disease-prevention mechanisms and personal sanitation practices for all workers and supervisors.
2. A preventive inoculation program (tetanus/diphtheria, hepatitis, etc.) available to all personnel.
3. Clothing to protect against infection, including rubber boots with full sole and heel steel insert liners, safety glasses or goggles, and gloves.

Dangerous Gases and Oxygen Deficiency: Sewer pipes, manhole structures, vaults, tanks, trenches, etc. are confined spaces which mean they have a limited means of egress and are subject to the accumulation of dangerous gases or oxygen deficiency. Volatile petroleum products and common household hazardous materials may be discharged into the sewer. Explosive gases, such as methane generated from decomposing organic material, may accumulate. Toxic gases, such as hydrogen sulfide, may be present in life-threatening concentrations. Significant oxygen depletion may occur. In addition, construction procedures may require combustion engine machinery to be located in or near the work site. Therefore, gaseous combustion byproducts, such as carbon monoxide, may be present.

In addition to the requirements set forth in the regulations described above, the Contractor shall provide portable atmospheric 4-gas monitors that measure levels of oxygen, lower explosive limit (LEL), carbon monoxide, and hydrogen sulfide (H₂S). Monitors shall be properly calibrated and carefully maintained throughout the construction period. Monitors shall be used continuously while personnel are working at the facility.

Toxic chemicals may be part of the construction process. The Contractor shall abide by all handling procedures recommended by the manufacturer when dealing with toxic chemicals.

The Contractor shall promptly suspend work and notify the City's Project Manager of any suspect material and/or unusual conditions, including oily soil found on the work site. Work shall remain suspended until the Contractor receives authorization from the City's Project Manager to continue.

The Contractor shall notify the City's Project Manager immediately of all incidents involving personal injury and/or property damage. Provide a written report known as the Incident Report within 24 hours of any incident. Report for each incident occurrence shall include:

1. Description of event.
2. Names of personnel involved.
3. Description of injuries and treatment required (short term and long term).
4. Description of property damage.
5. Site visits and inspections of other agencies as a result of an incident. Include names of the persons, purpose of the visit, and any other pertinent information.

100.14.03 – DRUG/ALCOHOL PROGRAM REQUIREMENT

In order to be eligible to perform work on a City of Reno Public Works Construction Project, contractors are to have in place a drug and alcohol policy applicable to workers who will be employed on such project. This requirement is a reasonable precaution to ensure a safe and drug-free environment on City of Reno Public Works Construction Projects.

The policy is to be an approved Federal drug and alcohol policy/program which provides, at a minimum, that the use of alcohol, and use, possession, transfer, or sale of illegal drugs, narcotics, or other unlawful substances is prohibited while working on any site in connection with work performed under this Contract and assurance that the Contractor's subcontractors are required to cooperate with the Contractor's policy.

The Contractor shall demonstrate compliance with this provision by submitting an affidavit of certification for drug and alcohol policy with their bid under penalty of perjury that the policy is in place, will be actively enforced, and that workers who will be employed on the project will be subject to the policy.

The City of Reno may review the Contractor's record of its drug and alcohol policy at any time during the period following award of the bid up to and including completion of the project in order to determine whether the policy is in place.

Failure to maintain a policy may result in suspension of the Contract, pending proof of compliance by the Contractor, at no cost to the City of Reno.

The Contractor shall indemnify, defend and hold the City of Reno harmless against any and all claims, demands, suits or liabilities that may arise out of or is in any way related to Contractor's application or non-application of their drug and alcohol policy.

100.14.03. – CONFINED SPACE ENTRY

The Contractor shall be required to comply with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations, as outlined in the 29 CFR Parts 1910; "Permit-Required Confined Spaces for General Industry; Final Rule". The Contractor shall submit, at the pre-construction meeting, a written plan for confined space entry and written documentation that its employees have been trained in confined space entry procedures. The plan shall include emergency rescue operations. The documentation shall include the specific names of the trained employees and their training records. Failure to fully comply with this specification during construction may result in a work stoppage until corrective action has been taken. Any work stoppage shall be at the Contractor's expense. Such suspension time shall count against the Contractor's total number of project calendar days under the Contract.

100.14.04 – INDEMNITY

Delete Standard Specification section and replace with the following:

To the fullest extent permitted by laws and regulations the Contractor shall assume the defense of, indemnify and hold harmless the City and its Officers, Employees, and Consultants from all suits, actions, or claims of any character brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the said Contractor; any act or omission of Contractor arising from the work performed; or on account of or in consequence of any neglect in safeguarding the work; or the use of unacceptable materials in constructing the work; or because of any claims or amount recovered under the "Workman's Compensation Act", or any other law, ordinance, order, or decree. The money due the said Contractor under and by virtue of this Contract as may be considered necessary by the City's Project Manager for such purpose, may be retained for use of City or in case no money is due, his surety may be held until such suit or suits, action or actions, claim or claims for the injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the City's Project Manager; except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he is adequately protected by public liability and property damage insurance.

Reimbursement to the Contractor by the City in whole or in part for costs of protecting traffic shall not serve to relieve the Contractor of their responsibility as set forth in the Standard Specifications and these Special Provisions.

The Contractor guarantees the payment of all just claims for materials, supplies, and labor, and all other just claims against their, or any, subcontractor in connection with this Contract.

100.15.01 – PREVAILING WAGE, CERTIFIED PAYROLL

Delete Standard Specification section and replace with the following:

This project is subject to prevailing wage rates in accordance with Nevada Revised Statutes Chapter 338. The prevailing wage rates for Washoe County, as established by the Nevada State Labor Commission, shall be paid for all classifications of labor. The Contractor is responsible for verifying and adhering to all prevailing wage rates. Pursuant to Chapter 132, Statutes of Nevada 2023, enacted by the Nevada Legislature by passage of Assembly Bill No. 190 (NRS 338.030 (9)), the prevailing rates of wages are the rates in effect at the time of the opening of bids and will be paid as provided in Assembly Bill No. 190 and will be included in the conformed contract documents.

This Project is under and subject to Executive Order 11246 of September 24, 1965, and to the Equal Employment Opportunity (EEO) and Labor Standard Provisions. Minimum Wage rates have been determined by the Labor Commissioner of the State of Nevada and are set forth in the contract documents. In no case shall the wage rates be less than prescribed therein. In the event there is a difference between the minimum wage rates as predetermined by the Secretary of Labor and the prevailing wages rates as determined by the State Labor Commissioner for similar classifications of labor, the contractor or and his subcontractor shall not pay less than the wage rate which is the higher of the two. Additionally, if a classification that is being used does not appear in the Davis Bacon Wage decision, a Request for Classification will be required and will be forwarded to the U.S. Department of Labor for approval.

A forty-hour (40-hour) work week shall be performed over no less than a five (5) day week of work. A contractor or subcontractor may work in excess of forty (40) hours a week; however the contractor or subcontractor must pay overtime wages, in accordance with NRS338.020, for hours worked in excess of eight (8) hours in any given day.

The Contractor's attention is directed to NRS Chapter 338, as it relates to Public Works Projects and, specifically, changes in the requirements for submission of certified payrolls and payment of prevailing wages. The Contractor shall make arrangements for submittals at the preconstruction meeting.

The Contractor shall report in writing to the City the name and address of each subcontractor whom they will engage for work on this project within five (5) calendar days after award of Contract. **THIS SUBMITTAL DOES NOT RELIEVE THE CONTRACTOR OF THE SUBMITTAL REQUIREMENTS IN THESE SPECIFICATIONS.**

The Contractor shall report in writing to the State of Nevada Labor Commissioner the name and address of each subcontractor whom they engage for work on this project within ten (10) calendar days after each subcontractor has commenced work on the project. The Contractor shall submit a copy of this information to the City within the same timeframe.

The Contractor shall submit certified payrolls to the City for all individuals working on this project on a weekly basis. The Contractor and all subcontractors are required to submit certified payroll electronically through the City's LCPTracker program. Progress payment requests submitted by the Contractor will not be accepted unless certified payroll submittals from the Contractor and all subcontractors are current for the project period covered by the pay application.

100.15.03 – REGISTRATION OF CONTRACTORS & PREQUALIFICATION REQUIREMENTS

Contractors shall be licensed in accordance with the provisions of NRS 624 for all projects.

For projects which are estimated to exceed \$2.5 million in accordance with the engineer's estimate, Bidders must be prequalified pursuant to NRS 338.1382(1)(a) to bid on the project. Bidders at the time of submission of the bid must be qualified by the State of Nevada Public Works Board and be on the State Public Works Board Qualified Bidder List. A bidder not prequalified is not an eligible bidder.

100.15.04 – FAIR EMPLOYMENT PRACTICES/LABOR DISCRIMINATION

Delete Standard Specification section and replace with the following:

Attention is directed to the following portion of NRS Provision 338.125. Contracts negotiated between Contractors and the State, or any of its political subdivisions, shall contain the following contractual provisions:

In connection with the performance of work under this contract, the contractor agrees not to discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, sexual orientation, gender identity or expression, or age. Such Contract shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

The Contractor further agrees to insert this provision in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

Any violation of such provision by a contractor shall constitute a material breach of contract. As used in this article, sexual orientation means having or being perceived as having an orientation for heterosexuality, homosexuality, or bi-sexuality. Sexuality and gender identity or expression means a gender-related identity, appearance, expression, or behavior of a person, regardless of the person's assigned sex at birth. Race includes traits associated with race, including, without limitation, hair texture and protective hairstyles.

100.15.05 – PREFERENTIAL EMPLOYMENT

Delete Standard Specification section and replace with the following:

Pursuant to NRS 338.130, in all cases where persons are employed in the construction of public works, preference must be given, the qualifications of the applicants being equal, first to persons who have been honorably discharged from the Army, Navy, Air Force, Marine Corps or Coast Guard of the United States, a reserve component thereof or the National Guard; and are citizens of the State of Nevada, and second to other citizens of the State of Nevada. If the contractor engaged on the public work is not in compliance with the provisions of this subsection, the contract is void, and any failure or refusal to comply with any of the provisions of this section renders any such contract void.

100.15.06 – AMERICANS WITH DISABILITIES ACT

The Contractor and all subcontractors shall comply with the terms, conditions, and requirements of the Americans with Disabilities Act of 1990 (P.L. 101-136), 42 U.S.C. 12101, as amended and regulations adopted thereunder contained in CFR 26.101-36.999, inclusive, and any relevant program-specific regulations.

100.15.07 – PAYMENT OF SALES AND USE TAXES

The Contractor, subcontractors, or anyone who provides labor, equipment, materials, supplies or services must comply with applicable federal, state, and local laws, including without limitation, any applicable licensing requirements and requirements for the payment of sales and use taxes on equipment, materials and supplies provided for this project.

100.15.08 – STATE OF NEVADA BUSINESS LICENSE

NRS 338.072 provides that any subcontractor of the successful bidder who is awarded the contract must also hold a state business license issued pursuant to Chapter 76 of the Nevada Revised Statutes. RMC 4.04.020 applies to subcontractors as to Business License requirements.

100.15.09 – APPRENTICES

Contractor is to comply with Nevada Revised Statutes 338.01165, enacted by the Nevada Legislature by passage of Senate Bill No. 207, setting forth the requirements for the use of apprentices on public

works which requires a contractor or subcontractor to comply with certain requirements relating to the use of apprentices on public works.

100.16.03 – INSPECTION FACILITIES

Quality Assurance testing and inspection will be provided by the City. Quality Control shall be the Contractor's responsibility. All samples shall be furnished by the Contractor without cost to the City. The City's Project Manager may waive sampling and testing if adequate information, properly certified, is available to indicate that materials comply with the terms of specifications. Any retests due to faulty workmanship or materials shall be paid for by the Contractor. Specific testing requirements are contained in the Standard Specifications and as modified herein. Subject to NRS 338.140, the responsibility for ensuring that the work is constructed in strict conformance with the contract documents and specifications resides solely with the Contractor.

No payment shall be made to the Contractor for the cost of delay while waiting for inspection by the City's Project Manager of completed work.

100.17 – MATERIALS AND WORKMANSHIP

The Contractor shall warrant equipment, material, and workmanship to be of first quality and approved by the City's Project Manager and shall guarantee that the quality of material and workmanship used in the job will be satisfactory for a period of one year after final acceptance of the work. Any defects occurring during the guarantee period shall be corrected in a manner satisfactory to the City's Project Manager. In the event repairs cannot be made without undue difficulty, the Contractor or his surety shall be responsible to the City for any damages determined reasonable and consistent with the circumstances and acceptable to the City.

The Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the work. All materials shall be of good quality and new, except as otherwise provided in the contract documents.

The Contractor acknowledges that any damage to public or private property due to excavation, equipment movement or storage, foot traffic, material storage or any other contractor activity will be replaced in accordance with these Specifications to equal or better than previously existing conditions at the Contractor's expense. Grass will be re-sodded, trees and shrubs replaced in kind, irrigation systems repaired or replaced, fencing restored, and any damaged or removed structures and flatwork repaired or replaced.

100.18 – USE OF PRIVATE AND PUBLIC PROPERTY

The Contractor shall restrict their construction operations to the limits of City right-of-way and/or easements. The use of property for the convenience of the Contractor that is in addition to the right-of-way and easements provided shall be arranged by the Contractor.

The Contractor shall furnish the City, prior to the use of any public or private property by the Contractor in the performance of the work required under these Specifications, a grading permit for

stockpiling/processing materials outside the public right-of-way, see Section 100.49 of this document. No construction activities shall commence on any private property until such permit is obtained.

Prior to acceptance of the work by the City, the Contractor shall furnish written evidence acceptable to the City's Project Manager that private or public property used for construction purposes has been restored to an acceptable condition and all the terms of the authorization between the Contractor and the property owner regarding use of said property have been satisfied.

The Contractor shall take all necessary precautions to preserve private and public property in the immediate area of all construction locations. Complete liability shall be assumed by the Contractor for any damage to private and/or public property during the execution of work. Upon completion of the work, all private and public property shall be, at a minimum, restored to the same or better physical condition as that prior to the commencement of work thereon.

100.19 – CONTRACT TIME, TIME OF COMPLETION

Delete Standard Specification section and replace with the following:

The contractor will be allowed ten (10) calendar days after the date on which the contract is awarded, in which to deliver the contract with the contractor's signature affixed thereto, together with the bonds prescribed by law and these specifications to the agency.

The Contractor shall begin construction no earlier than the date set forth in the "Notice to Proceed." Required intermediate completion milestones for specific portions of the project are addressed in Section 100.21 of these Specifications. Failure to complete the work within the specified time requirement will subject the Contractor to liquidated damages in accordance with Section 100.39 of these Specifications.

100.19 – PHOTOGRAPHS AND VIDEO RECORDS

Contractor shall comply with Section 337 of these specifications for recording pre- and post-construction documentation. The Contractor shall submit all pre-construction documentation to the Engineer for approval prior to proceeding with project work. Contractor shall provide post-construction documentation for approval prior to substantial completion.

100.20.1 – NOTIFICATION TO CITY OF SPARKS GIS COORDINATOR

The contractor shall notify the City of Sparks GIS Coordinator Jon Walker with a minimum of 24 hours prior notice before backfilling any underground piping/valves, to allow for the GPS coordinates to be surveyed prior to backfill. Jon Walker can be reached at 775-353-4069.

100.21 – PROGRESS SCHEDULE

Delete Standard Specification section and replace with the following:

The Contractor shall prepare a project schedule plan for the entire Contract work and submit it to the City's Project Manager at least seven (7) days prior to the Pre-Construction Meeting. The Pre-Construction Meeting will not commence until the City has reviewed and approved the schedule.

Construction at the project site cannot commence until the pre-construction meeting is held. The project schedule shall show the order in which the Contractor proposes to carry out the work within the Contract time in addition to showing the beginning and completion times for all major features of work provided in the Contract. The project schedule shall be in the form of an arrow network, precedence diagram, or other similar schedule developed under a CRITICAL PATH METHOD. The schedule shall outline in sufficient detail the proposed operations, the interrelations of the various operations and the order of performance so that the progress can be evaluated at any time during the Contract. The network will reflect activity durations in a working day time frame and shall not reflect free time. The Contractor shall submit three (3) copies of the proposed final project schedule.

In addition to the total project schedule, the Contractor shall provide a detailed weekly work agenda that describes the work item and time frame in the form of a bar graph, listed-itemized schedule or any other form agreed to by the City's Project Manager. The agenda may be updated by contacting the City's Project Manager no later than 48 hours prior to a change. The Contractor shall deliver the agenda for the following week to the City's Project Manager no later than noon Thursday. If a holiday or non-working day falls on Thursday, the agenda shall be delivered at or before noon on the preceding working day. If no work or a continuation of the prior week's work is anticipated for the following week, an agenda indicating this shall be submitted. Each agenda shall be signed and dated by the construction superintendent.

Weekly progress meetings shall be scheduled at a convenient location to discuss the weekly schedule, work progress, construction concerns or other project matters at the City's Project Manager discretion. The Contractor's representative and appropriate Subcontractor representatives requested by the City's Project Manager shall attend.

In addition to the baseline schedule, the Contractor shall provide monthly updates to the baseline schedule. The updated baseline schedule shall be submitted no later than the first Tuesday of the month.

100.21.01 – CONSTRUCTION SEQUENCE, PHASING AND CONSTRAINTS

The contractor shall complete all the piping, mechanical work, and testing associated with the TMWRF Steamboat Meter Addition Project inside the vault, with the intent of TMWRF being able to flow reclaimed water through the vault and to the downstream customers before March 15, 2024. Liquidated damages in the amount and frequency specified in section 100.39 shall be levied against the contractor for any additional delays past this intermediate in-service milestone date.

The electrical upgrades and meter vault functional testing and project completion shall be completed before May 15, 2024. Liquidated damages in the amount and frequency specified in section 100.39 shall be levied against the contractor for any additional delays past this date.

100.22 – DELAYS

Delete Standard Specification section and replace with the following:

When delays occur due to unforeseen causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to acts of God, acts of the public enemy, acts of government agency, fires, floods, epidemics, strikes, and freight embargoes, the time for completion shall be extended an amount determined by the City's Project Manager to be equivalent to the delays; provided,

however, written request for such an extension of time is made by the Contractor within ten (10) days after the beginning of such delay. No allowance shall be made for delay or suspension of the work due to the fault of the Contractor.

An extension of time shall not release the Contractor or Surety from their obligations, which shall remain in full force until the discharge of the Contract.

100.23 – PROVISIONS FOR HANDLING EMERGENCIES

Delete Standard Specification section and replace with the following:

In the case of emergencies affecting the safety or protection of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City's Project Manager, shall be obligated to act to prevent threatened damage, injury or loss. Contractor shall give City's Project Manager prompt written notice if Contractor believes that any significant changes in the work or variations from the contract documents have been caused thereby.

100.24 – CHANGE ORDERS – FORCE ACCOUNT

The Contractor is to submit a Labor and Material Schedule provided per Section 055 of these Specifications within two hours of the bid opening. The schedule is to contain a list of construction equipment, hourly rates of said equipment, and hourly rates of personnel proposed to be utilized on this contract. At the discretion of the City's Project Manager, the schedule may be used for unanticipated extra work or agreed additional work added to the project.

Extra work shall authorized by the City of Reno Project Manager and a written Extra Work Order (EWO) executed by the City and the Contractor prior to unanticipated extra work being performed.

100.26 – SUSPENSION OF WORK

The City's Project Manager will have the authority to suspend the work entirely or in part due to the failure of the Contractor to correct conditions unsafe for the workmen or the general public; for failure to carry out the provisions of the contract; for failure to carry out orders; for such periods as he may deem necessary due to unsuitable weather; for conditions considered unsuitable for the prosecution of the work or for any other reason deemed to be in the public interest.

100.27 – FAILURE TO PERFORM PROPERLY

If, in the judgment of the City, the failure of the Contractor to prosecute the work properly places the health and safety of the public at risk, the City may make good such deficiencies immediately and deduct the cost thereof from the payment then or thereafter due the Contractor.

100.28 – DEFAULT AND TERMINATION OF CONTRACT

Delete Standard Specification section and replace with the following:

If the Contractor:

- A. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- B. Fails to perform the work with sufficient workmen and equipment or with sufficient materials to assure the prompt completion of said work, or
- C. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable or unsuitable, or
- D. Discontinues the prosecution of work, or
- E. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- F. Becomes insolvent or is declared bankrupt or commits any act of bankruptcy or insolvency, or
- G. Allows any final judgment to stand against them unsatisfied for a period of five (5) days, or
- H. Makes an assignment for the benefit of creditors, or
- I. Does not complete at least ninety percent (90%) of the contract work within the contract time, or
- J. For any other cause whatsoever, fails to carry on the work in an acceptable manner, or
- K. If any required insurances are cancelled or terminated during the duration of the contract,

Then the City's Project Manager will give notice in writing to the Contractor and his surety of such delay, neglect, or default.

If the Contractor or surety, within a period of ten (10) days after such notice, shall not proceed in accordance therewith, then the City shall have full power and authority without violating the contract, to take the prosecution of the work out of the hands of the Contractor and the contract shall be deemed terminated. The City's Project Manager may, at his option, call upon the surety to complete the work in accordance with the terms of the contract; or he may take over the work, including any or all materials and equipment on the project as may be suitable and acceptable, and may complete the work by force account, or may enter into a new agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as, in his opinion, may be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the City, together with the cost of completing the work under the contract, shall be deducted from any money due or which may become due said Contractor. In case such expense shall exceed the sum which would have been payable under the contract, then the Contractor and his surety shall be liable and shall pay to the City the amount of said excess.

100.31 – DATA TO BE FURNISHED BY THE CONTRACTOR, SUBMITTALS

Delete Standard Specification section and replace with the following:

Submittals covered by these Specifications shall include manufacturers' information, samples, requests for substitutions, and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, all mechanical, electrical and electronic equipment and systems, materials, reinforcing steel, fabricated items, and piping and conduit details. The Contractor shall furnish all contract documents, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the Specifications and intent of the contract documents.

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the City's Project Manager in each case where the submittal may affect the work of another contractor or the City. The Contractor shall coordinate submittals among their subcontractors and suppliers.

The Contractor shall coordinate submittals so that work will not be delayed. Contractor shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete.

The Contractor shall use the submittal transmittal form found in Specification Section 100.60 for each submittal. The Contractor shall certify on each submittal transmittal document that they have reviewed the submittal, verified field conditions, and complied with the contract documents.

The Contractor shall certify on each submittal transmittal document that they have reviewed the submittal, verified field conditions, and complied with the contract documents.

If the Contractor proposes to provide material, equipment, or method of work, which deviates from the contract documents, they shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

When the contract documents require a submittal, the Contractor shall submit four (4) copies of all information plus one reproducible original of all information.

Unless otherwise specified, the City's Project Manager shall have ten (10) calendar days after receipt of submittal to review and comment. The City's Project Manager shall retain the reproducible original.

Subject to NRS 338.140, review of contract documents, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of their responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Project Manager or the City, or by any officer or employee thereof, and the Contractor shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed.

The cost for third and subsequent submittals shall be borne by the Contractor. The cost of reviews for third and subsequent reviews shall be at a rate of \$150 per hour for the City's Project Manager's and/or the Project Manager's consultant's time.

100.33 – PROTECTION OF PROPERTY

The Contractor shall protect against any damage to pipes, conduits, or other structures crossing the trenching or encountered during the execution of work and shall be responsible for any damage done to such pipes, structures or property resulting therefrom. If a utility is affected, the Utility Company shall be notified immediately by the Contractor of any damage. Contractor shall protect all existing structures and property from damage and shall provide bracing, shoring or other work necessary for such protection.

The Contractor shall be responsible for all damage to streets, roads, curbs, sidewalks, ditches, embankments, landscaping, or other public or private property, which may be caused by transporting equipment, materials, or workers to or from the work. Contractor shall make satisfactory and acceptable arrangement with the property owner and/or the City over damaged property concerning its repair or replacement and as specified in these Specifications.

The Contractor and their Subcontractors are solely responsible for the security of their work site. Contractor and their Subcontractors shall provide their own security for their work in progress and for the goods, products, material, equipment, systems, construction machinery, tools, devices and other items required, used or to be used in the execution of the work.

100.33 – SPILL CONTROL

A spill is defined as any release of raw sewage, construction water, or other liquids at the site. Spills shall not be permitted at any time throughout the duration of the Contract. Sewage released from the existing sewer system shall be considered a spill. Sewage in contact with the soil on the ground or within pits or excavations shall also be considered a spill.

The Contractor shall be responsible for all consequences and damages caused by a sewage spill due to the Contractor's work activities. Contractor shall give both verbal and written notification to the City's Project Manager immediately in the event of any sewage spill.

100.33.01 – TRAFFIC CONTROL PLANS

The TMWRF facility will remain in operation during the completion of this contract. The Contractor shall maintain access to existing facilities and coordinate construction with TMWRF. The facility typically receives septage deliveries, chemical deliveries, and materials deliveries on a daily basis, and sometimes several times within an hour. In addition, there will be several other construction projects in progress at the facility while this project proceeds. The Contractor shall make provisions to accommodate traffic through the site, and shall keep disruptions to a minimum. If traffic routes must be closed, they shall be coordinated a minimum of three (3) working days prior to the closure, and shall be timed to minimize impact to other traffic.

100.37 – PROTECTION OF WORK AND CLEANING UP

The Contractor shall keep the work site, staging areas, storage and parking area, and Contractor's facilities clean and free from rubbish and debris. Materials and equipment shall be promptly removed from the site when they are no longer necessary. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance in conformance with the preconstruction condition of the site. Refer to each section of these Specifications for further requirements.

The Contractor shall not store equipment or materials anywhere other than locations approved by the City's Project Manager. Property surrounding the work site shall be completely free of debris and rubbish at all times.

In the event that waste material, refuse, debris and/or rubbish have not been removed after the Contractor has been directed to do so, the City's Project Manager reserves the right to have this material removed at the Contractor's expense.

The Contractor shall handle paints, solvents, and other construction materials with care to prevent entry of contaminants into storm drains, sewers, surface waters, or soils. **NO SOLID MATERIALS OR SOILS SHALL BE FLUSHED INTO STORM DRAINS OR SEWERS.** Cleaning of these facilities shall be at the Contractor's expense. In the event the Contractor does not clean the facilities to the satisfaction of the City's Project Manager after the Contractor has been directed to do so, the City's Project Manager reserves the right to have the facilities cleaned by others at the Contractor's expense.

The Contractor shall install fences and/or barriers around all excavations and open structures. The barrier shall enclose the area and prevent unauthorized access.

The Contractor shall be responsible for preventing dirt, dust, and sediments from escaping from trucks departing the project site, by covering dusty loads, washing truck tires before leaving the site, or other reasonable methods. The Contractor shall be required to clean said streets as soon as possible, but no later than at the conclusion of each day's operations. Cleaning shall be at the Contractor's expense. Any violation of the requirements shall be sufficient grounds for the City's Project Manager to order the streets in question cleaned at the Contractor's expense. In the event the Contractor does not clean the streets to the satisfaction of the City's Project Manager after the Contractor has been directed to do so, the City's Project Manager reserves the right to have the streets cleaned by others at the Contractor's expense.

The Contractor is responsible for immediately removing all graffiti from equipment, tools and signs on the worksite.

100.37 – SECURITY FOR WORK IN PROGRESS

The Contractor is solely responsible for the security of the site. Contractor shall provide its own security for its work in progress and for the goods, products, material, equipment, systems, construction machinery, tools, devices and other items required, used or to be used for its scope of the Work.

100.39 – LIQUIDATED DAMAGES/FAILURE TO COMPLETE WORK ON TIME

Time is of the essence of this contract, and in the event the construction of the work is not completed within the time herein specified, it is agreed that from the compensation otherwise to be paid to the contractor, the City may retain the sum of One Thousand Dollars (\$1,000) per day for each contract calendar day thereafter, that the work remains uncompleted and not accepted. This sum is not a penalty, being the stipulated damage City will have sustained in the event of failure by the Contractor to complete the work within the contract time. Liquidated damages shall be cumulative for each portion of the work for which the specified construction completion time(s) is not met by the Contractor.

In addition to liquidated damages assessed for failure to complete the contract within the calendar days allotted, there are two separate requirements with task durations which also have a liquidated damages component:

The contractor shall complete all the piping, mechanical work, and testing associated with the TMWRF Steamboat Meter Addition Project inside the vault, with the intent of TMWRF being able to flow reclaimed water through the vault and to the downstream customers before March 15, 2024. The liquidated damages for failure to meet this requirement is One Thousand Dollars (\$1,000) per day for each contract calendar day thereafter, that the work remains uncompleted and not accepted. The intent of this requirement is to minimize disruption to the City of Reno reuse system, since the City's reuse

customers need to have reuse water service at the start of the reuse season, starting on March 15, 2024.

The electrical upgrades and meter vault functional testing and project completion shall be completed before May 15, 2024. The liquidated damages for failure to meet this requirement is One Thousand Dollars (\$1,000) per day for each contract calendar day thereafter, that the work remains uncompleted and not accepted. The intent of this requirement is to minimize the outage of the metering facility, since this meter is critical to reuse meter redundancy.

The liquidated damages described in this Section are cumulative.

100.40 – SANITATION AND SAFETY

The Contractor shall comply with provisions of local, state and federal regulations as relates to sanitation and sanitary facilities. Portable sanitary facilities shall be provided at each work site location.

100.41 – PUBLIC SERVICE EQUIPMENT

The Contractor shall contact Underground Service Alert at 811 or 1-800-227-2600 a minimum of two working days prior to the start of construction for street or parking lot patching and adjusting service utilities or survey monuments. The Contractor shall contact TMWRF staff for guidance in helping the Contractor in locating existing TMWRF utilities that would not be located by USA services.

The Contractor shall immediately notify the City's Project Manager of any apparent or potential conflict of which the Contractor becomes aware between existing underground facilities and facilities to be installed or constructed as a part of the work required by these specifications and contract documents. Upon said notice, the City's Project Manager will make a timely investigation of the apparent or potential conflict and, if required, will issue instructions to the Contractor for the adjustment of the existing underground facilities or will revise the design of the facilities to be installed, or both.

The project plans were developed prior to the inception of any underground projects that may fall within or near the same construction limits. Therefore, these plans may not reflect all the existing conditions that the Contractor may encounter. It is the Contractor's responsibility to become familiar with the conditions, as they exist at the bid time or may exist at the commencement of the project. The Contractor acknowledges that the contract documents are not guaranteed to be complete or entirely accurate in showing the actual location of all existing underground facilities.

The Contractor shall be responsible to investigate and verify the actual location of all existing underground facilities, whether or not shown on the contract documents, by means of exploratory excavation at the beginning of the project. In the event damage to any existing underground facility should occur during progress of the work, the Contractor shall immediately notify the Project Manager and the City of the damaged facility. The Contractor shall be responsible for any damage to existing underground facilities which may result from their performance of the work and shall arrange for the timely repair of such damaged facilities at his sole cost and expense. The Contractor shall coordinate the temporary shutdown, support, or relocation of existing private utilities as determined necessary during construction with the owning utility, allowing adequate time for relocations as required.

100.43 – UTILITY SERVICES

All utilities required by the Contractor shall be furnished at their expense. Construction and drinking water for Contractor and Subcontractors shall be provided by the Contractor. Connection to fire hydrants or private property services for the purpose of obtaining construction water shall not be permitted.

100.44 – TREE AND PLANT PROTECTION

If a tree or any landscaped vegetation is damaged or destroyed by construction, or by any action of the Contractor, the Contractor shall replace the damaged tree or plant with a healthy one of the same or similar species, subject to the approval of the City's Project Manager. The replacement tree or plant shall be of the same size as the damaged tree or plant and will be placed at the existing grade. The Contractor shall bear all expenses required to establish the replacement tree or plant. The replacement tree or plant shall be guaranteed healthy for one (1) year after the final payment made to the Contractor. The Contractor shall be responsible for any tree or plant that the Contractor had replaced that is deemed unhealthy during that year.

100.47 – TRADE NAMES, SUBSTITUTES AND "OR EQUAL" ITEMS

Delete Standard Specification section and replace with the following:

Whenever an item of material or equipment is specified or described in the contract documents by using the name of a proprietary item or the name of a particular supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains, or is followed by, words reading "no like, equivalent, or-equal item", or "no substitution is permitted", other items of material or equipment of other suppliers may be accepted by the City's Project Manager under the following circumstances and subject to NRS 338.140:

1. **Or equal:** If, in City's Project Manager's sole discretion, an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related work will be required, it may be considered by City's Project Manager as an "or-equal" item.
2. **Substitute items:** If, in City's Project Manager's sole discretion, an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, it will be considered a proposed substitute item. Contractor shall submit sufficient information to allow the City's Project Manager to determine if the item of material or equipment proposed is essentially equivalent to that named and is an acceptable substitute. Requests for review of proposed substitute items of material or equipment will not be accepted from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to City's Project Manager for acceptance thereof, certifying that the proposed substitute will perform adequately and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the work will require a change in any of the contract documents, to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty.

All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by City's Project Manager in evaluating the proposed substitute. City's Project Manager may require Contractor to furnish additional data about the proposed substitute.

3. **Substitute construction methods or procedures:** If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the contract documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to City's Project Manager. Contractor shall submit sufficient information to allow City's Project Manager, in Project Manager's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the contract documents. The procedure for review by Project Manager will be similar to that provided in item 2 above.

All support and/or testing data provided by Contractor for any proposed "or-equal" or substitute item shall be at the Contractor's expense. City's Project Manager will be allowed a minimum of five (5) calendar days to evaluate each proposal and/or submittal made. The City's Project Manager shall be sole judge of acceptability. A proposal and/or submittal may be denied by the City's Project Manager without explanation. No "or-equal" or substitute(s) will be ordered, installed or utilized without City's Project Manager's prior written acceptance. The City may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. The time required by City's Project Manager and/or the Project Manager's consultants for evaluating proposed or submitted substitutes shall be at the Contractor's expense. The rate for reimbursement of these services shall be \$150.00 per hour. The charges for the evaluation shall be applied no matter if the proposed or submitted item is accepted or rejected.

100.48 – DISPUTE RESOLUTION

Delete Standard Specification section and replace with the following:

All claims, counterclaims, disputes and other matters in question between the City and the Contractor arising out of, or relating to, this contract or breach of it, unless otherwise settled, must be mediated before initiation of a judicial action.

Unless the parties mutually agree otherwise, mediation will be in accordance with the Construction Industry Mediation Procedures of the American Arbitration Association currently in effect. The American Arbitration Association will not be used to administer or facilitate the process or the selection of the mediators. Instead, the parties will mutually agree to the appointment of one mediator. If the parties cannot agree to one mediator, each party shall select one mediator and the two mediators will appoint a third mediator. The parties agree to split the mediator(s) fees and expenses. Each party shall bear their own attorney's fees and other costs incurred for the mediation.

If the City is the prevailing party in litigation, unless otherwise agreed to in writing, it shall be entitled to an award of reasonable attorney's fees and costs. NRS 338.640(1) applies when appropriate.

100.48.01 – REMEDY AND DAMAGES AVAILABLE TO THE CITY WHICH RESULT FROM CONTRACTOR’S REQUEST TO BE RELEASED FROM PERFORMANCE OF CONTRACT PRIOR TO ISSUANCE OF A NOTICE TO PROCEED

If a Contractor requests to be released from performance of the Contract prior to issuance of a Notice to Proceed, and it is determined by the City that it is in the City’s best interest to release the Contractor from performance of the Contract, the Contractor shall pay to the City any and all expenses incurred by the City as a result of the City releasing the Contractor from performance.

100.49 – PERMITS AND LICENSES

The Prime Contractor is responsible for ensuring all subcontractors working on this project hold a current Reno Business Licenses as required by Reno Municipal Code Section 4.04.020, as well as a City of Sparks Business License. Unless otherwise noted below, the Contractor is responsible for obtaining all certificates, licenses, and permits required to perform the work. This includes current state and local (both Reno and Sparks) business licenses, certificates, licenses and permits for all on site or off site vehicles, equipment, processes, and activities associated with the work.

Building Permit - A City of Sparks Building Permit is not required for this project.

An amount of money has been set for this item by the City’s Project Manager and is shown on the “Schedule of Prices-Base Bid” form. If the actual cost of the building permit, payable to the City of Sparks, by the Contractor is in excess of the scheduled amount, the Contractor shall be compensated the difference. If actual Contractor cost of the building permit is less than scheduled, the difference shall be deducted from payment. Payment shall be limited to the amount reflected in receipts from the City of Sparks Building Department, without any Contractor markup.

100.49 – WASHOE COUNTY DUST CONTROL PERMIT

All construction procedures shall conform to Washoe County Air Quality Standards. Dust Control Permits associated with staging areas and material processing yards may be required and are the responsibility of the contractor. No payment will be made by the City for permitting of staging areas and processing yards.

The Contractor will also be responsible for obtaining a Dust Control Permit for any staging areas outside the City right-of-way used by the Contractor. By law, these areas are the responsibility of the property owner. The Contractor shall ensure that said property owners are aware of their responsibility when negotiating permission to use private property for staging operations.

The requirement of a Dust Control Permit is necessary when more than one (1) acre of bare ground is disturbed by construction operations and/or the grading of more than one (1) acre of aggregate surfaces. This requirement applies to underground work as well as surface operations.

100.49 - NDEP CONSTRUCTION STORMWATER PERMIT

All construction activities shall incorporate Nevada Department of Environmental Protection (NDEP) Best Management Practices for Storm Water Management in accordance with the Federal Clean Water Act.

All construction procedures shall conform to Nevada Department of Environmental Protection (NDEP) Best Management Practices for Storm Water Management. If required by regulations and project magnitude, the contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP), keep it on site at all times, and modify it as needed.

100.49 – NOISE CONTROL

The Contractor shall perform all work in compliance with OSHA standards and in no case will noise levels be permitted that are greater than allowed by local laws and regulations. Noise levels shall not exceed 65 decibels (db) at 50 feet from the operating equipment.

All internal combustion engines utilized for any purpose on this project, or associated with work on this project, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated without said muffler.

Noisy portable equipment, such as generators, compressors and/or pumps shall be equipped with sound abatement enclosures and devices and shall be located as far away from sensitive noise receptor areas as practicable. (Sensitive noise receptors are defined as occupied buildings with windows or doors facing the site.) Noise barriers shall be constructed around noisy stationary construction equipment such as compressors, generators and pumps that are utilized at locations near (within 100 feet of) sensitive noise receptors as defined above during the daytime working hours and at all sites when construction is being completed at night.

Idling equipment not actively being used for construction purposes shall be shut off.

100.49 - ODOR CONTROL

The Contractor shall employ methods and procedures that mitigate the generation and discharge of objectionable odors to the surface environment during all work, including bypassing of sewage flows.

100.51 – PARTIAL PAYMENTS

For each progress payment, five percent (5%) will be held until fifty percent (50%) of the work has been performed. This amount will be held until one hundred percent (100%) completion and final acceptance of the project.

Except for cause, in accordance with NRS 338.525, no retention will be held from subsequent payments.

100.53 – CONTINGENT ITEMS AND INCREASED OR DECREASED QUANTITIES

Delete Standard Specification section and replace with the following:

Quantities shown on the Schedule of Prices are a calculated estimate and will be used for the purpose of comparing bids. Payment will be made for actual quantities furnished, installed, or constructed. An exception is where a specific item is identified in these specifications as a "Contingent item" in which

case the quantity set forth on the Schedule of Prices represents no actual estimate, is nominal only, and may be greatly increased or decreased or reduced to zero.

For major items of work not identified as contingent, a net increase or decrease in excess of 25% in the bid quantity may result in a negotiated change in the bid price for that item.

100.54 – NO WAIVER OF LEGAL RIGHTS

The City shall not be precluded or stopped by any measures, estimate, or certificate made either before or after the completion and acceptance of the work and payment therefore, from showing the true amount and character of the work performed, and materials furnished by the Contractor, nor from showing that any such measurements, estimate, or certificate is untrue or is incorrectly made, nor that the work or materials do not in fact conform to the contract. The City shall not be precluded or stopped, notwithstanding any such measurement, estimate, or certificate, and payment in accordance therewith, from recovering from the Contractor or his sureties, or both, such damages as it may sustain by reason of his failure to comply with the terms of the contract. Neither the acceptance by the City, or any representative of the City, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the City, shall operate as a waiver of any portion of the contract or any power herein reserved, or of any right to damages. A waiver of any breach of the contract shall not be held to be a waiver of any other or subsequent breach.

100.58 - MEASUREMENT AND PAYMENT

The scope of this section defines the items included in each bid item in the Base Bid Schedule of Prices of these specifications. Payment for work performed by the Contractor under these Contract Documents shall be made at the approved contract agreement bid price for each of the principal items as listed in the Base Bid Schedule of Prices. All contract prices included in the Base Bid Schedule of Prices shall be considered full compensation for all labor, materials, tools, equipment, overhead profit, insurance bonding, taxes, and all other incidentals necessary to complete the construction as shown on the Contract documents and/or as specified in the Contract Documents to be performed under this contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in a manner described for each item in these Specifications. Payment of all items listed in the bid schedule will constitute full compensation for all work shown and/or specified to be performed under this project. All incidental and appurtenant work essential to the completion of the project in a workmanlike manner, including cleanup and disposal of waste or surplus material, shall be accomplished by the Contractor without additional cost to the City.

Measurements of the completed work will be made in place, with no allowance for waste. Measurements of distances will be made in a horizontal plane, unless otherwise stated. Measurements of areas will be made in a horizontal plane, unless otherwise stated. Widths of pavement removal areas and trenching will be measured as specified in these Contract Documents.

Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the Contractor to conform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or material placed outside the lines indicated on the plans or given by the City's Project Manager; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will be deducted from the final total quantities. No compensation will be allowed for hauling rejected material.

Payment shall be made for the actual quantities constructed or installed; said quantities being measured as specified in their respective specification sections. Payment will be made for installed work only. Payment will not be made for stored, uninstalled materials, with the exception that at the discretion of the City of Reno project coordinator, payment may be made for cost of major pieces of equipment delivered and safely stored at the project site. Work items not specifically identified in the Proposal, but shown and specified, shall be considered incidental items. No additional payment will be made for incidental items.

Technical Specification Section 01025 – Measurement and Payment outlines more specific payment for the bid items.

100.58.01 – CONTRACTOR’S LUMP SUM COST BREAKDOWN

For work to be performed for a lump sum amount, the Contractor shall submit a cost breakdown to the City’s Project Manager prior to the first payment and within ten (10) days after Notice to Proceed. The cost breakdown, as agreed upon by the Contractor and the City’s Project Manager, shall be used for preparing future estimates for partial payments to the Contractor, and shall list the major items of work with a price fairly apportioned to each item.

The cost breakdown shall be generally in the same format as the Contract specifications divisions and subdivisions, with major items of work listed individually. The cost breakdown shall be by logical division of work. The cost breakdown shall include separate allowances for any testing and start-up work required. Measurable approximate quantities of work performed by the Contractor or its subcontractors shall be provided. For quantities that are the sum total of several individual quantities, backup summaries shall be provided which list the individual descriptions and quantities. These summaries then will be used to determine the quantities of work in place in subsequent progress payment requests.

The above is a statement of the intent of the Contract Documents to provide a moderate level of detail, acceptable to the City’s Project Manager, to allow a fair and reasonable estimate to be made of the value of work installed. The detail of the cost breakdown must be sufficient to provide timely processing of the monthly progress payment request.

The cost breakdown will be subject to the approval of the City’s Project Manager, and upon request, the Contractor shall substantiate the price for any or all items and provide additional level of detail, including quantities of work. The cost breakdown shall be sufficiently detailed to permit its use by the City’s Project Manager as one of the bases for evaluating requests for payments. The City’s Project Manager shall be the sole judge of the adequacy of the cost breakdown.

The cost breakdown shall not be considered in determining payment or credit for additional or deleted work.

100.60 - SUBMITTAL TRANSMITTAL FORM

SUBMITTAL TRANSMITTAL

Submittal Description: _____ Submittal No: _____

Spec Section: _____

	Routing	Sent	Received
OWNER: CITY OF RENO	Contractor		
PROJECT:	Engineer		
	Contractor		
CONTRACTOR:			

We are sending you ☐ Attached ☐ Under separate cover via _____

- ☐ Submittals for review and comment
☐ Product data for information only

Remarks: _____

Item	Copies	Date	Section No.	Description	Review action ^a	Reviewer initials	Review comments attached

^aNote: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit;
R = Rejected

Attach additional sheets if necessary.

Contractor: Certify either A or B:

- ☐ A. We have verified that the material or equipment contained in this submittal meets all the requirements, including coordination with all related work specified (no exceptions).
- ☐ B. We have verified that the material or equipment contained in this submittal meets all the requirements specified except for the attached deviations.

No.

Deviation

Certified by: _____
Contractor's Signature

SECTION 300 – SUPPLEMENTAL CONSTRUCTION METHODS

CITY OF RENO – UTILITY SERVICES DEPARTMENT

SUPPLEMENTAL CONSTRUCTION METHODS

**TMWRF STEAMBOAT METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

SECTION 337 – PHOTOGRAPH AND VIDEO RECORDING

SECTION 337 – PHOTOGRAPH AND VIDEO RECORDING

337.1– DESCRIPTION

Work shall consist of the Contractor providing photographs and digital color MPEG's of conditions prior to, during, and post construction. Photographs and color audio-video recordings are intended for use as evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of the Contractor and the City, and will be a means of determining whether and to what extent damage, resulting from the Contractor's operations, occurred during the Contract work.

337.2– DOCUMENT MATERIALS AND PROCEDURE

Photographs shall be digital color and shall indicate the date and location where the photograph was taken. One copy of each digital photo, shall be delivered to the Engineer. The photographer shall be qualified and equipped to photograph either interior or exterior exposures, with lenses ranging from wide angle to telephoto.

Digital MPEG video (or other format acceptable to the Engineer) shall be color, provided on USB flash drive, and shall indicate the date, TMWRF STEAMBOAT METER VAULT ADDITION, and the location where the inspection was recorded. The MPEG video (or other format acceptable to the Engineer) shall contain an audio track which narrates the progression of the inspection through the site. All video must display index counter, date and time of recording. One copy of the preconstruction worksite inspection shall be delivered to the Engineer on USB Flash Drive. The videographer shall be qualified and equipped to videotape either interior or exterior, with lenses ranging from wide angle to telephoto.

Contractor shall maintain a copy of site examination documentation for the duration of the work.

After receiving notice of Contract Award from the Engineer, and within one week of the pre-construction meeting, the Contractor shall provide both digital still photographs and a pre-construction digital video inspection recording which covers the entire work area. This shall include the works areas, the staging and storage areas, and adjacent property improvements, such as sidewalks, wall,

fences, landscaping, railings, decks, valves, etc. Digital videoing shall not take place until all USA utility locates have been performed, where required.

No construction shall start until the pre-construction video inspection recording and photographs have been completed and submitted to the Engineer.

Photographs shall be provided during construction to show any items of special interest upon the request of the Engineer.

Also, take and provide general photographs of construction progress taken on cutoff date for each scheduled application for payment.

Upon completion of the work, the Contractor shall perform the digital video inspection recording and take the same series of digital still photographs again. The recordings/photographs shall be taken from the same points and in the same direction as the pre- construction video/photographs. The post construction video/photographs shall be made within 14 days upon completion of the work.

After the post-restoration video and photographs are taken, a copy will be provided to the Engineer. The Engineer will ascertain the extent of any damage (if any), and will determine whether improvements, damaged or removed during construction, have been returned to specified or original condition.

337.3-SUBMITTALS

This section specifies photographs and digital video recordings of all surface features in all construction areas to be provided by the Contractor before, during and after construction.

Engineer will review video and photographs for quality. The Contractor will be responsible for modifications to their equipment and/or inspection procedures to achieve video and photograph material of acceptable quality. No work shall commence prior to approval of the material by the Engineer.

The Contractor shall submit the following information for review per Section 100.31:

1. One week prior to the pre-construction meeting, the Contractor shall provide a pre-construction digital video inspection recording and photographs which covers the entire work area.
2. General photographs to demonstrate the construction progress and any additional photographs and videos taken during construction shall be submitted with each application for payment.
3. Post-restoration photographs and video shall be submitted to the Engineer for approval prior to substantial completion of the project.

337.4-BASIS OF PAYMENT

This item of work is considered incidental to other item(s). No additional payment will be made for incidental items.

SECTION 400 – PREVAILING WAGE RATES

CITY OF RENO – UTILITY SERVICES DEPARTMENT

**TMWRF STEAMBOAT METER VAULT ADDITION
CONTRACT NUMBER I100133
PWP WA-2024-020**

This project is subject to prevailing wage rates in accordance with Nevada Revised Statutes Chapter 338. The prevailing wage rates for Washoe County will be effective as of the date of bid opening. Prevailing wage rates will be included in the conformed contract; reference Section 100.15.01 – “Prevailing Wage, Certified Payroll”.

*****END OF SECTION*****

*****END OF WASHOE COUNTY PREVAILING WAGE RATE*****

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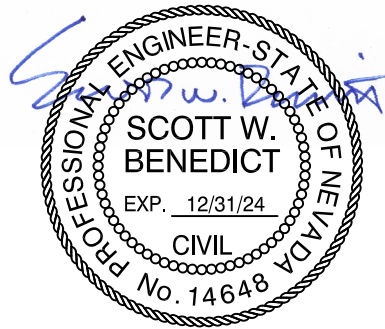
**TRUCKEE MEADOWS WATER RECLAMATION
FACILITY STEAMBOAT REUSE METER VAULT
CITY OF RENO PROJECT NUMBER: I100133**

**CONSTRUCTION SPECIFICATIONS
AND
CONTRACT DOCUMENTS
VOLUME 1 - DIVISION 1 THROUGH DIVISION 17**

**BID
SEPTEMBER 2023**

SECTION	RESPONSIBLE ENGINEER OR ARCHITECT	TITLE
TECHNICAL SPECIFICATIONS		
Division 1: General Requirements		
01010	SBE	General Construction Info and Requirements
01025	SBE	Measurement and Payment
01300	SBE	Submittals
01330	SBE	Safety Plan
01672	DOWL	Asset Identification and Labeling
Division 2 Site Construction – Not Used		
Division 3: Concrete – Not Used		
Division 4: Masonry – Not Used		
Division 5: Metals- See Plans		
Division 6: Wood and Plastics – Not Used		
Division 7: Thermal and Moisture Protection – Not Used		
Division 8: Doors and Windows – Not Used		
Division 9: Finishes		
Division 10: Specialties – Not Used		
Division 11: Equipment – Not Used		
Division 12: Furnishings – Not Used		
Division 13: Special Construction – Not Used		
Division 14: Conveying System – Not Used		
Division 15: Mechanical		
15000	SBE	Water Piping, Valves, Equipment and Appurtenances
Division 16: Electrical		
16000	DOWL	Electrical General Provisions
16110	DOWL	Raceway Boxes Fittings and Supports
16120	DOWL	Wires and Cables (600 V Maximum)
16200	DOWL	Miscellaneous Equipment
Division 17: Instrumentation		
17001	DOWL	Instrumentation and Controls

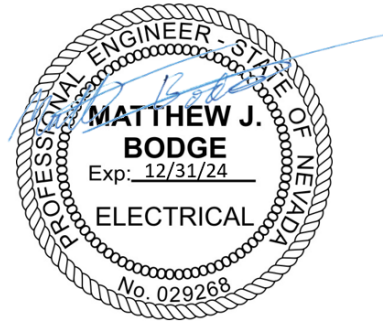
TECHNICAL SPECIFICATIONS – PROFESSIONAL RESPONSIBILITY



9/21/23

Civil-SBE

Sections 01010 through 01330,
Sections 02100 through 15000



9/21/23

Electrical - DOWL

Sections 01672, and Sections
16000 to 17001

SECTION 01010

GENERAL CONSTRUCTION INFORMATION AND REQUIREMENTS

PART 1 GENERAL

1.1 THE REQUIREMENT

The work to be performed under this Contract shall consist of furnishing tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

The work is located at the following location:

- Steamboat: Located on 8500 Clean Water Way on Washoe County parcel APN 021-020-02. Work is within the noted parcel and extends from the eastern edge of the Truckee Meadows Water Reclamation Facility (TMWRF) to the existing below grade vault to be rehabilitated (approximately 450-feet west of Steamboat Creek). Access to the vault shall be from Clean Water Way on an existing gravel/base road approximately 3,350-feet long. Work to be completed within APN 021-020-02 which is owned by City of Reno-Sparks. Steamboat is within areas of controlled access areas and shall require coordination with Reno-Sparks.

The work described in these documents will be conducted under a single prime contract. The following is a general description of the work included.

Steamboat: Demolish existing pipe and appurtenances within underground vault as noted on the plans. Installation of new pipe spool and general vault clean up. Electrical demolition and installation of new power/control equipment. The project highlights include but is not limited to the following items:

- Pipe/fitting/MOV demolition/removal in below grade vault with access constraints.
- Installing mechanical replacement piping/fittings.
- Electrical demolition and installation of new as indicated on the plans.

1.3 RELATED SECTIONS

Section – 01300 Submittals

Section – 01330 Safety Plan

1.4 SCHEDULE

The schedule provides a basis for determining the progress status of the project relative to the completion time, specific dates, and for determining the acceptability of the Contractor's progress payment estimates. No progress payments will be made until the COR Representative has accepted the Contractor's construction schedule and schedule of values.

Within seven (7) days after the Award of Contract, the Contractor shall submit one PDF copy of the Preliminary Project Schedule (PPS). Copies of the schedule shall be provided for the Preconstruction Conference and will be discussed at that time. Within fourteen (14) days after issuance of the Notice to Proceed the Contractor shall submit one PDF copy of the Baseline Project Schedule (BPS), including projected costs.

The Contractor shall be required to submit the project schedule and proposed traffic control plans to the City of Reno a minimum of 1-week prior to the pre-construction meeting.

The COR Representative considers the project schedule requirements to be of significant importance to both the Contractor and the Owner. The following requirements shall be met for submitting the schedules.

Contractor shall use a commercial project scheduling software product to develop all schedules. Software shall be generally in use by the construction industry.

Schedule shall be a time-scaled logic diagram based on the critical path method on a GANTT chart or a time-scaled bar chart.

The schedule shall depict all significant construction activities and all items of work listed in the breakdown of contract prices submitted by the Contractor. Assigned values for each part of the work shall be indicated. The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule. Any milestone activities identified must be indicated. Critical dates for Owner furnished Contractor installed materials shall be indicated showing reasonable delivery periods.

Completion time and all specific dates given in the Contract Documents shall be shown on the schedule. Activities making up the critical path shall be identified.

Revisions to the accepted cost-loaded construction schedule may be made only with written approval of the COR Representative. Changes in timing for activities which are not on the critical path may be modified within the available period of the activities' specific available float but not in a manner

which will place them on the critical path, with the written agreement of the Contractor and COR Representative. A change affecting the contract value of any activity, the timing of any activity on the critical path, the completion time and specific dates may be made only in accordance with the Agreement.

1.5 GENERAL ORDER OF WORK AND CONSTRAINTS

Due to outage limitations during peak demands work at some locations cannot commence until after November 1st 2023. Below are the stations desired order of work, with locations that cannot start until November 1st 2023 noted:

- Steamboat: Cannot commence until after November 1st 2023 and will need to be in-service by March 15th 2024.

1.6 PROJECT MEETINGS

Preconstruction Conference:

Prior to the commencement of Work at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by the Contractor's Project Manager, its superintendent, and its Subcontractors as the Contractor deems appropriate. Other attendees will be:

COR Project Manager/Engineer.

COR Project Representative.

Owner's designated inspector.

Representatives from Governing agencies; City of Reno UNR, City of Sparks and Washoe County. Others as requested by Contractor, Owner, or Engineer.

The purpose of the preconstruction conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the Contractor prior to the meeting date. At a minimum, the Contractor should be prepared to discuss all of the items listed below.

Status of Contractor's insurance and bonds.

Contractor's tentative schedules.

Transmittal, review, and distribution of Contractor's submittals.

Requirements of the regulatory agencies.

Critical work sequencing.

Field decisions and Change Orders.

Invoicing and payment schedule.

Major equipment deliveries and priorities.

Progress Meetings:

The COR Representative and Contractor shall coordinate, schedule and hold regular on-site progress meetings at times as requested by COR Representative or as required by progress of the Work. The Contractor, COR Representative, and all Subcontractors active on the Site shall attend each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.

The COR Project Representative will prepare agendas and preside at the progress meetings. The purpose of the meetings is to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the Contractor shall present any issues which may impact its progress with a view to resolve these issues expeditiously.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CONTRACTOR'S EQUIPMENT

Security: The Contractor shall at all times be responsible for the security of their equipment and materials. The Owner will not take any responsibility for missing or damaged equipment, tools, materials or personal belongings.

Contractor's Field Office: A separate Contractor's Field Office will not be required on this project, while portable restroom facilities shall be required at each site.

Parking Facilities: Contractor shall provide temporary parking areas, at locations on the project site(s) approved by the COR and/or City of Sparks, for the vehicles used by the Contractor's construction employees.

3.2 CONTRACTOR'S UTILITIES

Power: The Contractor shall be responsible for all cost to provide power and other utilities as necessary.

Water: Potable and non-potable water is not available at the site(s). The Contractor shall be responsible to provide all construction water and drinking water needed for his employees.

Temporary Heating: The Contractor shall be responsible for providing temporary heating, covering and enclosures as necessary to protect all work and material against damage by dampness and cold and to facilitate completion of the work. The Contractor shall supply all the fuel, equipment and materials required for temporary heating, in accordance with manufacturer's recommendations.

3.3 LANDS PROVIDED BY OWNER.

The Contractor has the option to stage adjacent to the Steamboat Vault. Site security shall be the responsibility of the Contractor, not Reno or Sparks.

3.4 PRECONSTRUCTION DOCUMENTATION

The Contractor shall, before mobilization begins, submit two copies of digital preconstruction photos of the work area, including access routes from adjacent public right of ways. Each photo shall include a date stamp as part of the image. The electronic photo files shall be provided in JPEG format at the highest quality compression setting with a camera resolution of 10 megapixels minimum on a CD, DVD, or flash drive. Digital video is also acceptable with video cataloged by site.

3.5 STANDARDS AND CODES

Design and install materials in accordance with best present-day installation and manufacturing practices.

Where specified, workmanship and materials shall conform with applicable sections of latest revisions of following codes and standards. Standards may be abbreviated in the specifications as follows:

ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
HI	Hydraulics Institute
IBC	International Building Code
IPC	International Plumbing Code

Local Code	Local Building, Health and Plumbing Codes
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Science Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PS	Product Standards, U.S. Department of Commerce
UBC	Uniform Building Code
UL	Underwriters Laboratories Inc.
UPC	Uniform Plumbing Code

3.6 TESTS AND INSPECTION

General Requirements: All materials, equipment, installation and workmanship included in this contract, if so required by the COR Representative, shall be tested and inspected to prove compliance with the contract requirements. No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test.

Tests and inspections shall include:

The delivery acceptance test and inspections.

The installed tests and inspections of items as installed.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry.

The form of evidence of satisfactory fulfillment of delivery acceptance test and of installed test and inspection requirements shall be, at the discretion of the COR Representative, either by tests and inspections carried out in his presence or by certificates or reports of tests and inspections carried out by approved persons or organizations.

Delivery Acceptance Tests and Inspections: The delivery acceptance tests and inspections shall be at the Contractor's expense for any materials or equipment specified and shall include the following:

Test of items during the process of manufacture and/or on completion of manufacture, comprising material tests, hydraulic pressure tests, performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual sections of these specifications, or as may be required by the COR Representative to satisfy himself that the items tested and inspected comply with the requirements of this contract.

Inspection of all items delivered at the site in order to satisfy the COR Representative that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery.

Installed Tests and Inspection:

All mechanical equipment shall be tested by the Contractor to the satisfaction of the COR Representative before any facility is put into operation. Tests shall be specified herein and shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work and be pre-approved by

If any doubt, dispute or difference should arise between the COR Representative and the Contractor regarding the test results or the methods or equipment used in the carrying out of a test, the COR Representative may order the test to be repeated using modified methods or equipment. If the repeat test substantially confirms the COR Representatives position on the previous test, all costs in connection with the repeat test will be paid by the Contractor, otherwise the costs shall be borne by the Owner. Where the results of any installed test fail to meet the contract requirements, repeat tests to achieve the contract requirements shall be made at the Contractor's expense.

3.7 RESTORATION OF STRUCTURES AND SURFACES

Structures, Equipment and Pipework: The Contractor shall remove such existing structures, equipment, and pipework as may be necessary for the performance of the work and shall rebuild or replace the items thus removed to original or better condition. Contractor shall repair any existing structures which may be damaged as a result of their work.

Roads and Streets: All roads and streets in which the surface is removed, broken or damaged, or in which the ground has caved or settled due to work under this contract, shall be completely restored and brought to the original grade and crown section unless otherwise indicated. Before resurfacing material is placed, edges of pavements shall be trimmed back far enough to provide clean, solid, vertical faces, and shall be free of any loose material. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged or otherwise affected due to the Contractor's operations.

Cultivated Areas and Other Surface Improvements: All cultivated and natural areas, either agricultural or lawns, and other surface improvements which are damaged by actions of the Contractor shall be restored, including roadside drainage ditches, as nearly as possible to their original condition or better.

3.8 SAFETY

The Contractor shall execute and maintain their work so as to avoid injury or damage to any person or property. All work shall be done in conformance with OSHA, City of Reno, City of Sparks and Washoe County Standards.

Safety precautions as applicable shall include, but not be limited to, adequate life protection, and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees; such machinery guards, walkways, scaffolds, ladders, bridges, and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; confined space continuous air monitoring and permit required confined space requirements, the proper inspection and maintenance of all safety measures.

The names and telephone numbers of at least two medical doctors practicing in the vicinity and the telephone number of the local ambulance shall be prominently displayed adjacent to all telephones.

3.9 CONFINED SPACE SAFETY

The Steamboat vault is a permit required confined space. The Contractor shall provide all the continuous air monitoring and means to exit the vault per OSHA standards, including standby personnel. All personnel entering the vault shall be trained in confined space entry to the level required for the work needed.

3.10 HOURS OF WORK

Unless stipulated otherwise in the Special Provisions work at all sites shall be limited to between the hours of 7 am to 5 pm Monday through Friday (non-Holidays).

The hours include the start-up and shut down of equipment as well as the set-up and removal of traffic controls.

Overtime and weekend work may be allowed subject to the pre-approval of the Project Representative.

No work on weekends or Holidays shall be allowed unless approved in advance by the Project Representative.

The following items would be allowed outside of normal work days and hours without pre-approval from the Project Representative.

Stormwater monitoring and BMP maintenance.

Dust control abatement.

Traffic control and street maintenance.

3.11 COR FURNISHED MATERIAL

No material is being furnished by Owner in this Contract.

END OF SECTION 01010

SECTION 01025
MEASUREMENT & PAYMENT

PART 1 – GENERAL

Payment for the bid items identified in the Bid Schedule, as further described herein, will constitute full compensation to the Contractor for furnishing all labor, equipment, tools, supplies and materials to complete the Work in accordance with the Contract Documents, including the costs of permits and the costs of compliance with the regulations of public agencies having jurisdiction. Any item that is not specifically set forth in the Bid Schedule shall be considered incidental to the cost of the Work. The final pay quantities shall be by field measurement unless lump sum work is stipulated.

1.1 MOBILIZATION AND DEMOBILIZATION

The bid price for mobilization/demobilization shall include all cost associated with mobilization to the Project site (labor, material and equipment), cost of Project specific bonds and insurance, start-up cost such as, sanitation facilities, construction survey, potholing existing utilities, temporary power and acquiring Project permit cost if paid by the Contactor, site clean-up, restoration, as-built drawings and removal from the Project site.

Payment will be made at the lump sum price for Mobilization/Demobilization.

PART 2 - STEAMBOAT FLOW METER ADDITION

2.1 STEAMBOAT MECHANICAL PIPE/FITTING DEMOLITION

The bid price for this item shall include all labor, equipment and materials required to remove and waste the existing pipe/fittings/valves per Contract Plan Sheet D10. Included in this item is vault washing and clean-up. Included in this bid item is dewatering of approximately 2,000 liner feet of 30-inch DIP with a volume of water on the order of 73,000 gallons.

Payment will be made at the lump sum price for Steamboat Mechanical Pipe/Fitting Demolition.

2.2 STEAMBOAT ELECTRICAL DEMOLITION

The bid price for this item shall include all labor, equipment and materials required to remove and waste electrical equipment/conductors as indicated on plan sheet ED10

Payment will be made at the lump sum price for Steamboat Electrical Demolition.

2.3 STEAMBOAT MECHANICAL PIPE/FITTING INSTALLATIONS

The bid price for this item shall include all labor, equipment and materials required to provide installation of the pipe/fittings, sump pump, ladder-up and all incidentals necessary to provide a complete installation per Contract plan Sheet M10.

Payment will be made at the lump sum price for Steamboat Mechanical Pipe/Fitting Installations.

2.4 STEAMBOAT ELECTRICAL POWER AND CONTROL INSTALLATIONS

The bid price for this item shall include all labor, equipment and materials required to provide installation of all electrical and control equipment necessary to provide a complete installation per Contract plan Sheets E10, E11 and E12.

Payment will be made at the lump sum price for Steamboat Electrical Power and Control Installations.

END OF SECTION 01025

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, trench safety plan and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, all mechanical, electrical and electronic equipment and systems, materials, reinforcing steel, fabricated items, detailed piping layout drawings, and conduit details. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01010 – General Construction Info and Requirements

1.3 SUBMITTAL PROCEDURE

- A. All submittals shall be electronic and submitted to the City of Reno per the City of Reno Representative's direction.
- B. The Contractor shall prepare and submit to Reno within two weeks after the date of the Preconstruction Conference a complete list of shop drawings and material submittals intended to be delivered. No progress payment will be made to the Contractor until this list is submitted, reviewed, and found acceptable to Reno and the Project Representative.
- C. At least 30 days prior to their need for approval, the Contractor shall forward to the Reno Representative all submittals required by the individual sections of the specifications. Contractor shall submit one (1) electronic copy of each submittal, shop drawing, and operation and maintenance manuals. Hard copy submittals may be requested from the contractor at no additional cost to the Owner. Additionally, submit one (1) copy of each large format shop drawing and one (1) specimen of each sample requested. One (1) reviewed copy of each submittal will be returned to the Contractor, and the sample specimen will be retained by the RENO Representative.

- D. Identify all submittals, including schedules and operation and maintenance manuals, on the transmittal form as included in this Section. Obtain an electronic or original copy from the Reno Representative. Routing submittals through the applicable parties will be established at the pre-construction meeting and executed through Procore. If the Contractor desires physical copies of submittal documents returned, the Reno Representative's comments shall be transferred by the Contractor onto additional copies at no additional cost to the Owner.
- E. The contractor shall organize and submit the submittals per their respective specification section. The contractor shall make all attempts to submit the entire specification section in one submittal. If this cannot be achieved the contractor may make a request to the Reno Representative and submit upon the Reno Representative's approval. Uncoordinated submittals will be rejected. Do not combine unrelated (multiple spec sections) materials in the same submittal.
- F. The Reno Representative reserves the right to require submittals in addition to those specifically called for in individual sections when deemed necessary at no additional cost to the Owner.
- G. The Contractor shall schedule submittals to avoid concentration of submittals in a short time period. Scheduling of submittals shall be included in the Contractor's Progress Schedule.
- H. If physical copies of submittals are requested, each major mechanical equipment submittal shall be bound in a three hole-punched binder, which is sized such that when all material is inserted, the binder is not over 3/4 full. Spiral ring type binders are not acceptable.
 - 1. Each binder shall be appropriately labeled on the front cover with the project name, Contract number, equipment supplier's name, Specification Section(s), and major material contained therein. Any variations from the specified equipment shall also be noted.
 - 2. An index shall be provided on the inside front cover. This index shall itemize the contents of each tab and sub-tab section. Also list the project name, Contract number, and equipment supplier's name, address, phone number, and contact person on the index page.
- I. If the Contractor submits shop drawings of equipment by manufacturers other than those listed in the specifications, he shall provide the following additional information with the submittal:
 - 1. The name and address of at least three companies or agencies who are currently using the equipment.
 - 2. The name and telephone number of at least one person at each of the above companies or agencies whom the Reno Representative may contact.

3. A description of the equipment that was installed at the above locations. The description shall be in sufficient detail to allow the Reno Representative to compare it with the equipment that is proposed to be installed in this project.
 4. Refer to Reno Representative's approval (1.5, Part C).
- J. A copy of the specification section, and all referenced and applicable sections, with any addendum updates included, shall be submitted with each paragraph check-marked to indicated specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy for the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.4 SHOP DRAWINGS

- A. The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the Contract.
- B. The Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness, and compliance with contract requirements, and shall indicate their approval thereon as evidence of such coordination and review. Shop drawings submitted to the Reno Representative without evidence of the Contractor's approval will be returned for resubmission.
- C. Approval by the Reno Representative shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this Contract, except with respect to variations described and approved in accordance with Paragraph D below.
- D. If shop drawings show variations from contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at time of submission. All such variations must be approved by the Reno Representative.

1.5 RENO REPRESENTATIVE'S APPROVAL

- A. The Reno Representative will indicate his acceptance or disapproval of each submittal, and his reasons for disapproval.

1. If no corrections are required, the copies will be returned marked "APPROVED" and work may begin immediately on incorporating the material and equipment covered by the submittal into the project.
 2. If limited corrections are required, the copies will be returned marked "APPROVED AS NOTED". Work may begin immediately on incorporating the material and equipment covered by the corrected submittal into the project.
 3. If insufficient or incorrect data has been submitted, the copies will be returned marked "REVISE AND RESUBMIT". No work incorporating the material and equipment covered by this submittal into the project may begin until the submittal has been revised, resubmitted, and returned marked either "APPROVED" or "APPROVED AS NOTED".
 4. If the submittal is unacceptable, the copies will be returned marked "REJECTED". No work incorporating the material and equipment covered by this submittal into the project may begin until a new submittal has been made and returned marked either "APPROVED" or "APPROVED AS NOTED".
- B. The Contractor shall not change any drawing after it has been marked "APPROVED" or "APPROVED AS NOTED", or change any approved equipment or material, without written permission of the RENO Representative. The Contractor shall comply with all submittals as marked by the RENO Representative, to the extent applicable.

1.6 OPERATION AND MAINTENANCE MANUALS

Manufacturer's printed instructions shall include installation instructions, operating instructions, schematics for electrical and hydraulic systems, maintenance literature, lubrication requirements, and parts lists. O&M manuals may require physical copies at no additional cost to the Owner. Contractor shall coordinate with the RENO project representative to determine if O&M physical copies are required. O&M manuals shall be required for all pumps, motors, control valves and electric devices/instrumentation as required per the Electrical specifications.

1.7 CERTIFICATES

For those items called for in individual sections, furnish certificates from manufacturers, suppliers, or others certifying that materials or equipment being furnished under the Contract comply with the requirements of these specifications.

1.8 SAMPLES

Samples submitted for preference selection by the Owner or Reno Representative shall be of sufficient size to clearly illustrate functional characteristics and full range of color, texture, and pattern. A completed submittal review transmittal form must accompany each submitted sample.

1.9 CONSTRUCTION SCHEDULE

As soon as possible after receiving Notice of Award and before any work starts, submit four copies of a Baseline Construction Schedule showing estimated starting and completion dates for each part of the work. The first progress payment will not be issued until the progress schedule is submitted and approved.

1.10 REVIEW OF SCHEDULES

Submit Schedule of Values and Construction Schedule as a package. Both the Progress Schedule and the Schedule of Values shall be subject to review by Reno Representative both for format and content.

PART 2 MATERIALS

Not used.

PART 3 EXECUTION

3.1 CONTRACTOR'S JOBSITE RECORD DRAWINGS

- A. Provide and maintain on the jobsite one complete set of prints of all drawings which form a part of the Contract. Immediately after each portion of the work is installed, indicate all deviations from the original design shown on the Contract Drawings either by additional sketches or ink thereon. The Project Representative will coordinate and review the jobsite record drawings with the Contractor for accuracy on a weekly basis. Upon completion of the project, deliver this record set to the Project Representative for final approval. Upon final approval of the jobsite record drawings by the Project Representative the Contractor shall submit the marked-up drawings to the RENO Representative. Refer to Electrical specifications for drawings to be provided and required as-builts.
- B. A condition of the processing of Progress Payments shall be the satisfactory maintenance and final submittal of the Contractor's record (as-built) documents, as determined by the Reno Representative. The Contractor prepared progress payment estimates shall include an initial block for the Contractor's representative and the Reno Representative to acknowledge the satisfactory maintenance of the documents.

END OF SECTION 01300

SECTION 01330

SAFETY PLAN

PART 1 GENERAL

1.1 SUMMARY

This Section includes development and maintenance of a Construction Safety Plan. The Project is located within a public land that are heavily used and Washoe County Right of Ways. Areas with interim grading that has potential for any fall hazard shall need to be barricaded and signed to prevent injury. All locations in this Contract are in area with heavy feral horse traffic. The feral horses shall be protected at all times from potential hazards, such as falling into open trenches, construction traffic and entrance into areas that could result in harm to them or others.

1.2 REFERENCES

- A. Nevada OSHA web site: <http://dirweb.state.nv.us/OSHA/osha.htm>
- B. Federal OSHA web site: <http://www.osha.gov/>

1.3 CONSTRUCTION SAFETY PLAN

- A. Detail the Methods and Procedures to comply with Nevada, Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Include the following:
 - 1. Identification of the individual or entity who will prepare, initiate, maintain and supervise safety programs, and procedures.
 - 2. Procedures for providing workers and the public with an awareness of safety and health hazards expected to be encountered in the course of construction.
 - 3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, and safety equipment used in multi-level structures.

4. Methods for minimizing employees' and the public's exposure to safety and health hazards expected during construction.
 5. Procedures for reporting safety or health hazards.
 6. Procedures to follow to correct a recognized safety and health hazard.
 7. Procedures for investigation of accidents, injuries, illnesses and unusual events that have occurred at the construction site.
 8. Periodic and scheduled inspections of general work areas and specific work stations.
 9. Training for employees and workers at the jobsite.
 10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
 11. Public communication and signage for trail relocations and/or temporary closures.
- B. Assume responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of Subcontractors, suppliers, and other persons on the jobsite.
1. Forward available information and reports to the Contractor's representative who shall make the necessary recommendations concerning worker health and safety at the jobsite.
 2. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.
- C. Nevada OSHA 10/30 Requirements: Contractors in Nevada are required to comply with the OSHA 10/30 requirements as follows:
1. Supervisory employees working on a construction site are required to complete a specified 30-hour health and safety course not later than 15 days after being hired; and
 2. All other construction workers working on the construction site are required to complete a specified 10-hour course not later than 15 days after being hired.
 3. Employers are required to suspend or terminate the employment of an employee on a construction site who fails to provide proof of obtaining the required training not later than 15 days after being hired. Regulations provide for administrative fines for employers who fail to suspend or terminate certain employees on a construction site after the 15-day period if those employees have not obtained the required training.

4. Provide documentation of compliance with NRS 618.987 regarding OSHA-10 and OSHA-30 training. Provide copies of certification cards for all construction workers scheduled to work on the project.
- D. Transmit to Project Representative and Engineer copies of reports and other documents related to accidents or injuries encountered during construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION 01330

SECTION 01672
ASSET IDENTIFICATION AND LABELING

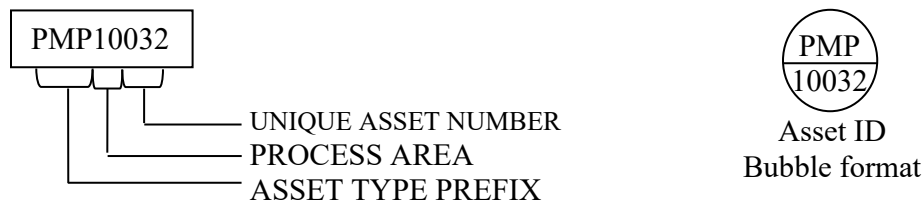
PART 1 – GENERAL

1.01 SUMMARY

- A. This section provides the required naming convention standards, details and format of assigning labels to assets installed in the facility.

1.02 ASSET NAMING CONVENTION

- A. Asset Identification tag numbers shall be a three-digit letter prefix followed by a five-digit number. The three-digit letter prefix denotes the asset type. The first two digits in the five-digit tag number denote the process area where the asset is located. The following three digits form a unique number for the asset within the process area.
- B. The “TMWRF Asset Prefix Table” contains the allowable three-digit letter prefixes for asset denotation and is located at the end of this section. In general, the asset prefix should correspond to the asset “type” and not to the asset “function”. For example, a valve should be labeled as a gate valve as opposed to an isolation valve or drain valve.
- C. The Contractor shall use the approved three-digit letter prefixes. If alternative three-digit letter prefixes are proposed for use, they shall follow the format represented in the “TMWRF Asset Prefix Table”, without any conflicts, and shall be submitted to TMWRF staff for approval.
- D. The “TMWRF Process Area Map” contains the established process area denotation for the Facility and is located at the end of this section. In general, the process area denotation should correspond to the physical location of the asset. The Contractor shall coordinate with TMWRF to determine which process area number(s) are appropriate for project assets. If the project involves a new process at the Facility, TMWRF will determine which process area number(s) shall be assigned to the new process.
- E. The format of the Asset ID number on the design plans, specifications, and asset field tags shall be a three-digit letter prefix (see “TMWRF Asset Prefix Table” for approved prefixes) followed by a five-digit identifier (as described above) with no spaces. A bubble format is also acceptable on drawings or for circular asset field tags. See below for examples of Asset ID formats.



1.03 ASSET ATTRIBUTE LIST

- A. At the completion of the construction phase of the project, the Contractor shall provide a completed Asset Attribute List in excel format. The Contractor shall coordinate with TMWRF to obtain a formatted excel template for the Asset Attribute List. It is important that the format of the spreadsheet remain preserved and capable of direct upload to the Facility asset management database. A display of the Asset Attribute List is located at the end of this section.
- B. The Asset Attribute List must be submitted to TMWRF prior to system startup procedures begin.

1.04 ASSET FIELD TAG REQUIREMENTS

- A. Contractor shall furnish and install Asset ID tags conforming to the requirements of this section for each asset identified in the drawings.
- B. Coordinate information to be displayed on field tags with TMWRF prior to purchase of tags.
- C. At a minimum, an asset field tag shall include the Asset ID. Other information including lettering and wording as coordinated with OWNER, recommended by manufacturer, or as required for proper identification and operation/maintenance of electrical system and equipment may be included on field tags.
- D. Install asset tags at locations indicated or at a location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate substrate.
- E. Asset tags shall be either engraved plastic laminate signs or round brass tags.
- F. Engraved Plastic Laminate Signs
 - 1. Provide engraving stock melamine plastic laminate lamicoid-type engraved nameplates, complying with FS L P 387, in sizes and thickness indicated, engraved with engraver's standard letter styles of sizes and wording indicated, black face and white core plies (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
 - 2. Except as otherwise indicated, provide single line of text, 1/2-inch high lettering on 1-1/2-inch high sign (2-inches high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the Contract documents and Shop Drawings as coordinated with TMWRF.
 - 3. Thickness: 1/8-inch except as otherwise indicated.
 - 4. Fasteners: Self-tapping screws of brass, cadmium-plated steel, or stainless steel,

5. Adhesive: Nameplates shall be bonded using an epoxy or similar permanent waterproof adhesive. 3M VHB two-sided foam adhesive tape is an acceptable alternative to epoxy adhesive.
6. Stainless steel bands shall be used to attach tags to asset if no place for proper attachment is feasible (e.g. valves).

G. Round Brass Suspended Tags

1. Round brass tags shall be minimum 19-gauge brass, 1-1/2" diameter, and include a 3/16" diameter top hole for fastener.
2. Lettering shall be stamped, minimum 1/4" in height, black in color, and utilize the bubble format layout described in this Section.
3. Tags shall accurately display the Asset ID in the format described in this Section and as coordinated with TMWRF.
4. Brass tags shall be affixed to assets with stainless steel braided cable secured with a crimp style fastener.

H. Application and Installation

1. Install asset identification products as indicated, in accordance with manufacturer's written instructions.
2. Substrate for adhesive plastic laminate tags shall be prepared in accordance with the manufacturer's recommendations prior to application of tags
3. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.
4. Regulations: Comply with governing regulations and requests of governing authorities for identification of equipment.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

TMWRF Asset Prefix Table

Prefix	Asset Type	Prefix	Asset Type	Prefix	Asset Type
ACT	Valve Actuator (electric, hydraulic, pneumatic)	BLV	Ball Valve	CPL	Control Panel
ACU	Air Conditioning Unit	BOI	Boiler	CPT	Control Power Transformer
AER	Aerator	BRS	Bar Screen	CPU	Computer
AET	Aeration Tank	BRT	Biological Removal Tower	CRN	Crane
AEX	Analysis Element	BSC	Bypass Contactor	CRT	Cart
AHU	Air Handling Unit	RTP	Belt Filter Press	CSP	Chemical Spill Pallet
AIT	Analyzer Indicating Transmitter	CAL	Calibration Column	CST	Chemical Storage Tank
ALD	Air Line Drain	CAP	Capacitor Bank	CTB	Terminal Box - Control
ALL	Air Line Lubricator	CAV	Combination Air Valve	CIC	Control Cabinet
AND	Digester - Anaerobic	CEN	Centrifuge	CTR	Current Transformer
APD	Digester - Acid Phase	CFP	Chemical Feed Pump	CTS	Test Station - Control
ARD	Air Dryer	CHH	Handhole - Control	CTV	Vault - Control
ARF	Air Filter	CHI	Chiller	CVR	Cover
ARV	Air Release Valve	CHL	Chlorinator	CVT	Capacitor Voltage Transformer
ASU	Evaporative Cooler	CHP	Chemical Pot	CYC	Cyclone
ATS	Automatic Transfer Switch	CHT	Chute	DAM	Damper
AUG	Auger	CJB	Junction Box - Control	DCS	Distributed Control System
AVV	Air/Vacuum Valve	CKS	Circuit Switcher	DEC	Decarbonator
BAC	Battery Charger	CKV	Check Valve	DIF	Diffuser
BAS	Basin	CLA	Classifier	DIS	Distributor
BAT	Battery	CLR	Clarifier	DMV	Diaphragm Valve
BGG	Building	CLU	Clutch	DPT	Differential Pressure Transmitter
BDR	Back drive	CLV	Calvert	DSC	Dust Collector
BFP	Back Flow Preventer	CMP	Compressor	DSK	Disconnect Switch
BFT	Bio Filter (Nonchemical)	CNV	Conveyor	DTP	Drip Trap
BIV	Butterfly Valve	COA	Coalescer	DYW	Dry Wall
BGS	Bagging System	COL	Collector	EAF	Exhaust Air Fan
BKR	Circuit Breaker	COO	Cooler	ECF	Electrical Control Panel
BLO	Blower	COS	Composite Sampler	EDJ	Eductor
BUR	Blender	CPB	Pull Box - Control		
		CPG	Compound Gauge		

EEX	Voltage Sensor	FAP	Fire Alarm Panel
EJX	Junction Box - Electrical	FAV	Flame Arrestor/Conservation Vent Assembly
ELV	Vault - Electrical	FBB	Fluidized Bed Bioreactor
EMT	Electrical Meter	FBD	Fluidized Bed Dryer
EPB	Pull Box - Electrical	FCU	Fan Coil Unit
FSW	Ethernet Switch	FDR	Feeder
CTB	Terminal Box - Electrical	FEX	Flow Element
EVP	Evaporator	FIT	Flow Indicating Transmitter
EWC	Electric Water Cooler	FIX	Flow Indicator (non transmitting)
EWB	Electric Water Heater	FLC	Floor Cleanout
EWS	Emergency Eyewash and Shower	FLD	Floor Drain
EXT	Expansion Tank	FLO	Flocculator
FAP	Fire Alarm Panel	FLR	Flare
FAV	Flame Arrestor/Conservation Vent Assembly	FLS	Floor Sink
FBB	Fluidized Bed Bioreactor	FLT	Filter
FBD	Fluidized Bed Dryer	FLX	Flare Element
FCU	Fan Coil Unit		
FDR	Feeder		
FEX	Flow Element		
FIT	Flow Indicating Transmitter		
FIX	Flow Indicator (non transmitting)		
FLC	Floor Cleanout		
FLD	Floor Drain		
FLO	Flocculator		
FLR	Flare		
FLS	Floor Sink		
FLT	Filter		
FLX	Flare Element		

Prefix	Asset Type
FMT	Flame Trap
FSH	Flow Switch High
FSL	Flow Switch Low
FSN	Fill Station
FSW	Fused Disconnect Switch
FTR	Filter (liquids)
FUN	Funnel
FUS	Fuse
GAT	Gate
GDR	Grinder
GEN	Generator
GFI	Ground Fault Interrupter
GLC	Grade Cleanout
GLV	Globe Valve
GND	Ground Rod
GNW	Ground Rod Well Case
GRC	Grit Removal Chamber
GRS	Grounding Resistor
GTV	Gate Valve
HBV	Hose Valve, Hose Bibb
HGX	Hand Control
HDU	Hydraulic Drive Unit
HEX	Heat Exchanger
HMI	Human Machine Interface
HOP	Hopper
HRN	Horn
HST	Hoist
HTC	Heat Trace
HTR	Heater
HVU	Heating and Ventilation Unit
HWC	Hot Water Heating Coil
IEX	Current Sensor
INJ	Injector

Prefix	Asset Type
ITM	IT Miscellaneous
KGV	Knife Gate
LAB	Laboratory Equipment
LAR	Lighting Arrester
LEM	Lighting Emergency
LFX	Lighting Fixture
LGN	Lagoon
LHH	Level Switch High High
LID	Level Indicating Display
LIT	Level Indicating Transmitter
LIX	Level Indicator (non-transmitting)
LMI	Level Manual Indicator (sight glass)
LPB	Lighting Panelboard
LSH	Level Switch High
LSL	Level Switch Low
LSM	Level Switch Mid
LTC	Lighting Contactor
LTX	Level Element
LVR	Louver
LVT	Level Transmitter (non-indicating)
LXT	Lighting Exit
MAU	Make-up Air Unit
MCC	Motor Control Center
MCP	Motor Circuit Protector
MLE	Mechanical Equipment
MMU	Microprocessor Metering Unit
MRY	Multi-Function Relay
MSC	Miscellaneous
MSH	Moisture Switch High
MSL	Moisture Switch Low

Prefix	Asset Type
MST	Motor Starter
MTR	Motor
MTS	Manual Transfer Switch
MTU	Master Terminal Unit
MUD	Mudwell
MVS	Medium Voltage Switch
MVV	Mud Valve
MWH	Motor Winding Heater
MXM	Mixing Manifold
MXR	Mixer
NLV	Needle Valve
NTF	Nitrification Trickling Filter
ODR	Odor Scrubber
CSX	Operator Switch
CWS	Oil/Water Separator
PBD	Panelboard
PBS	Push Button Station
PCL	Clarifier - Primary
PCU	Process Control Unit
PDS	Pressure Differential Switch
PEX	Pressure Sensor Element
PHV	Pinch Valve
PIP	Piping
PIT	Pressure Indicator Transmitter
PIX	Pressure Indicator (non-transmitting)
PLC	Programmable Logic Controller
PLO	Plow
PLV	Plug Valve
PMP	Pump (nonchemical)
POT	Potentiometer
PPB	Power Distribution

Prefix	Asset Type
	Panelboard
PQM	Power Quality Monitor
PRE	Press
PRG	Pressure Gauge
PRV	Pressure Regulating (Reducing) Valve, Pressure
PSH	Pressure Switch High
PSL	Pressure Switch Low
PST	Pressure Transmitter (non-indicating)
PUD	Pulsation Damper
QCB	Quick Connect Box
RAD	Radiator
RCP	Receptacle
REA	Reactor
REC	Air Receiving Tank
REL	Relay
REP	Relay Control Panel
RES	Reservoir
REX	Radiation Sensing Element
RST	Resistor
RTM	Rotometer
RII	Rotomat
RTU	Remote Terminal Unit
RUP	Roll-Up Door
RVS	Reduced Voltage Starter
SAF	Supply Air Fan
SBD	Switchboard
SBR	Spray Bars
SCB	Scrubber
SCG	Suice Gate
SCL	Clarifier - Secondary
SCR	Screen
SCW	Screw

Prefix	Asset Type
SDV	Solenoid Valve
SEC	Security Panel
SEL	Seal
SFT	Software
SGA	Surge Arrestor
SGR	Switchgear
SHA	Shaker
SIT	Speed Indicating Transmitter
SLA	Slaker
SLG	Slide Gate
SLO	Storage Silo
SMP	Sump
SNK	Sink
SNR	Strainer
SPD	Surge Protective Device
SPK	Speaker
SST	Soft Starter

Prefix	Asset Type
STG	Staff Gauge
SWI	Switch
TAV	Thermostatic Valve
TBK	Terminal Block
TCA	Terminal Cabinet
TEG	Temperature Gauge
TEL	Telephone
TEX	Temperature Element
TGV	Tail Gate Valve
THH	Temperature Switch High
THI	Thickener
THS	Thermostat Switch
TIT	Temperature Indicating Transmitter
TIX	Temperature Indicator (Non-transmitting)
TNK	Tank
TPO	Telephone Outlet

Prefix	Asset Type
TRA	Trap
TRH	Trough
TSD	Telephone System Device
TSH	Temperature Switch High
TSL	Temperature Switch Low
TST	Temperature Transmitter (Non-Indicating)
TVS	Transient Voltage Surge Suppressor
TWV	Three Way Valve
UHR	Unit Heater
UNK	Unable to Determine
UPS	Uninterrupted Power Supply
VAG	Vacuum Gauge
VBX	Valve Box
VEX	Vibration Element
VFD	Variable Frequency Drive
VIB	Vibrator

Prefix	Asset Type
VRV	Vacuum Relief Valve
VSB	Vacuum/Siphon Breaker
VSL	Vessel
VSW	Vacuum Switch
WCM	Webcam
WDR	480V Welder Receptacle
WEL	Well
WHR	Water Heater
WSC	Weight Scale
WSR	Washer/Compactor
WTW	Wet Well
XFR	Transformer
ZEX	Position Element
ZIT	Position Indicating Transmitter
ZSC	Position Switch Closed
ZSM	Position Switch Middle
ZSO	Position Switch Open

END OF SECTION

SECTION 15000

WATER (RECLAIM) PIPING, VALVES, EQUIPMENT AND APPURTENANCES

PART 1 – GENERAL

1.01 General Requirements:

- A. This section covers pressure reclaim water supply polyvinyl chloride pipe (PVC), ductile iron pipe (DIP), copper (CU), steel pipe less than or equal to 12-inches and polyethylene pipe (PE) which shall be furnished and installed complete with all jointing materials, fittings, meters, service laterals and other appurtenances as shown on the plans or otherwise required for a complete installation. The Contractor shall furnish, install and test pipe, fittings and appurtenances of the dimensions and types and to the lines and grades shown on the plans and specified herein. Not all materials specified in this Section are used in this Contract, the Contractor shall reference applicable paragraphs as needed.

1.02 Submittals:

- A. Submit manufacturer's standard drawings or catalog cuts of items specified. Clearly mark options, coatings/linings and pressure classes if applicable. All submittals not completed shall not be reviewed and re-submittal shall be required.

1.03 Delivery, Storage and Handling of Materials:

- A. Delivery and Storage: Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Slightly oxidized plastic pipe, paint coatings or rubber components as determined by visual inspection at the sole discretion of the City of Reno Representative shall be subject to rejection depending on intended use. Moderately oxidized material as determined by visual inspection at the sole discretion of the City of Reno Representative shall be rejected regardless of application. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
- B. Handling: Handle pipe, fittings, valves, hydrants, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. Chains shall not be used to transport any pipe/fitting/valve, only cloth straps or other material that is unable to scratch or damage the coating/surface shall be allowed. Take special care to avoid injury to coatings and linings on pipe and fittings; make repairs satisfactory to the City

of Reno Inspector if coatings or linings are damaged. Carry pipe to the trench; do not drag it. Do not leave rubber gaskets and plastic piping that are not to be installed immediately out in the sunlight, but store under cover out of direct sunlight.

PART 2 - MATERIALS

2.01 Ductile Iron Pipe, Steel Pipe less than or Equal to 12-inches, PVC Pipe, Polyethylene Tubing, Copper Pipe, Valves, Fittings, Coatings and Appurtenances:

- A. PVC Pressure Pipe: Shall conform to AWWA C900 except as modified herein. Pipe shall have a dimension ratio (DR) of not more than 18 and have an outside diameter equivalent to that of cast iron pipe. Pipe pressure class shall be 235 psi per AWWA C900-07. The standard pipe length shall be 20 feet. Pipe manufactured by JM-eagle or PW-eagle shall not be accepted at this time.
 - a. Each length of pipe shall be furnished with a coupling consisting of either a PVC sleeve and two sealing rings or an integrally cast bell and one sealing ring designed to hold the pipe in alignment, provide flexibility, separate the ends of the pipe lengths, resist applied earth pressures and provide fluid tightness.
- B. Ductile Iron Pipe (diameter 3-inches or greater): Unless otherwise stated, all ductile iron pipe 3-inches through 12-inches shall be pressure class 350, ductile iron pipe greater than or equal to 14-inches shall be pressure class 250. All ductile iron pipe shall conform to ANSI A21.51 AWWA C151. The standard pipe length shall be 18 feet. Ductile iron pipe shall be cement mortar lined and seal coated with an exterior asphaltic coating.
 - a. DIP Polyethylene encasement (buried): Polyethylene encasement shall comply with ISO 8180, ANSI/AWWA, A21.5/C105 and ASTM A674. Polyethylene encasement shall consist of three layers or co-extruded linear low-density polyethylene (LLDPE) film fused into one. The inside surface shall be infused with an anti-microbial compound to mitigate microbiologically influenced corrosion ("MIC"). Poly wrap for buried ductile iron pipe, fittings and valves shall be V-bio as provide by US Pipe, American Ductile Iron Pipe or City of Reno approved equal.
 - b. Any damage to the polyethylene shall be repaired prior to completing backfill per AWWA C105 paragraph 4.4.6.
 - c. Openings in the polyethylene for service taps shall be done in accordance with AWWA C105 paragraph 4.4.7.
 - d. Polyethylene encasement shall be purple and labeled "RECLAIM".
- C. Restrained Joint Ductile Iron Pipe: Ductile iron pipe requiring joint deflections less than or equal to 2 degrees up to 24-inches in diameter shall be restrained using an integral boltless restraining gasket with a minimum working pressure rating of 350 psi. The restraining gasket shall be designed and tested in accordance with AWWA

C111/A21.11. Restraining gaskets shall be US pipe field-lok 350 gaskets, Gripper Gasket or City of Reno approved equivalent. Refer to Paragraph 2.09 of this section for restraint of ductile iron mechanical joint or flanged joint connections.

For restrained ductile iron pipe requiring joint deflections in excess of 2 degrees (or can also be used for joint deflections less than or equal to 2 degrees at Contractors option), pipe shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push on joints shall be in accordance with ANSI/AWWA C111/A21.11. Restrained push on joints for pipe shall utilize individual ductile-iron locking segments that are inserted through a single slot in the bell face and be easily removed. The working pressure of the joint shall meet or exceed the working pressure rating of the ductile iron pipe. Restrained joint high deflection ductile iron pipe shall be US pipe HDSS. Restraint of field cut pipe shall be provided with US Pipe HDSS Pipe field weldments or approved equal.

- D. Steel Pipe: Steel pipe shall be shop fabricated in sections so that no field welding is required, unless a butt-strap joint is required per the plans. Shop fabrication shall include all joint harnesses and FCA tie-rod assemblies. Pipe shall be fabricated prior to coating and lining.

Steel pipe shall be Schedule 40 meeting the requirements of ASTM A53, Grade B. If required per M11 joint harness or outlet calculations provide higher thickness classes if dictated.

Steel pipe joints shall be made using slip on welding flanges, weld-neck flanges or butt welding as shown on the drawings. Gaskets, and bolt sets shall be provided by the Contractor for all flanged connections. Gaskets shall be full face and meet (or exceed) the pressure rating of the connection flange.

Steel flanges shall be ANSI B16.5 Class 150, unless specified otherwise on the drawings). Class 150 flanges shall be used for all sections of pipe and fittings with a 150 psi test pressure. Raised face (RF) flanges shall not be allowed.

- E. Polyethylene (PE) tubing shall be copper tubing size, pressure class 200, SDR 9. Provide reclaim purple stripping.
- F. Copper pipe and fittings shall meet the requirements of ASTM B42 and ASTM B16 with solder joints. Copper shall be Type K. Copper tubing shall meet the requirements of ASTM B88.
- G. Sanitite HP dual wall storm drain pipe 12-inch through 30-inch shall meet ASTM F2764 with a minimum pipe stiffness of 45 psi when tested in accordance with ASTM D2412. Pipe joints shall be bell and spigot meeting the requirements of ASTM F2764 and watertight in accordance with ASTM D3212 with the addition of a 15-psi pressure requirement. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe Manufacture and covered with a removable, protective wrap to

ensure the gaskets are free from debris.

2.02 DIP Fittings:

- A. Fittings shall be ductile iron conforming to ANSI A21.10 (AWWA C110 or AWWA C153), grey or cast-iron fittings shall not be allowed. All fittings not stamped “D.I.” or “Ductile Iron” shall be rejected.
- B. Fittings shall be mortar lined in accordance with ANSI A21.4 (AWWA C104). Exterior bolts (not factory coated) shall be field coated with two coats of mastic. The entire fitting body shall be polyethylene encased per AWWA C105 to the satisfaction of the City of Reno Project Inspector.
- C. Flanges and Gaskets:
 - 1. Flanged ductile iron fittings and gaskets shall meet AWWA C115.
 - 2. Flanged ductile iron fittings shall be mortar lined and provided with an exterior asphaltic coating (see 2.02(B) above).
 - 3. Studs and bolts shall be of such length that no less than ¼-inch nor more than 1/2-inch will be projected through the nut when drawn tight. All bolt heads and nuts shall be hexagonal except where special shapes are required. For insulating flange adapters provide adequate bolts lengths as needed to meet this requirement.
 - 4. Gaskets for ductile iron connections shall be full face type SBR elastomer (confirm NSF 61 certified and if not the case provide alternate NSF 61 certified gasket material for review/approval) per ANSI/AWWA C111/A21.11 and shall be 1/8” thick. Gaskets shall be of the high-performance (profile) type per ANSI/AWWA C111 Appendix C, section C.2. Gaskets materials shall be NSF 61 certified, which may be Manufacture specific. Gaskets shall be US Pipe Flange-Tyte, American Toruseal or CITY OF RENO approved equal.
- D. Mechanical joints shall conform to ANSI A21.11.

2.03 Dielectric (Insulating) Flange Gasket Kits

- A. Insulating flange gaskets shall include full-faced gaskets 1/8” thick, isolating sleeves and washers, and steel washers. Gasket shall be NSF 61 certified. The assembly shall have the pressure rating equal to that of the flange. The gasket material shall have a minimum dielectric strength of 550 volts/mil and 50,000 psi compressive strength. The gasket sealing element/surface shall not require bolt torque levels that result in damage to the insulating washers nor the need to provide back-up gaskets to seal under design/test pressures. Insulating flange gaskets kits shall be PSI Linebacker 61, APS Trojan G-10 or CITY OF RENO approved equal.

2.04 Steel Pipe Fittings less than or Equal to 12-inches

- A. Steel fittings shall be butt welding type meeting the requirements of ANSI B16.9, Schedule

40. Higher thickness classes as dictated by the test pressures and/or application may be required.
- B. Steel pipe flanges shall be slip on or weld neck per drawings meeting AWWA C207 for the diameter and pressure class listed, AWWA Class E for 150# connections (ANSI B16.5 class 150).
 - C. Steel flange gaskets shall full face 1/8" thick and be NSF 61 certified for contact with potable water. Steel flange gaskets shall be rated for 250 psi working pressure. Steel flange gaskets shall be Garlock EPDM style 98206 (class 150), or City of Reno approved equal.

2.05 Coating of Steel Pipe and Fittings less than or Equal to 12-inches

- A. All steel pipe and fittings shall be fusion bonded epoxy lined and coated per AWWA C213.
 - a. Coating shall cover the entire pipe surface (internal and external) including flanges (but not flange faces).
 - b. Thredolets and harness lugs shall be welded to the pipe prior to coating application.
 - c. Coating color shall be blue (submit sample for approval).
 - d. Minimum number of coats shall be 1 with a minimum dry film thickness of 12 mils, unless a thicker coating is recommended by manufacture.

2.06 Nuts, Bolts and Washers

- A. Bolts and nuts shall meet applicable provisions of AWWA C115 and Appendix C of AWWA C111 unless modified herein. Bolts shall be carbon steel with a minimum 60,000 psi tensile strength conforming to ASTM A307 Grade A. Nuts shall conform to ASTM A563 and be standard ANSI B1.1, Class 2A coarse threads.
- B. Mechanical joint T-head bolts shall be ASTM A242 weathering steel with a minimum yield strength of 45,000 psi. All T-bolts and nuts shall be threaded in accordance with ANSI/ASME B1.1, Class 2A fit, with coarse-thread series. Heavy hex nuts shall be used. Bolt head dimensions shall be in accordance with ANSI/AWWA C111/A21.11-95.
- C. Studs and bolts shall be of such length that no less than 1/4-inch nor more than 1/2-inch will be projected through the nut when drawn tight. All bolt heads and nuts shall be hexagonal except where special shapes are required.
- D. All non-stainless nuts, washers, bolts and T-heads not installed within an above grade building shall be supplied with a factory applied flouropolymer coating. The coating shall be low friction, wear resistant and corrosion resistant. The coating application shall require all surfaces be chemically cleaned, abrasive blasted and primed prior to the application of the xylan flouropolymer. Wear resistance (K-factor) shall be in the range of 6-8. Coating system shall be Tripac 2000 as provided by Tripac Fasteners or CITY OF RENO approved equal. Coated nuts and bolts shall not require field applied mastic unless damage to the coating occurs, but in-conjunction with the fitting shall be encapsulated in poly wrap.
 - a. Utilize washers at all bolted connections to prevent damage to coatings on

valves or fittings.

- E. Stainless steel nuts and bolts shall be acceptable when supplied with tapping sleeves, or service saddles. Stainless steel nuts, bolts and hardware shall not be coated with mastic.

2.07 Valves & Valve Boxes

A. Gate Valves

- 1. Distribution main gate valves 3 inches to 12 inches shall be AWWA C509 with cast or ductile iron bodies, or AWWA C515 with ductile iron bodies. Gate valves 14 inches and larger shall be AWWA C515 with ductile iron bodies, ductile iron disc with EPDM coating, and if noted on the plans be provided with a bevel gear actuator. Gate valves shall be provided with an NSF 61 fusion epoxy lining and coating that meets AWWA C550, buried valves shall have a non-rising stem with a 2-inch square operating nut, provide cast iron handwheel for above grade valves if noted on plans (2-inch operating nut if not specified). Buried valves shall have exposed nuts field coated with a bituminous coating and entire valve body shall be polyethylene encased per AWWA C105. Gate valves shall be as manufactured by AVK, Mueller or CITY OF RENO approved equal.

B. AWWA Butterfly Valves

- 1. Class 150B Butterfly valves shall be meet or exceed all applicable requirements of ANSI/AWWA C504 Standard Class 150B. Valves shall be epoxy lined and coated in accordance with AWWA C504. Body and disc shall be cast iron per ASTM A-126. 3" – 24" valves shall have 304 SST hardware. Valves and actuator shall be designed for direct bury applications. Valves as Manufactured by Mueller, Dezurick or City of Reno approved equal.
- 2. Class 250B Butterfly valves shall be meet or exceed all applicable requirements of ANSI/AWWA C504 Standard Class 250B. Valves shall be epoxy lined and coated in accordance with AWWA C504. Body and disc shall be cast iron per ASTM A-126. 3" – 24" valves shall have 304 SST hardware. Valves shall be rated for a minimum working pressure of 350 psi. Valves as Manufactured by Mueller, Dezurick or City of Reno approved equal.

C. Combination Air Release Vacuum Valves (CAVs)

- 1. Air and vacuum combination air release valves (CAVs) for reclaim service shall have cast iron body with stainless steel float and internal hardware. Seat shall be buna-n rubber. Inlet and outlet shall be 2-inch NPT unless indicated otherwise on plans. Minimum working pressure shall be 300 psi. 2-inch CAVs shall be Crispin S20AS, Valmatic or City of Reno approved equal. 1-inch CAVs shall be Crispin S10ASB (short body)

D. Stainless Steel Ball Valves

1. Stainless steel (SST) ball valves shall have investment cast components, reinforced seats, blowout-proof stem design, adjustable packing gland and stainless steel lever and nut. SST valves shall meet NACE MR0175 and MR010103. Body shall be SST per A351-CF8M. SST ball valves shall be as Manufacture by Apollo Valves, or CITY OF RENO approved equal.

E. Valve Boxes

1. Valve boxes shall have a cast or ductile iron frame and cover and be traffic rated. Valve box lids shall be marked "Reclaim" for water valves and "TS Reclaim" for tracer wire test stations. Valve boxes shall have a purple epoxy coating. Valve boxes shall be Christy model G05, or City of Reno approved equal.

2.09 Flanged Coupling Adapters, Mechanical Couplings and Restrained Joint Adapters:

- A. Flanged coupling adapters for and mechanical couplings for 2 inches to 12 inches shall meet the requirements of AWWA C219 unless modified herein. Sleeve material shall be carbon steel with an NSF-61 registered fusion-bonded epoxy coating. Bolts and Nuts for buried service shall be ANSI 304/303 stainless steel. Flanged coupling adapters shall be Hymax 2100 series as manufactured by Total Piping Solutions, Romac 501 or City of Reno approved equal.
- B. Restrained flange coupling adapters shall be made of ductile iron with ANSI class 150 bolt circles. Adapter shall be NSF 61 fusion epoxy lined/coated or City of Reno approved equal coating. Adapter shall be specific for the pipe material being restrained (DIP, PVC or Steel). Gasket material or the complete fitting shall be NSF 61 certified. Restrained flange coupling adapters shall be manufactured by EBAA Iron, Romac Industries or City of Reno approved equal.
- C. Mechanical joint retainer (restraint may be indicated on plans or RMJ or MJR) glands for DIP or PVC shall be ductile iron, meet applicable portions of AWWA C110/C111, epoxy coated per AWWA C116 or C550 (or City of Reno approved equal). Products as manufactured by EBAA Iron, Romac Industries or City of Reno approved equal with the following working pressure ratings:
 - i. 16-inches or less in diameter minimum working pressure rating of 350 psi.
 - ii. Greater than 16-inches in diameter minimum working pressure rating of 250 psi.
- D. End caps for mains to remain in-service 4 inches to 12 inches shall be ductile iron Romac EC501, or steel fusion epoxy Smith-Blair 481. Provide thrust blocking and tapped outlets as shown on plans.
- E. End caps for mains to remain in-service 14 inches or large shall be accomplished with

a restrained mechanical joint cap with restraint gland.

2.10 Service Clamps:

- A. Service clamps shall be full circle type, AWWA approved for PVC or ductile iron pipe, size per plans. Service saddles shall be of the double strap design with ductile iron body and 304 stainless steel straps. The saddle shall be fusion nylon coated. Saddles shall be Muller DR2S series, Romac 202NS, or City of Reno approved equal.

2.11 Corporation Stops and Curb Valves:

- A. Corporation stops installed at main/saddle shall be ball valve, brass conforming to AWWA C800 and ASTM B-62, and suitable for a working pressure of 300 psi. Inlet end shall be male iron pipe thread (MIP), outlet shall be compression connection suitable for connection to CTS O.D. HDPE tubing. Corporation stops shall be Ford Ballcorp quick joint connection, Mueller 300 ball type corporation valves with Mueller 110 compression connection outlet, or approved equal.
- B. Curb valves shall be suitable for connection to CTS HDPE plastic pipe, copper or galvanized (if to remain). Inlet/outlet shall be grip joint as manufactured by Ford Meter Company or Mueller 110 compression. Connection size per plans, or if connecting to existing to be field confirmed by Contractor at time of installation, only size on size connections shall be allowed. Curb valves shall be brass, suitable for a 300-psi working pressure as manufactured by Mueller, Ford Meter company, or CITY OF RENO approved equal.

2.12 Grip Joint Couplings for Service Line Connections to Existing Service Lines and Setters

- A. Grip joint couplings for connecting new CTS PE service lines to existing service lines or meter setters shall be grip joint couplings as manufactured by Ford Meter Company or City of Reno approved equivalent.

2.13 Tapping Sleeves, Crossings and Valves:

- A. Tapping sleeves: Shall be constructed of stainless steel with a full circumferential gasket. Tapping sleeves test plugs shall be stainless steel with coated threads to prevent galling. Sleeves shall be Romac SST or approved equal.

2.14 Locating Wire:

- A. Locating wire shall be 12-gauge stranded or solid copper wire with purple THHN insulation. Wire shall be taped to the pipe every 5 feet.

2.15 Incidental Items

- A. The Contractor shall furnish all incidental items required to complete the work that are not specifically referred to herein. Incidental items which shall be furnished by the Contractor include but are not limited to gaskets, test station anodes/wires, nuts, bolts, tape wrap, brass plugs, hardware for temporary flush assemblies, etc..

2.16 Petrolatum Wax Tape, Primer, Profiling Mastic and Protective Outer-Wrap

- A. Petrolatum wax tape and primer used for coating underground dielectric (insulating) flange pipe joints, fittings, valves and appurtenances shall comply with AWWA C217 and shall be #1 Wax-Tape and primer as manufactured by Trenton Corp. for buried steel surfaces, or City of Reno approved equal. As required to provide a smooth profile over irregular surfaces (valves, fittings, flanges, etc..) provide a profiling mastic that can be cold applied and is self-adhesive and self-supporting, profiling mastic shall be Fill-Pro PM-GP as manufactured by Trenton Corp., or CITY OF RENO approved equal. Protective outer-wrap for above grade installations shall be a clear plastic wrapper consisting of three membranes of .5-mil clear, 50 gauge, clear, polyvinylidene chloride plastic, high-cling membranes, wound together as a single sheet, protective wrap shall be Poly-Ply as Manufactured by Trenton Corp., or City of Reno approved equal. Protective outer-wrap for buried installations shall be polyethylene encasement complying with ISO 8180, ANSI/AWWA, A21.5/C105 and ASTM A674. Polyethylene encasement shall have a thickness of 4 mil and be black or white in color.

2.17 Mastic Coating

- A. All exposed buried steel surfaces (rebar, c-clamps, tie-rods, uncoated non-stainless bolts hardware, pressure plates...) that are not fusion coated, stainless steel or provided with a corrosion resistant coating shall receive two 12 mil coats of Roskote A-51 or equal mastic. In addition, concrete joints between vault tops and cast-in place collars, grade rings as noted on the plans shall have mastic applied to provide a waterproof seal. Allow for sufficient cure time between coats and prior to backfill (in general, 1 hour minimum at or above 60 degree F with low humidity, 2 hours total below 60 degree F with low humidity), refer to minimum cure times per the manufactures recommendations for cold weather application. Cure time is a function of temperature, UV exposure and humidity, so minimum time to allow backfill shall be as deemed required by the CITY OF RENO Inspector.

2.18 MJ Adapters

- A. Mechanical joint (MJ) valves and fittings shall be connected using a bolt-through positive restraint mechanism manufactured of U. S. A. ductile iron conforming to ASTM A536, 65-45-12. The positive restraint device shall connect the valves and/or fittings at a linear distance not to exceed three (3) inches and without attachment to pipe. The device shall come complete with all accessories, including standard styrene

butadiene rubber (SBR) MJ gaskets conforming to the latest revision of AWWA C111/ASTM F-477. The bolt-through MJ positive restraining device and the ductile iron spacers shall be supplied with an NSF 61, 7-mil. fusion bonded epoxy conforming to AWWA C116/A21.16-09 as well as the coating, surface preparation and application requirements of ANSI/AWWA C550. The bolts and nuts shall be ASTM A193 type 304 or 316 stainless (as requested) and the nuts shall be Teflon® coated. The device shall be used with standard mechanical joint fittings (AWWA C110 or C153) and valves. The device shall be Infact Corporation FOSTER ADAPTOR or Washoe County approved equal.

PART 3 - EXECUTION

3.01 General:

- A. All laying, jointing and testing for defects and leakage shall be performed in the presence of the CITY OF RENO Project Inspector and shall be subject to his approval before acceptance. Materials found during construction to have defects will be rejected and the Contractor shall promptly remove such defective material from the site.

3.02 Trenching, Bedding, And Backfill:

- A. Requirements for trenching, excavation, bedding and backfill shall be per City of Reno construction standards/details and the Contract Drawings; and as required by applicable permits and regulations; and as required by applicable safety codes.
- B. Reclaim pipe and fittings shall be laid on shaped bedding and with properly dug bell or coupling holes. Supporting pipe on blocks or mounds of earth or bedding material shall not be permitted.

3.03 Cutting:

- A. Cutting and machining of pipe shall be accomplished in accordance with the pipe manufacturer's standard recommendations. Pipe shall not be cut with a cold chisel, flame, standard iron pipe cutter, nor any other method that may fracture the pipe, produce ragged, uneven edges, or split the pipe end. Cut ends shall be machined smooth to the proper dimensions.

3.04 Reclaim Pipe Laying:

- A. The water reclaim mains and services shall be installed to meet minimum cover, clearances from existing and proposed improvements as shown on the plans. Mains shall be installed to avoid localized high points and slope uniformly to air valves, unless

indicated otherwise on the plans. Immediately before placing each section of pipe in final position, the bedding shall be checked by the City of Reno Project Inspector for firmness and uniformity of surface.

- B. The deflection at any flexible joint shall not exceed that prescribed by the manufacturer of the pipe for DIP. The deflection of any pipe joint shall be done in the presence of the City of Reno Inspector. For PVC, the maximum allowable offset from any combination of deflection and/or bending shall be 4-inches per 20-foot section of pipe. It shall be the Contractor's responsibility to account for obstructions (existing and proposed), and the corresponding clearances required sufficiently ahead of the work to avoid the potential for excessive deflections or fittings.
- C. Proper implements, tools, and facilities as recommended by the pipe manufacturer's standard printed installation instructions shall be provided and used by the Contractor for safe and efficient execution of the work. All pipe, fittings, valves, and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
- D. The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged, or unsound pipe shall be rejected and replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean prior, during and after laying. All openings on the pipe line shall be closed with swabbed disinfected watertight expandable type sewer plugs or test plugs at the end of each day's operation or whenever the pipe openings are left unattended. The use of burlap, wood, or other similar temporary plugs shall not be permitted.

3.05 Jointing:

- A. Each pipe joint shall be joined either with a coupling consisting of a PVC sleeve and 2 rubber gaskets or an integral bell with one rubber gasket.
- B. The gasket and the gasket seat inside the collar or bell shall be wiped clean before the gasket is inserted. At this time a thin film of lubricant shall be applied to the gasket and to the outside of the clean pipe end. Lubricant other than that furnished with the pipe shall not be used. The end of the pipe shall be then forced into the collar or bell to complete the joint.
- C. The assembly of the joint shall be made in accordance with the printed recommendations of the manufacturer. This shall be accomplished with an assembly tool if so recommended by the manufacturer, so that the resulting position of the sleeve shall be such that it is centered over pipe ends. After assembling the coupling, the rubber gasket location shall be checked with a suitable gauge. Gaskets for the full

circumference of the pipe shall be located at a distance from the coupling or bell end as recommended by the manufacturer of the couplings. If the distance does not fall within required limits, the joint shall be disassembled and reassembled in an acceptable manner.

- D. When pipe laying is not in progress, the open end of the pipe shall be closed by a swabbed disinfected watertight expandable sewer plug to prevent trench water from entering pipe. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and re-laid in an acceptable manner. No pipe shall be laid when, in the opinion of the CITY OF RENO Project Inspector, the trench conditions or weather are unsuitable for such work.
- E. The lubricant used in the installation of sealing gaskets shall be suitable for use in reclaim water. It shall be delivered to the job in enclosed containers and shall be kept clean.

3.06 Installations of Fittings and Tapping Sleeves:

- A. Fittings shall be installed utilizing standard installation procedures. Fittings shall be lowered into trench by means of rope, cable, chain, or other acceptable means without damage to the fittings. Cable, rope, or other devices used for lowering fitting into trench, shall be attached around exterior of fitting for handling. Under no circumstances shall the cable, rope, or other device be attached through the fitting's interior for handling. Fitting shall be carefully connected to pipe or other facility, and joint shall be checked to insure a sound and proper joint.
- B. Tapping sleeves shall be installed and hydrostatically tested by the Contractor to the satisfaction of the CITY OF RENO Project Inspector. Hot taps 4-inches to 12-inches for connecting distribution mains shall be conducted by CITY OF RENO with a minimum 4 working days' notice provided to the CITY OF RENO Project Inspector for the day and time that tap will be conducted. Hot taps scheduled by Contractor, but delayed for unsatisfactory test of tapping sleeve or inability of the Contractor to provide adequate excavation, shoring or traffic control shall be rescheduled for the next available time as determined by the CITY OF RENO Inspector. Small taps for service connections shall be conducted by Contractor. The Contractor shall be responsible for the excavation, shoring and traffic control necessary to accommodate the tapping machine and labor needed to conduct the tap.

3.07 Reclaim Meters and Boxes

- A. Water reclaim meters and setters shall be installed per City of Reno Standard details. All utility/meter box covers shall be painted purple.
- B. Set reclaim water meters flush within sidewalks, paved improvements or adjacent

grade.

3.08 Thrust Blocking:

- A. Thrust blocks shall be installed such that they bear against the pipe fitting (not the pipe) on one side and against undisturbed earth on the other side. In cases where thrust blocks cannot bear against native soil compact imported soil to 95 percent relative compaction the full depth of the block.
- B. Thrust block concrete shall not obstruct removal of flange bolts from fittings. Concrete shall be prevented from adhering to the fittings by use of polyethylene encasement around the fitting.
- C. Concrete thrust blocking shall be provided at all tees, elbows, wyes, caps, valves, hydrants, reducers, and other points of unbalanced thrust where shown on the plans. Restrained joint DIP shall not require the use of thrust blocks at locations of unbalanced thrust unless specifically indicated on the plans (connections to existing mains). Thrust blocking shall be poured so the thrust surface bears against undisturbed soil.
- D. Anchor blocks where shown on the plans shall be sized as indicated to provide the mass needed to prevent pipe movement. Rebar shall be bent around the fitting (not pipe) secure prior to the placement of concrete. Unsuitable foundations as determined by the City of Reno Inspector shall be over-excavated 2-feet and the placement of structural fill per Section 02200. No placement of anchor blocks shall occur until the subgrade has been inspected.

3.09 Tracer Wire:

- A. A 12 gauge (solid or stranded) copper tracer wire with purple THHN insulation shall be placed above the pipelines within the bedding material per the trench detail located on the plans.
- B. The tracer wire shall be extended to an empty valve box, up to the cover, located in each intersection or as shown on the plans. The actual placement of the test stations shall be field determined by City of Reno Project Inspector.
- C. The tracer wire shall be placed under service laterals and extended onto meter set up to the meter cover at locations where the lateral is not installed perpendicular to the main. In cases where the service lateral is installed perpendicular from the main to the meter box no tracer wire shall be required.
- D. The tracer wires shall be connected together in the empty valve box using an appropriately sized wire nut.
- E. Prior to acceptance of the reclaim line, the contractor shall perform a continuity test

after backfilling the reclaim pipe trench to the satisfaction of the CITY OF RENO Project Inspector.

3.10 Installation of Valve Boxes:

- A. Valve Boxes: Center the valve boxes and set plumb over the wrench nuts of the valves. Set valve boxes so that they do not transmit shock or stress to the valves. Set the valve box covers flush with the surface of the finished pavement as shown or such other level as may be ordered by the City of Reno Project Inspector. Cut extensions to the proper length so that the valve box does not ride on the extension when set at grade.
- B. Backfill shall be the same as specified for the adjacent pipe. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed, and backfilled at the Contractor's expense. Upon completion of installing valve boxes they shall be cleaned of all debris with a vacuum truck prior to Inspector acceptance.

3.11 Installation of Service Laterals:

- A. All service laterals and shall be constructed with PE tubing using open trench construction methods. Trenchless installations or tunneling shall not be permitted.

3.12 Installation of Storm Drain Lines

- A. Storm drain pipe shall be installed in accordance with ASTM D2321 and manufactures recommended installation guidelines. Minimum pipe cover shall be 2-feet with backfill per detail on plans.

3.12 Petrolatum Wax Tape

- A. All buried fittings, valves and appurtenances indicated on the plans to have wax tape applied and exposed surfaces of underground insulating (dielectric) flange gasket kits, including the outside of the flange gasket and exposed flange bolts, nuts and washers shall be coated with the specified primer, wax tape and protective outer wrap.
- B. Apply primer to all surfaces prior to placing wax tape. For fittings apply to the fitting ends/joints and all hardware, the body of the fitting does not require primer and wax tape. For valves apply primer and wax tape to ends/joints, packing gland and bonnet bolts. Prior to placing primer clean surfaces and remove all loose material, if the surface is wet, cold or rusty, rub and press on primer to displace moisture and ensure adhesion. For irregular surfaces (fittings, valves, etc..) the Contractor has the option to apply a profiling mastic (Fill-Pro PM-GP or equal) directly by hand working the material onto the metal. Continue applying the material in and around the voids, contours and crevices building up an even surface all around the fitting or structure.

Then overwrap the entire application with wax tape. For straight pipe sections applying profiling mastic should not be required. In lieu of utilizing profiling mastic the wax tape application can be completed with more refined/smaller wax tape applications to the extent no bulges or creases in the wax tape application result.

- C. All wax tape shall be applied with a 1-inch minimum overlap and in accordance with the Manufacturer's instructions. Wax tap shall be cut and contoured to provide a smooth wrinkle free surface without any bulges or edges protruding. Unacceptable surface appearance shall result in the removal and complete re-installation to the satisfaction of the CITY OF RENO Inspector.
- D. After application of the wax tap install the protective wrap (poly wrap for buried gate valves, fittings and appurtenances) over all surfaces. Wrap securely to adhere to the pipe without any loose material or bulges present.

3.13 Flushing, Testing and Disinfection:

- A. A pressure and leakage test in accordance with AWWA C600 and City of Reno Construction Standards shall be performed on the completed ductile iron piping and appurtenances. The test pressure shall be 250 psi as measured at the pressure transducer within the vault. The test duration shall be two hours. Any visible signs of leakage within the replacement pipe/fittings within the vault shall dictate corrective measures by the Contractor at no additional cost to City of Reno.

END OF SECTION

SECTION 16000
ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials and equipment required and install complete and make operational, electrical and process instrumentation system as shown on the Drawings and as specified herein.
- B. The work shall include furnishing, installing, and testing the equipment and materials detailed on the drawings and in the following Sections:

<u>Section No</u>	<u>Title</u>
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16000	-	Electrical - General Provisions
16110	-	Raceways, Boxes, Fittings and Supports
16120	-	Wires and Cables (600 Volt Maximum)
16200	-	Miscellaneous Equipment
17001	-	Instrumentation and Controls

- C. The work shall include furnishing and installing the following:
 - 1. Conduit, wiring and terminations for all control devices, control panels and electrical equipment furnished under Divisions 15, 16, and 17.
 - 2. Conduit, wiring and terminations for all field-mounted instruments furnished and mounted under other Divisions, including process instrumentation primary elements, transmitters, local indicators and control panels.
 - 3. Conduit, wiring, and terminations for surge protection equipment.
 - 4. Wiring to new control systems including installation of auxiliary relays, switches, as required to provide the control functions or inputs as shown on the Drawings. Verify all existing wiring and connections for correctness. Trace the circuits in the field and develop the wiring diagrams necessary for completion of the work. Document all changes made to the wiring diagrams and return a marked-up set of Record Drawings to Engineer after the work is complete.
 - 5. Furnish and install precast manholes and handholes.

6. Perform testing of the electrical equipment and make settings for the electrical protective devices.
- D. Review the electrical underground system and the civil yard piping. Install the electrical underground system in a manner that avoids conflicts with manholes, catch basins, etc. provided under other Divisions.
- E. Sequencing and Scheduling
 1. Coordinate electrical equipment installation with other disciplines and utilities.
 2. Sequence, coordinate and integrate the installation of electrical materials and equipment for efficient flow of the work.
 3. Verify final locations for rough ins with field measurements and with the requirements of the actual equipment to be connected.
- F. The Contractor is advised to visit the site before submitting a bid to better acquaint itself with the Work of this Contract. Lack of knowledge will not be accepted as a reason for granting extra compensation to perform the Work.

1.02 DEMOLITION AND RELATED WORK

- A. The Contractor shall perform electrical demolition Work as indicated on the electrical drawings and in parts of this Specification Section. The Contractor is cautioned that demolition work may also be indicated on non-electrical drawings. Coordinate electrical de-energization, disconnection, and removal with all trades and the overall sequence of construction.
- B. Unless otherwise indicated on contract drawings, electrical requirements associated with removed equipment shall be:
 1. Remove control and signal wiring as indicated.
 2. Remove all abandoned conduits unless otherwise indicated.
 3. Encased conduits shall be cut flush to the floor and be grouted.
 4. Remove disconnect switches, circuit breakers, sensors, and transmitters.
- C. Unless otherwise indicated on contract drawings, conduits to be reused or extended shall be terminated in a new junction box. The junction box shall have a NEMA rating in accordance with the area in which it is located and shall be sized as required.
- D. Materials and equipment not indicated to be removed and returned to the Owner shall, upon removal, become the Contractor 's property and shall be disposed of off-site.

- E. Material and equipment indicated to be relocated or reused shall be removed and relocated and reinstalled with care to prevent damage thereto.
- F. Materials indicated to be returned to the Owner shall be placed in boxes with the contents clearly marked and be stored at a location determined by the Engineer.

1.03 SUBMITTALS

- A. As a minimum, all equipment specified in each Section of Division 16 shall be submitted at one time. As an example, all lighting fixtures shall be submitted together, all power pedestals shall be submitted together, etc. Submittals that do not comply will be returned disapproved.
- B. Shop drawings shall be submitted for the following equipment:
 - 1. Miscellaneous Equipment (as specified in Section 16200)
 - 2. Lighting Fixtures and Lamps
 - 3. Precast Manholes and Handholes, Frames and Covers
- C. MODBUS register maps shall be included in the submittal for the following equipment:
 - 1. Flow Meters.
 - 2. Programmable Logic Controllers.
 - 3. All other electrical equipment with MODBUS communications.
- D. The manufacturers name and product designation or catalog numbers shall be submitted for the following material:
 - 1. Raceways, Boxes, Fittings and Hangers
 - 2. Wire and Cable
 - 3. Switches, Receptacles and Covers
- E. The following shall be submitted for record.
 - 1. Ground System Test Results.
 - 2. Electrical System Test Results
 - 3. PCIS equipment loop tests and other tests as required within specification 17001.
- F. Mark submittals to clearly identify proposed equipment including accessories, options, and features and to exclude parts not applicable to the project.

- G. Check shop drawings for accuracy prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to this Section and the Drawings. This statement shall also list all exceptions to this Section and the Drawings. Mark submittals to identify proposed equipment including accessories, options and features being proposed for approval and exclude parts not to be used. Shop drawings not so checked and noted shall be returned marked NOT APPROVED.
- H. The Engineer's check shall be for conformance with the design concept of the project and compliance with this Section and the Drawings. Errors and omissions on approved shop drawings shall not relieve the Contractor from the responsibility of providing materials and workmanship required by this Section and the Drawings.
- I. All dimensions shall be field verified at the job site and coordinated with the work of all other trades.
- J. Material shall not be ordered or shipped until the shop drawings have been approved. No material shall be ordered, or shop work started if shop drawings are marked "APPROVED AS NOTED - CONFIRM," "APPROVED AS NOTED - RESUBMIT" or "NOT APPROVED."
- K. Operation and Maintenance Data
 - 1. Submit operations and maintenance data for equipment furnished under this Division. The manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists including replacement part numbers, to instruct operating and maintenance personnel unfamiliar with such equipment.
 - 2. Manuals shall include the following as a minimum:
 - a. A comprehensive index.
 - b. A complete "As-Built" set of approved shop drawings.
 - c. A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.
 - d. A table listing of the "as left" settings for all timing relays and alarm and trip setpoints.
 - e. System schematic drawings "As-Built," illustrating all components, piping and electric connections of the systems supplied under this Section.
 - f. Detailed service, maintenance and operation instructions for each item supplied.
 - g. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.

- h. Complete parts list with stock numbers, including spare parts.

1.04 REFERENCE STANDARDS

- A. Electric equipment, materials and installation shall comply with the current edition of the following codes and standards in the state or county where the work is being performed:
 - 1. National Electrical Safety Code (NESC)
 - 2. National Electrical Code (NFPA 70)
 - 3. National Fire Protection Association (NFPA)
 - 4. National Electrical Manufacturers Association (NEMA)
 - 5. American National Standards Institute (ANSI)
 - 6. Instrument Society of America (ISA)
 - 7. Underwriters Laboratories (UL)
 - 8. National Electrical Testing Association (NETA)
 - 9. American Society for Testing and Materials (ASTM)
 - 10. Institute of Electrical and Electronics Engineers (IEEE)
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 PRIORITY OF THE CONTRACT DOCUMENTS

- A. In all cases, figured dimensions shall govern over scaled dimensions, but work not dimensioned shall be as directed by the Engineer and work not particularly shown, identified, sized, or located shall be the same as similar work that is shown or specified.
- B. Detailed Drawings shall govern over general drawings, larger scale Drawings take precedence over smaller scale Drawings, and Change Order Drawings shall govern over Contract Drawings
- C. If the issue of priority is due to a conflict or discrepancy between the provisions of the Contract Documents and any referenced standard, or code of any technical society, organization or association, the provisions of the Contract Documents will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, organization or association, or between Laws and Regulations, the higher performance requirement shall be binding on the Contractor, unless otherwise directed by the Engineer.

- D. In accordance with the intent of the Contract Documents, the Contractor accepts the fact that compliance with the priority order specified shall not justify an increase in Contract Price or an extension in Contract Time nor limit in any way, the Contractor's responsibility to comply with all Laws and Regulations at all times.

1.06 ENCLOSURE TYPES

- A. Unless otherwise required or specifically specified in contract drawings or contract specifications, electrical enclosures shall be NEMA Types as follows:
 - 1. NEMA 1 in dry, non-process indoor above grade locations (i.e. administration areas, laboratories, control rooms, storage rooms).
 - 2. NEMA 12 in "DAMP" locations shown on the Drawings and maintenance shops.
 - 3. NEMA 4 in outdoor locations, rooms below grade including basements and buried vaults and "WET" locations shown on the Drawings.
 - 4. NEMA 4X in "CORROSIVE" locations shown on the Drawings.

1.07 CODES, INSPECTION AND FEES

- A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.
- B. Obtain all necessary permits and pay all fees required for permits and inspections.

1.08 ELECTRICAL SYSTEM TESTING AND SETTINGS

- A. Test systems and equipment furnished under Division 16; repair or replace all defective work and equipment at no additional cost. Refer to the individual equipment sections for additional specific testing requirements.
- B. Make adjustments to the systems furnished under Division 16 and instruct personnel in the proper operation of the systems.
- C. In addition to the specific testing requirements listed in the individual Sections, the following minimum tests and settings shall be performed.
 - 1. Mechanical inspection, testing and settings of circuit breakers, protective relays, disconnect switches, control circuits and equipment for proper operation.
 - 2. Check power and control power fuse ratings for correct size and type. Replace fuses if they are found to be of the incorrect size.

3. Check interlocking, control, and instrument wiring for each system and/or part of a system to prove that the system will function properly as indicated by control schematic and wiring diagrams.
 4. Verify all terminations at transformers, equipment, panels and enclosures by producing a 1, 2, 3 rotation on a phase sequenced motor when connected to "A," "B" and "C" phases.
 5. Verify all circuit breaker ratings and settings are as required by the Contract Documents or as amended during shop drawing review. Advise the Engineer of discrepancies and make changes as directed by the Engineer.
 6. Verify grounding of instrumentation equipment and line surge protection equipment.
- D. Testing shall be scheduled and coordinated with the Engineer at least two weeks in advance. Provide qualified test personnel, instruments, and test equipment.
- E. Provide a test report verifying compliance with the testing requirements included under Division 16. The report shall include a Table of Content and a data sheet for each component tested. The Table of Content shall identify each component by a unique number. The Number shall appear on the technical data sheet for identification. Submit cable test results, grounding test results, circuit breaker, and protective device settings, fuse type and rating for each piece of equipment. Test report shall be submitted in PDF form.

1.09 INTERPRETATION OF DRAWINGS

- A. Unless specifically stated to the contrary, the Drawings do not show exact locations of conduit runs. Coordinate the conduit installation with other trades and the actual supplied equipment. However, conduits shall run parallel or perpendicular to the structure.
- B. Conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed.
- C. Verify the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation.
- D. Except where dimensions are shown, the locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the Contractor and approved by the Engineer during construction. Obtain information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner.
- E. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials to install and place in satisfactory operation all power, lighting and other electrical systems shown.

- F. Redesign of electrical or mechanical work, which is required due to the Contractor's use of an alternate item, arrangement of equipment and/or layout other than specified herein, shall be done by the Contractor at his/her own expense. Redesign and detailed plans shall be submitted to the Engineer for approval. No additional compensation will be provided for changes in the work, either his/her own or others, caused by such redesign.
- G. Incidentals: The Contractor shall provide all materials and incidentals required for a complete and operable system, even if not required explicitly by the Specifications or the Drawings. Typical incidentals are terminal lugs not furnished with vendor-supplied equipment, compression connectors for cables, splices, junction and terminal boxes, couplings, and connections required by vendor-furnished equipment.

1.10 SIZE OF EQUIPMENT

- A. Investigate each space in the structure through which electrical equipment furnished under Division 16 must pass to reach its final location.

1.11 RECORD DRAWINGS

- A. Record Drawings shall accurately show the installed condition of the following items:
 - 1. One-line Diagram(s).
 - 2. Raceways and pull boxes.
 - 3. Conductor sizes and conduit fills.
 - 4. Panel Schedule(s).
 - 5. Control Wiring Diagram(s).
 - 6. Lighting Fixture Schedule(s).
 - 7. Lighting fixture, receptacle, and switch outlet locations.
 - 8. Underground raceways
 - 9. Grounding system.

1.12 EQUIPMENT INTERCONNECTIONS

- A. Review shop drawings of equipment furnished under Divisions 15, 16, and 17 and prepare coordinated wiring interconnection diagrams. Submit copies of wiring diagrams or tables with Record Drawings.
- B. Furnish and install all equipment interconnections.

1.13 MATERIALS AND EQUIPMENT

- A. Materials and equipment furnished under this contract shall be new.
- B. Material and equipment of the same type shall be the product of one manufacturer and shall be UL listed.

1.14 EQUIPMENT IDENTIFICATION

- A. Identify equipment, disconnect switches, control stations, etc. furnished under Division 16 with the name of the equipment it serves. Control panels, panelboards, junction or terminal boxes, transfer switches, etc., shall have nameplate designations as shown on the Drawings. Where no name is given on the drawings, contractor will label indicating it's use and in accordance with the NEC.
- B. Nameplates shall be engraved, laminated plastic, not less than 1/16-in thick by 3/4-in by 2-1/2-in with 3/16-in high white letters on a black background.
- C. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates shall be bonded to all other enclosure types using an epoxy or similar permanent waterproof adhesive. Two-sided foam adhesive tape is not acceptable. Where the equipment size does not have space for mounting a nameplate the nameplate shall be permanently fastened to the adjacent mounting surface.

END OF SECTION

SECTION 16110
RACEWAYS, BOXES, FITTINGS AND SUPPORTS

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 16000.

PART 2 – PRODUCTS

2.01 RACEWAYS AND FITTINGS

- A. Steel Conduit and Fittings
 - 1. Rigid metal conduit (GRS), couplings, factory elbows and fittings shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading and shall comply with ANSI C 80.1 and UL/6.
 - 2. Acceptable manufacturers:
 - a. Allied Tube & Conduit Corp.
 - b. LTV Steel Tubular Products Corp.
 - c. Triangular PWC Inc.
 - d. Or approved equal.
 - 3. Rigid metal and intermediate metal conduit fittings shall be of the threaded type, and shall be steel or malleable iron, with a hot-dipped galvanized finish. Threadless fittings and split couplings are not allowed except in specific applications as approved by the Engineer.
 - 4. Acceptable manufacturers:
 - a. Appleton Electric Co.
 - b. O-Z Gedney Co.
 - c. Steel City

- d. Or approved equal

B. PVC Coated Rigid Steel Conduit and Fittings

1. PVC coated rigid steel conduit shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading with a minimum 0.040-in thick, polyvinyl chloride coating permanently bonded to it and an internal chemically cured urethane or enamel coating. The rigid steel conduit shall comply to ANSI C80.1 and UL/6 prior to coating.
2. PVC coated couplings, factory elbows and fitting shall be furnished with a PVC coating bonded to steel the same thickness as used on the PVC coated conduit. The ends of all couplings, fittings, etc. shall have a minimum of one pipe diameter in length of PVC overlap.
3. Acceptable manufacturers:
 - a. "OCAL" as manufactured by Thomas & Betts
 - b. "Plasti-Bond Red" as manufactured by Robroy Industries
 - c. Triangle PWC Inc
 - d. Or approved equal

C. Non-Metallic Conduit and Fittings

1. PVC conduit shall be rigid polyvinyl chloride schedule 40. Rigid PVC conduit up to trade sizes 4-in shall comply with NEMA TC-2 and UL/651 and shall be sunlight resistant, rated for use with 90-degree C conductors in exposed, direct burial or concrete encased applications. Underground utility duct, over 4-in trade size and above, shall be high density polyethylene (HDPE) Schedule 40 conduit encased in concrete, rated for use with 90-degree C conductors and shall comply with NEMA TC-8 and ASTM F512.
2. Connectors, couplings, fittings and ancillary materials shall be supplied by the conduit manufacturer.
3. Acceptable manufacturers:
 - a. Carlon Corp.
 - b. Certained Corp.
 - c. Conux Pipe Systems, Inc.
 - d. Or approved equal.

D. Liquid-tight Flexible Metal Conduit, Couplings and Fittings

1. Liquid-tight flexible metal conduit shall be square locked, galvanized steel flexible conduit with a moisture proof, flame resistant, polyvinyl chloride jacket, for use with rigid metal conduit systems. Sealtite, Type UA, manufactured by the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co. or equal.
2. Liquid-tight conduit fittings shall be hot-dipped mechanically galvanized, positive grounding, screw in type. Provide external bonding lugs on sizes 1-1/4-in and larger. Box connectors shall have insulated throats as manufactured by the Thomas & Betts Co.; Crouse-Hinds Co. or equal.
3. Acceptable Manufacturers:
 - a. American Flexible Conduit Co.
 - b. Anaconda Metal Hose/ANAMET Inc.
 - c. Thomas & Betts
 - d. Or approved equal

2.02 BOXES AND FITTINGS

A. Dry and Damp Location Boxes and Fittings

1. Unless otherwise indicated on drawings, outlet boxes shall be zinc-galvanized, 2-1/8 in extra depth, pressed steel with knockouts and of size and type suitable for the intended application.
2. Unless otherwise indicated on drawings, boxes that are less than 100 cubic inches in size used for junction or pull boxes shall be zinc galvanized pressed steel not less than 14 USS gauge with appropriate blank covers, minimum size 4-11/16-in square by 2-1/8-in deep.
3. Unless otherwise indicated on drawings, boxes that are 100 cubic inches and larger shall be constructed of hop dip galvanized sheet steel without knockouts. Covers shall be secured with round head brass machine screws. All joints shall be welded and ground smooth.
4. Terminal cabinets shall be NEMA 12 sheet steel unless otherwise shown on the Drawings. Boxes shall be painted and have continuously welded seams. Welds shall be ground smooth and galvanized. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14-gauge metal and covers shall not be less than 12 gauge metal. Terminal boxes shall be furnished with latching hinged doors,

terminal mounting straps and brackets. Terminal blocks shall be rated not less than 20A, 600V.

5. Acceptable Manufacturers:

- a. Appleton
- b. Raco
- c. Hoffman
- d. Or approved equal

B. Wet Location Boxes and Fittings

- 1. NEMA 4 terminal boxes, junction boxes, pull boxes, etc, shall be sheet Type 316 stainless steel unless otherwise shown on the Drawings. Boxes shall have continuously welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel clamps. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 Amps, 600 Volt.
- 2. Cast or malleable iron device boxes shall be Type FD. Boxes and fittings shall have cadmium-zinc finish with cast covers and stainless-steel screws.
- 3. Acceptable Manufacturers:
 - a. Crouse-Hinds
 - b. Steel City
 - c. Hoffman
 - d. Or approved equal
- 4. Conduit wall seals for cored holes shall be Type CSMI or Type Link-Seal as manufactured by the O.Z./Gedney Co., Garlock, or equal.
- 5. Grounding bushings shall be malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs as manufactured by Crouse Hinds/Cooper, Series HGLL; Appleton, Series GIB; O.Z./Gedney, Type HBLG or equal.

2.03 HARDWARE

A. Conduit Mounting Equipment

1. In dry indoor areas, hangers, rods, backplates, beam clamps, channel, etc, shall be galvanized iron or steel unless otherwise shown on drawings.

B. Conduit Identification Plates

1. Conduit identification plates shall be embossed stainless steel with stainless steel band, permanently secured to the conduit without screws. They shall include conduit ID number on both ends.
2. Identification plates shall be as manufactured by the Panduit Corp. or equal.

C. Conduit Supports

1. All hangers, bracing, rods, beam clamps, accessories and components shall be as manufactured by the Carpenter & Paterson Inc.; Grinnell Corporation; B-Line Systems Inc. or equal.

PART 3 – EXECUTION

3.01 RACEWAY APPLICATIONS

- A. Refer to Table 1 for specific raceway application requirements unless otherwise indicated on drawings.
- B. All conduit of a given type shall be the product of one manufacturer.

Table 1: Raceway Application Guidelines

Raceway Application Guidelines		
Location	Circuit Type	Raceway Type
<u>General</u>	Exposed conduit for power wiring, lighting, switch, and receptacle circuits	Galvanized Rigid Metal Conduit (GRC)
	Concealed conduit for power wiring, lighting, switch, and receptacle circuits	Schedule 40 PVC
	All conduit stubbed through slab	PVC coated rigid until first fitting. Minimum length of 3 inches exposed through slab
	Underground elbows	PVC coated rigid
	Metallic conduits in contact w/ earth	PVC coated rigid
<u>Corrosive Areas</u> Chemical storage and handling areas, underground vaults,	Exposed conduit for power wiring, lighting, switch, and receptacle circuits	PVC coated rigid

within tanks or clearwells, filter pipe galleries and locations designated corrosive on the drawings.	Concealed conduit for power wiring, lighting, switch, and receptacle circuits	Schedule 40 PVC
<u>Outdoor Areas</u>	Exposed conduit for power wiring, lighting, switch, and receptacle circuits	Galvanized Rigid Metal Conduit (GRC)
	Concealed conduit for power wiring, lighting, switch, and receptacle circuits	Schedule 40 PVC
	All conduit stubbed through slab	PVC coated rigid until first fitting. Minimum length of 3 inches exposed through slab

3.02 BOX APPLICATIONS

- A. Unless otherwise specified herein or shown on the Drawings, all boxes shall be metal.
- B. Terminal boxes, junction boxes and pull boxes shall have NEMA ratings suitable for the location in which they are installed. See section 2.02.
- C. All conduit bodies and pulling outlets shall comply with NEC wire bending space requirements.

3.03 FITTINGS APPLICATIONS

- A. All underground conduit penetrations at walls or other structures shall be sealed watertight. Conduit wall seals and sleeves shall be used in accordance with the manufacturer's installation instructions.
- B. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.
- C. Insulated throat grounding bushings shall be used where specified herein.

3.04 INSTALLATION

- A. Unless otherwise shown on drawings, no conduit smaller than 3/4-in electrical trade size shall be used for power wiring, nor shall any have more than the equivalent of three 90-degree bends in any one run. Pull boxes shall be provided as required by the NEC after every 270 degrees of bends.
- B. No wire shall be pulled until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.

- C. All conduit which may under any circumstance contain liquids such as water, condensation, liquid chemicals, etc., shall be arranged to drain away from the equipment served. If conduit drainage is not possible, a conduit sealing system shall be used to plug the conduits. The ends of all conduits shall be temporarily plugged to exclude dust, moisture and debris from entering during construction.
- D. Conduit ends exposed to the weather or potential flooding shall be sealed with conduit sealing system.
- E. Conduits noted as spare shall have mule tape with sequential footings installed and coiled at the end, be capped or plugged at both ends with easily removable fittings.
- F. Conduit terminating in NEMA 3R, 4, and 4X enclosures shall be terminated with Myers type conduit hubs.
- G. Conduit terminating in pressed steel boxes shall have double locknuts and insulated bushings.
- H. Conduits containing equipment grounding conductors and terminating in metal boxes shall have insulated throat grounding bushings.
- I. Conduits shall be installed using threaded fittings except for PVC.
- J. The use of running threads is prohibited. Where such threads are necessary, a 3-piece union shall be used.
- K. All conduits entering or leaving a motor control center, switchboard or other multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway or other manufacturer's designated area, directly below the vertical section in which the conductors are to be terminated. The 3-in extension of conduit above the floor slab or concrete equipment pad may be reduced to a dimension that suits the equipment manufacturer's installation requirements if the 3-in stub-up interferes with the equipment being provided.
- L. Rigid galvanized steel conduits which have been field cut and threaded shall be painted with cold galvanizing compounds.
- M. Liquid-tight flexible metal conduit shall be used for all motor terminations, the primary and secondary of transformers, generator terminations and other equipment where vibration is present or may require removal. Non-metallic flexible conduit can be used with rigid PVC conduit systems.
- N. PVC coated rigid steel conduit shall be used as a transition section where concrete embedded conduit stubs out of floor slabs or through below grade walls or where conduit installed under building slabs on grade stub out of floors. The PVC coated rigid steel conduit shall extend a minimum of 3-in into and out of the floor slab, concrete pad, or wall to allow for proper threading of the conduit.

- O. Conduit supports, other than for underground raceways, shall be spaced at intervals not exceeding the distance required by the NEC to obtain rigid construction.
- P. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface.
- Q. Conduit Supports (Other than Underground Raceways)
 - 1. Flush Mounted Supports
 - a. Support shall be spaced 10-ft or less, as required to obtain rigid conduit construction.
 - b. Attachment to concrete shall be with cast-in-place inserts, cast-in place welded plates with welded studs or stainless adhesive anchors.
 - 2. Conduit Hangers
 - a. Conduit hangers shall be vertical supported 10-ft or less, as required to obtain rigid conduit construction.
 - b. Lateral seismic restraints (Sway Bracing) shall be spaced 20-ft or less.
 - c. Horizontal seismic restraints shall be spaced at 30-ft or less. There shall be at least one horizontal restraint per horizontal run.
 - d. Attachment to concrete shall be cast-in-place inserts, cast-in place welded plates with welded studs or stainless steel adhesive anchors.
 - 3. All reinforcing bars shall be located by the Electrical Subcontractor with the use of a rebar locator prior to installing adhesive capsule type anchors. Mark the location of all reinforcing bars in an area bounded by a line drawn at least 18-in from the edge of the support bearing/weld plates on all four sides of the bearing/weld plates prior to fabricating and installing bearing/weld plates.
 - 4. Where interference occurs, adjust anchor locations to clear reinforcing bars and alter support configuration at no additional cost.
- R. Miscellaneous steel for the support of fixtures, boxes, transformers, starters, contactors, panels and conduit shall be furnished and installed. Channel supports shall be ground smooth and fitted with plastic end caps.
- S. Steel channels, flat iron and channel iron shall be furnished and installed for the support of all electrical equipment and devices, where required, including all anchors, inserts, bolts, nuts, washers, etc., for a rigid installation. Channel supports shall be ground smooth and fitted with plastic end caps.

- T. Where conduits pass through openings in walls or floor slabs, the remaining openings shall be sealed against the passage of flame and smoke in accordance with UL requirements and the details shown on the Drawings. The sealing method shall have a UL fire rating, which equals or exceeds the fire rating of the wall or floor construction.
- U. Conduits shall not cross access hatches. They shall be routed to avoid such present or future openings in floor or ceiling construction.
- V. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc., shall be sealed with "duct seal" as manufactured by Manville or seal fitting to prevent the accumulation of condensation.
- W. Mandrels shall be pulled through all existing conduits which will be reused and through all new conduits 2-in in diameter and larger prior to installing conductors.
- X. Where no type or size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of NEC Article 314. Enclosure type and material shall be as specified herein unless otherwise indicated on drawings.
- Y. A conduit identification plate shall be installed on all power, instrumentation, alarm and control conduits at each end of the run and at intermediate junction boxes, manholes, etc. Conduit plates shall be installed before conductors are pulled into the conduits. Exact identification plate location shall be coordinated with the Engineer at the time of installation to provide uniformity of placement and ease of reading.

END OF SECTION

SECTION 16120
WIRES AND CABLES (600 VOLT MAXIMUM)

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish, install and test all wire, cable and appurtenances as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 16000.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Carefully handle all conductors to avoid kinks and damage to insulation.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.

2.02 ALL CONDUCTORS SHALL BE STRANDED UNLESS OTHERWISE SPECIFIED.

- A. Except for control, signal, and instrumentation circuits, wire smaller than No. 12 AWG shall not be used.

2.03 BUILDING WIRE

- A. Wire for lighting, receptacles and other circuits shall be NEC type XHHW-2 or THHN/THWN as manufactured by the Okonite Co.; Carol Cable Co. Inc.; Pirelli Cable Corp. or equal.

2.04 CONTROL, STATUS AND ALARM WIRE

- A. Wire shall be No.14 AWG NEC type MTW-UL1015, tin coated stranded as manufactured by the Okonite Co.; Carol Cable Co. Inc.; Pirelli Cable Corp. or equal.

2.05 INSTRUMENTATION WIRE

- A. Wire for process instrumentation signals (i.e. 1-5 VDC, 4-20 mADC), R.T.D., potentiometer and similar signals shall be:
 - 1. Single pair cable:

- a. Conductors: 2 No. 16 or 18 tin coated, stranded and twisted on 2-in lay
 - b. Insulation: PVC with 600 Volt, 105 degrees C rating
 - c. Shield: 100 percent mylar tape with drain wire
 - d. Jacket: PVC with UL Subject 13, UL 1581 and manufacturers' identification
 - e. Max overall diameter: 0.262-in
 - f. Miscellaneous: UL Subject 13, Type PLTC
 - g. Manufacturers: Belden No. 8760 or approved equal
2. Three conductor (triad) cable:
- a. Conductors: 3 No.16 or 18 tin coated, stranded and twisted on 2-in lay
 - b. Insulation: PVC with 300 Volt, 105 degrees C rating
 - c. Shield: 100 percent mylar tape with drain wire
 - d. Jacket: PVC with UL Subject 13, UL 1581 and manufacturers' identification
 - e. Max overall diameter: 0.276-in
 - f. Miscellaneous: UL Subject 13, Type PLTC
 - g. Manufacturers: Belden No. 8770 or approved equal

2.06 TERMINATION AND SPLICES (CONTROL, STATUS AND ALARM CONDUCTORS)

- A. Termination connectors shall be of the locking fork end (upturned leg ends) type as manufactured by Ideal Industries; 3M Co.; Panduit Corp. or equal.
- B. Insulated compression type connectors shall be of the expanded vinyl insulated parallel or pigtail type as manufactured by Ideal Industries; 3M Co.; Panduit Corp. or equal.
- C. Solderless pressure connectors shall be self-contained, waterproof and corrosion-proof units incorporating prefilled silicone grease to block out moisture and air. Connectors shall be sized according to manufacturer's recommendations. The connectors shall be UL listed and CSA approved, as manufactured by King Technology, St Louis, MO; Ideal Industries, Inc., Sycamore, IL or equal.

2.07 TERMINATIONS (INSTRUMENTATION CABLES)

- A. Termination connectors shall be of the locking fork-end (upturned leg ends) type as manufactured by Ideal Industries; 3M Co.; Panduit Corp.

2.08 WIRE AND CABLE MARKERS

- A. Wire and cable markers shall be "Omni-Grip" as manufactured by the W.H. Brady Co.; Thomas & Betts Co.; 3M Co. or equal.
- B. Wire and cables with diameters exceeding the capacity of the "Omni-Grip" shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co.; Panduit Corp. or equal.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Uniquely identify all wires, cables, and each conductor of multi-conductor cables (except lighting and receptacle wiring) at each end with wire and cable markers.
- B. Use lubrications to facilitate wire pulling. Lubricants shall be UL approved for use with the insulation specified.

3.02 WIRE COLOR CODE

- A. All wire shall be color coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all junction boxes, manholes and other accessible intermediate locations as well as at each termination.
- B. The following coding shall be used:

<u>System</u>	<u>Wire</u>	<u>Color</u>
24 Volts DC	Low voltage control	Blue
24 Volts AC	Low voltage control	Blue with white tracer
120 Volts AC	Control power	Red
120 Volts AC	Foreign Control Power	Yellow
240/120 Volts	Neutral	White
Single-Phase, 3 Wire	Line 1	Black

	Line 2	Red
208Y/120, Volts	Neutral	White
3 Phase, 4 Wire	Phase A	Black
	Phase B	Red
	Phase C	Blue
240/120 Volts	Neutral	White
3 Phase, 4 Wire	Phase A	Black
delta, center tap	Phase B (High)	Orange
ground on phase coil A-C	Phase C	Blue
480Y/277 Volts	Neutral	White
3 Phase, 4 Wire	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow

3.03 TERMINATIONS AND SPLICES

- A. Power conductors: Terminations shall be die type or set screw type pressure connectors as specified. Splices (where allowed) shall be die type compression connector and waterproof with heat shrink boot or epoxy filling for copper conductors # 4 AWG and larger. Splices shall be solderless pressure connectors with insulating covers for copper conductors # 6 AWG and smaller. Aluminum conductors (where specified) shall employ terminations and splices specifically designed for aluminum conductors.
- B. Control Conductors: Termination on saddle-type terminals shall be wired directly with a maximum of two conductors. Termination on screw type terminals shall be made with a maximum of two spade connectors. Splices (where allowed) shall be made with insulated compression type connectors.
- C. Instrumentation Signal Conductors (including graphic panel, alarm, low- and high-level signals): terminations same as for control conductors. Splices allowed at instrumentation terminal boxes only.
- D. Except where permitted by the Engineer, no splices will be allowed in manholes, handholes or other below grade located boxes.

- E. Splices shall not be made in push button control stations, control devices (i.e., pressure switches, flow switches, etc.), conduit bodies, etc.

3.04 INSTRUMENTATION CABLES

- A. All circuits shall be installed as twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever three wire circuits are required.
- B. Terminal blocks shall be provided at all instrument cable junction and all circuits shall be identified at such junctions.
- C. Shielded instrumentation wire, coaxial, data highway, I/O and fiber optic cables shall be run without splices between instruments, terminal boxes, or panels.
- D. Shields shall be grounded as recommended by the instrument manufacturer and isolated at all other locations. Terminal blocks shall be provided for inter-connecting shield drain wires at all junction boxes. Where individual circuit shielding is required, each shield circuit shall be provided with its own block.
- E. Seal openings in slabs and walls through which wires and cables pass.

3.05 FIELD TESTING

- A. Test all 600 Volt wire insulation with a megohm meter after installation. Make tests at not less than 500 Volt. Submit a written test report of the results to the Engineer.

END OF SECTION

SECTION 16200
MISCELLANEOUS EQUIPMENT

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install all miscellaneous equipment as shown on the Drawings and as specified herein.

1.02 EQUIPMENT LIST

- A. This Section provides the requirements for miscellaneous equipment typically employed in a facility.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 16000.

1.04 REFERENCE STANDARDS

- A. Equipment enclosures shall have NEMA ratings suitable for the location in which they are installed and as specified in Section 16000.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Disconnect Switches
 - 1. Disconnect switches shall be heavy-duty, quick-make, quick-break, visible blades, 600 Volt, 3 Pole with full cover interlock, interlock defeat and flange mounted operating handle. All current carrying parts shall be copper.
 - 2. NEMA 4 enclosures shall be stainless steel.
 - 3. NEMA 4X enclosures shall be stainless steel.
 - 4. Switches shall be as manufactured by the Schneider Electric; General Electric; Eaton, or equal.
- B. Terminal Blocks
 - 1. Terminal blocks shall be NEMA type rated at 20 amperes minimum, 600 Volt, channel mounted, with tubular screw and pressure plate.

2. Terminal blocks shall be Bulletin 1492 as manufactured by the Allen-Bradley Co.; ABB; Kukla, or equal.

C. Electric Warning Sign

1. Conform with OSHA regulations for accident prevention. Sign shall be constructed of High-Performance Plastic (HPP) by the Seton Name Plate Corp.; Global Equipment Co.; World-wide Sign Co., or equal.

D. Corrosion Inhibitors

1. All equipment enclosures, terminal boxes, etc, located in a corrosive rated area (where shown on the Drawings) that contains electrical or electronic equipment or terminal strips shall be furnished with an internally mounted, chemically treated corrosion inhibitor pad.
2. The corrosion inhibitor pads shall be as manufactured by Hoffman Engineering Co.; 3M; AGM Container Controls, or equal.

E. Equipment Identification Nameplates

1. All field mounted electrical equipment such as disconnects, push button stations, etc., shall be provided with a weather resistant engraved laminoid equipment identification nameplate screwed or bolted adjacent to the device. Nameplate shall identify the mechanical equipment controlled and equipment name exactly as shown on single line drawings. (i.e., P-95 Cooling Water Pump No. 1). Nameplates shall be Black with white letters and shall include: Panel name, Voltage, number of phases, amps as described in Section 16470.

PART 3 – EXECUTION

3.01 INSTALLATION

1. All floor mounting stands, bracing, anchor bolts and appurtenances furnished to support equipment loads, dynamic loads, wind loads, and seismic forces shall conform to the latest applicable requirements of the State Building Code in effect at the time of Bid.
2. All wall mounted brackets, bracing, bolts and appurtenances to support equipment loads dynamic loads, wind loads, and seismic forces shall conform to the latest applicable requirements of the State Building Code in effect at the time of Bid.

3.02 FIELD TESTING

- A. Check mechanical interlocks for intended operation. Make any adjustments required.

- B. In the event of an equipment fault in the panel, notify the Engineer immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor and Engineer. Repair or replace the equipment as directed by the Engineer prior to placing the equipment back into service at no additional cost to the Owner.

END OF SECTION

SECTION 17001

INSTRUMENTATION AND CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Contents: This Section Includes Information regarding the Process Control and Instrumentation System including logic controllers (and related hardware), control software systems, control systems programming, and controls system training.
- B. Definitions:
 - 1. DCS: Distributed Control System
 - 2. PCIS: Process Control and Instrumentation Systems
 - 3. SCADA: Supervisory Control and Data Acquisition
 - 4. Terms and references for PCIS and SCADA can be used interchangeably within this section.
 - 5. ISA: International Society of Automation. ISA provides standards and guidelines for Instrumentation symbols, drawings, layouts, and general controls.
 - 6. PLC: Programmable Logic Controller
 - 7. RTU: Remote Terminal Unit. An RTU is generally equal to a PCIS panel that is mounted at any local or remote site. The RTU many times contains a PLC and/or radio or other control related equipment.
 - 8. HMI: Human Machine Interface. The HMI is normally referring to the system-wide computer software used within the PCIS or SCADA system and is used for operator interaction with the general system.
 - 9. OIT: Operator Interface Terminal. The OIT is normally referring to the local device and/or software used at a specific PCIS panel or SCADA RTU and is used for operator interaction with the local equipment.
 - 10. I/O: Inputs and/or Outputs, usually related to a logic controller or other smart controller.
 - 11. Titles and Roles: The Following titles are used in the form of roles to define responsibilities and tasks described throughout this section.
 - a. OWNER: The Legal Owner of the facilities which will be added or modified as part of this project.

- b. ENGINEER: The lead engineering firm or person employed by the OWNER and who will be providing consultation to the OWNER.
- c. CONTRACTOR: Contractor who is hired to perform work and provide goods and services for this project.
- d. SUPPLIER: The Contractor who is hired to supply, build, install and/or certify installation of PCIS equipment in compliance with this specification. The SUPPLIER shall be employed by the CONTRACTOR.
- e. INTEGRATOR: The Contractor who is hired to provide, program, and integrate PCIS equipment associated with the sites added or modified as part of this project. The Integrator shall be employed by the CONTRACTOR.
- f. TMWRF CONTROL SYSTEMS PROGRAMMER: The individual working for the OWNER responsible for integrating all reporting received from the outfall SWBD RTU at PCU 14 Remote into the TMWRF DCS system.

1.02 DESCRIPTION

- A. General Contract Roles: General contract roles shall be as outlined in the following paragraphs as well as all other sections related to the PCIS and SCADA systems.
 - 1. The ENGINEER shall be responsible for providing design and project coordination services for the OWNER. The ENGINEER shall review contract documents, submittals, correspondence from the CONTRACTOR as well as other documents as required to assist with assuring the project is completed with the utmost quality and value for the OWNER.
 - 2. The CONTRACTOR shall be responsible for providing all PCIS equipment, complete and operational, in accordance with the contract documents. It is the intent of these specifications to have the CONTRACTOR be responsible for contracting to provide services and equipment to fulfill the individual roles of system INTEGRATOR and SUPPLIER. The requirements of this section, and others relating to it, define these roles as they pertain to the equipment and services required to supply, integrate, and provide a complete and operational PCIS for the OWNER.
 - 3. The SUPPLIER shall be responsible for providing equipment in accordance with the contract documents. All equipment submittals and equipment related correspondence provided by the SUPPLIER shall be coordinated such that it may be reviewed by all entities with listed roles in this project with the primary audience being the ENGINEER, INTEGRATOR, and OWNER. Primary methods of review and communication between the SUPPLIER and other entities shall be at the discretion of the CONTRACTOR. Unless communicated otherwise by the CONTRACTOR, e-mail and cloud-based file sharing shall be the primary medium for review and communication between the SUPPLIER and other entities and roles within this project. The SUPPLIER shall be responsible for providing complete and fully operational, loop tested PCIS equipment

for integration and programming. All testing requirements detailed in this specification shall be completed by the SUPPLIER prior to handing the system over to the INTEGRATOR for integration. All products and services provided by the SUPPLIER shall be subject to inspections and subsequent modifications as required by the INTEGRATOR or ENGINEER.

4. The INTEGRATOR shall be responsible for integrating a complete and operational PCIS with appropriate and approved control methods. The INTEGRATOR shall be responsible for field loop testing and verification of each field terminated circuit for the PCIS systems added or modified as part of this project. The INTEGRATOR shall be responsible for integrating a complete and operational PCIS with appropriate and approved control methods, appropriate and approved logic programming styles and methods, appropriate and approved OIT styles and methods, and appropriate and approved file and naming structures in accordance with contract documents and existing PCIS components as directed by the OWNER and ENGINEER. Unless directed otherwise, it is the responsibility of the INTEGRATOR to fully understand existing PCIS components within the OWNER's system and provide additions and changes to the existing PCIS in accordance with existing standards and/or practices. All services provided by the INTEGRATOR shall be subject to inspections and subsequent modifications as required by the OWNER.

1.03 REQUIREMENTS

- A. Due to the complexities associated with the interfacing of numerous control system devices, it is the intent of these Specifications that the INTEGRATOR work in conjunction with the OWNER, ENGINEER, and CONTRACTOR for the integration of the PCIS equipment into the TMWRF DCS system and provide a control system free of signal incompatibilities.
- B. Minimum SUPPLIER Scope: The exact contractual relationship and scope definition shall be established exclusively between the CONTRACTOR and the SUPPLIER. It is the intent of these Specifications that the SUPPLIER, under the direction of the CONTRACTOR, shall assume full responsibility for the following, as a minimum:
 1. Submit appropriate design and engineering documents for PCIS control panels and hardware, shop drawings, loop drawings, and spare parts submittals in accordance with the Contract Documents.
 2. Coordinate installation schedules with the OWNER, INTEGRATOR, and CONTRACTOR to minimize disruption of service at each site.
 3. Procure, furnish, and install all hardware required to conform to these specifications. Installation tasks shall be performed by experienced and qualified personnel who are familiar with the implications of their efforts related to the disruption of service at the site. The SUPPLIER shall provide the role of Panel Fabrication as outlined later in this section.

4. Perform all required PCIS pre-delivery/installation hardware tests, adjustments, and calibrations.
 5. Prepare and submit panel testing reports.
 6. Perform all required PCIS post-delivery/installation hardware tests, adjustments, and calibrations.
 7. Where the supplier provides the role of INTEGRATOR, they are subject to adhering to the responsibilities listed under Minimum INTEGRATOR Scope and outlined within this specification.
- C. Minimum INTEGRATOR Scope: The exact contractual relationship and scope definition shall be established exclusively between the CONTRACTOR, and the INTEGRATOR. It is the intent of these Specifications that the INTEGRATOR, under the direction of the CONTRACTOR, shall assume full responsibility for the following, as a minimum:
1. Provide an experienced and qualified lead SCADA engineer as Project Manager for the project. This person should have in-depth and successful integration experience with PLCs, radio telemetry, SCADA systems, HMI systems, and more importantly this person shall have in-depth experience with the wastewater process(es) addressed in the project. This person should be intimately involved in the project and be prepared to champion the integration of the project for the OWNER.
 2. Witness all required PCIS post-delivery/installation hardware tests, adjustments, and calibrations where appropriate.
 3. Perform loop testing.
 4. Programming of PLC and providing OWNER and Control Systems Programmer with the Modbus register mapping.
 5. Integration and implementation of the PCIS up to, but not including, the TMWRF DCS system.
 6. Startup and commissioning of the PCIS.
 7. Procure non-equipment specific software and programming tools.
 8. Provide the development of all software programs including PLC, OIT, and all other PCIS related software and establish communications between the TMWRF DCS and Outfall SWBD RTU.
 9. Compile technical manuals related to the PCIS equipment.
 10. Prepare Outfall SWBD RTU for future communications with remote sites.

D. Panel Fabrication

1. PCIS panel fabrication and testing shall be provided by a qualified panel building facility with a minimum of five (5) years of experience in the control and SCADA systems industry.
2. The PCIS panel building facility shall be located within 150 driving miles of the main office of the OWNER. This allows the OWNER, ENGINEER, or INTEGRATOR to visit the facility for testing (if required and/or desired) and return within a day.
 - a. Exception: For manufacturing facilities located greater than the specified driving miles from the PLANT that wish to supply panels, the SUPPLIER agrees to pay all related travel expenses including mileage, airfare, hotel and meals in accordance with standard federal expense guidelines as part of the basic bid package. Travel costs shall be based on two separate trips each consisting of two witnesses for a minimum of two days. Distances greater than 150 miles will require airfare and associated ground transportation from Reno/Tahoe (RNO) airport. No manufacturing facilities outside the continental US will be considered or allowed for this exception.

E. Equal Equipment:

1. These specifications require the provision and installation of specific equipment, software, and other PCIS items pertinent to the project. Such equipment has been selected and specified for the benefit of an operational and long-lasting PCIS system for the OWNER.
2. Equipment specified as having “no equal” or “no substitution” shall be provided as specified.
3. Equipment specified as having substitutes in the form of an “approved equal” shall only be provided and/or installed following submittal by the requesting party and receipt of approval by the ENGINEER.
4. “Approved equal” equipment shall be provided and installed at no additional cost to the OWNER or other entities, or roles related to this project. Additional engineering or other services required to accommodate such equipment shall be provided by the requesting party.

1.04 SUBMITTALS

- A. Submittal information provided by the SUPPLIER shall be incorporated into the final manual developed by the INTEGRATOR. Minimum specific requirements for PCIS submittals shall include the following:
 1. Submittals shall be provided in the form of a portable electronic document in pdf file format.

2. The first page of the submittal shall include the name of the OWNER, the project name, the submittal name, the submittal date and revision, and the filename used for the pdf file in which is provided.
3. Panel drawings shall be produced such that when printed all native scaling is accurate and appropriately represented on 11x17 sheets of paper.
4. Each product submitted shall have an appropriately sized set of submittal pages for the product.
 - a. The first sheet of the set (for each product) shall be a cover page containing the following items.
 - 1) Item name,
 - 2) Manufacturer's Name,
 - 3) Manufacturer's series, model, and part number,
 - 4) Short Description of Item,
 - 5) Listing of all locations and/or sites where the item is to be installed,
 - 6) Listing of All loops in which the item will be incorporated,
 - b. The second and following sheets of the set shall include pertinent submittal information for the item.
 - c. Submittal documents shall be neatly and clearly marked so as to represent the actual equipment to be provided. Sections of the pages that do not apply shall be marked or crossed out to minimize confusion for the exact model or part number represented.
 - d. Submittal sets for items requiring more than several sheets of paper shall include a table of contents and a bookmark to separate each topic of the submittal set such as bill of materials, test data, drawings, and other information.
 - e. Information provided within the set shall include appropriate product brochures, data sheets, and bulletins which include specifications for power, environmental operation and storage conditions, connections, process ratings, accuracies, appropriate chemical compatibilities, and other information pertinent to the specifications such that the product can be verified as compatible with the requirements of the specifications.
5. Multiple instances of the same product may be combined into one set as long as the cover sheet for the set clearly indicates all instances for which the submittal data applies.

- B. A spare parts submittal shall be provided for any PCIS equipment requiring spares. This submittal shall be similar to the hardware and equipment submittal described above. The cover sheet page shall indicate what equipment the spare part is used with. If no spare parts for PCIS equipment are required as part of this project, this spare parts submittal shall consist of a cover page as described above stating that no spare parts are required.
- C. A special tools submittal shall be provided for any PCIS equipment requiring special tools. This submittal shall be similar to the hardware and equipment submittal described above. The cover sheet page shall indicate what equipment the special tools are used with. If no special tools for PCIS equipment are required as part of this project, this special tool submittal shall consist of a cover page as described above stating that no special tools are required.

1.05 MEETINGS

- A. The SUPPLIER and INTEGRATOR shall be required to attend progress or coordination meetings as required and organized by the ENGINEER. The minimum frequency, duration, and location of meetings shall be as indicated in other sections of the contract documents. At a minimum the SUPPLIER and INTEGRATOR shall plan to attend miscellaneous meetings at least twice prior to PCIS installation as well as weekly progress meetings during active PCIS installation, testing, and startup. The SUPPLIER shall not be required to attend weekly meetings once equipment and installations have been tested per the requirements of the specifications.

1.06 WARRANTY

- A. Equipment and materials provided by the SUPPLIER that do not achieve the required design requirements, or demonstrate possibilities of defect or workmanship, shall be replaced or modified by the SUPPLIER to attain compliance at no additional cost to the OWNER.
- B. Integration services provided by the INTEGRATOR that do not achieve the required design requirements, or demonstrate possibilities of defect or workmanship, shall be replaced or modified by the INTEGRATOR to attain compliance at no additional cost to the OWNER.
- C. Programming services provided by the INTEGRATOR that do not achieve the required design requirements, or demonstrate possibilities of defect or workmanship, shall be replaced or modified by the INTEGRATOR to attain compliance at no additional cost to the OWNER.
- D. The warranty period for all equipment, materials, installation, and integration services provided by the SUPPLIER and INTEGRATOR shall be one year from the date of final acceptance of the PCIS portion of the project or one year from substantial completion, whichever is later.
- E. All work and equipment costs required for warranty work shall be at no extra cost to the OWNER.

- F. Following any warranty work, the SUPPLIER and/or INTEGRATOR shall retest the system components affected by the warranty work to verify compliance with the requirements of the contract documents.
- G. If warranty work is performed prior to final completion of the project, the ENGINEER shall be responsible for acceptance of the warranty work. If warranty work is performed following final completion of the project, the OWNER shall be responsible for acceptance of the warranty work.

PART 2 – MATERIALS

2.01 GENERAL

- A. Code and Regulatory Compliance: All PCIS work shall conform to applicable requirements of the National Electrical Code and local building codes.
- B. Hardware Commonality: All PCIS equipment which utilizes a common function, such as a PLC for logic control, or pressure transmitter for pressure monitoring, or any other instrument or device for which multiple units may be required within the project, shall be furnished by a single manufacturer with models matching existing owner desired equipment. It is the responsibility of the SUPPLIER and INTEGRATOR to maximize hardware commonality to the greatest extent feasible.
- C. Loop accuracy: Loop accuracy shall be as determined by the combination of the individual accuracy of the analog circuit (including PLC and any isolation equipment) AND the individual accuracy of the instrument or equipment being monitored or controlled. Requirements for the individual accuracy of instruments shall be as indicated in the specifications for the instrument.
 - 1. Calculation of anticipated accuracy (when required) for the loop shall be the square root of the sum of the squares of anticipated or certified accuracy of all the components in the loop.
 - 2. Field verification of loop accuracy (when required) shall be calculated based on five measured values checked against known values during testing procedures. Testing values at a minimum shall include 0%, 25%, 50%, 75%, and 100% of span.
 - 3. For the purpose of field verification, when an instrument can provide simulated or driven values, such values shall be used to test the loop. When an instrument cannot provide simulated or driven values, the process for which the instrument is providing measurement shall be adjusted where feasible to provide the required testing points. Unless specifically addressed in the specifications, adjustments to the process which are either unfeasible or destructive shall not be required for loop testing.

2.02 PCIS AND CONTROL PANEL EQUIPMENT

A. Existing Equipment

1. All PCIS equipment will be new unless otherwise indicated on contract drawings.

B. Modified and New PCIS Equipment

1. PCIS General Requirements

- a. **Function:** The PCIS panels installed as part of this project shall function as a stand-alone unit and shall perform all the functions specified for the respective site or installation described in these specifications and outlined within contract documents. The PCIS panel shall be microprocessor based. The PCIS panel shall have the capability to accept digital inputs, analog inputs, pulse inputs, counter inputs, and support Modbus TCP & Modbus RTU communication protocols. The PCIS panel shall produce digital outputs, perform local control and data manipulation functions, transmit measured and calculated values to other sites and equipment as specified, and accept configuration data from the master computer or other sites as required.
- b. **Environmental:** The intent of this design is to provide equipment that as much as feasible can function normally in the region's environment without the requirement of ancillary heating and cooling. Expected ambient temperatures are between -10 °F and 110 °F. Enclosures with heaters are permissible and expected where required for moisture reduction or panel heating but the primary control equipment shall be selected and installed with the intended operation to be within the published environmental specifications for such equipment without supplementary heat in the enclosure as is experienced during a power fail condition. As the RTU battery is expected to last for a specified duration without utility power, the primary control equipment is also expected to function in an unheated environment for the equal amount time or greater. It is understood that some equipment will not fully meet such a requirement, but this equipment shall be the exception, and in all cases where possible, shall not be primary control components or instruments.
- c. **Programmable Logic Controller (PLC):** To maintain common parts and compatibility with existing equipment, the PLC in each PCIS panel installed or modified as part of this project shall be equipped with the latest SCADAPack series of controllers as manufactured by Schneider Electric. The specific model to be used at each PCIS panel shall be as indicated in contract drawings.
- d. **Surge Protection:** Surge protection shall be provided for all circuits that span more than one facility grounding plane or leave the facility grounding plane where the PCIS panel is located. Surge protection includes all I/O and all communicating equipment based on these guidelines regardless of whether recommended or required surge protection may or may not be listed in the contract documents.

- e. Loop Isolation: Loop isolators shall be used in any and all loops where grounding issues can develop signal interference.
- f. Labels and Nameplates: All new wires, instruments, and enclosures installed as part of this project shall contain labels and nameplates in accordance with this or other sections in the contract documents.
- g. Flowmeter Communications: Flow metering equipment shall include Modbus (serial RS-485, or Ethernet) communications to allow the PLC to directly poll the flowmeter for totalization data. Appropriate signal cable shall be provided and installed in conduit between each flowmeter or flowmeter transmitter and its respective PCIS panel to accommodate the Modbus communications signal.
 - 1) Flow Totalization: Flow total values displayed on the flowmeter/transmitter display shall be in units of tenths of kGals. Primary flow totalization within the flowmeter/transmitter shall be non-resettable by the operator. Secondary (and additional) resettable flow totalization values may be included on the display or in the PLC if required by the OWNER, but primary values shall not automatically reset or have readily available means for a manual reset. Flow total values shall be polled from the flowmeter by the PLC using standard Modbus functions and registers. Flow totalization values shall be integrated into the PCIS and displayed on each local OIT as well as the HMI. Units for flow totalization shall be converted in the PLC as required and displayed at the OIT and HMI as tenths of kGals, thus the level of viewable unit of granularity is 100 gallons while the major unit of totalization is 1,000 gallons.
 - 2) Flow Rate: Flow rates displayed on the flowmeter/transmitter display shall be in units of GPM. Flow rate values shall be polled from the flowmeter/transmitter by the PLC using standard Modbus functions and registers. Flow rate values shall be integrated into the PCIS and displayed on each local OIT as well as the HMI. Units for flow rate shall be converted in the PLC as required and displayed at the OIT and HMI as GPM. Alternative units shall be MGD only if directed by the OWNER.
- h. Circuit Breakers and Fusing: Circuit breakers and/or supplementary protectors shall only be allowed for non-critical or slow reacting power systems (such as panel lamps or AC convenience receptacles) or panel AC supply to the main DC power supply and shall not be used as primary protection devices for PLCs, radios, OIT's or other such electronic devices within any portion of the PCIS. Such devices shall be protected by fuses, no exceptions. Power buses for PLC I/O and instruments shall be protected by fuses, no exceptions. All fuse holders shall be finger-safe and of the swing-out or removable terminal block type. Fuse holder manufacturer and series shall match that of the terminal block manufacturer and series where possible. Blown fuse indicators are not required and are not recommended due to false indications at PLC inputs under specific conditions.

- i. Instrument Communications Monitoring: For any usage of Modbus or any other means of communicating with an instrument, the communications scheme shall incorporate integrity monitoring of the polling cycle. Where feasible, watchdog values are preferred. Where watchdog values are not producible in the instrument, built-in diagnostics shall suffice for this requirement. In any case, monitored values and/or diagnostics shall be made visible at the OIT for troubleshooting of communications with the instrument. Generally, all polled communications shall incorporate Communications Fail alarms based on field data such as watchdog values where possible and not upon polling statistics.

2.03 COMMUNICATIONS

A. SCADA Radio Communications System

1. INTEGRATOR shall be responsible for establishing communications between the outfall switchboard located at TMWRF and PCU 14 Remote located at TMWRF.

2.04 DCS COMPUTER HARDWARE AND SOFTWARE

- A. Existing DCS computer hardware and software is located at the TMWRF. Integration of new points into the DCS system and DCS HMI shall be the responsibility of TMWRF Control Systems Programmer. However, INTEGRATOR is responsible for programming of remote sites RTUs and informing TMWRF control systems programmer when all remote sites are reporting to the TMWRF outfall SWBD RTU. Integrator is responsible for programming of outfall SWBD RTU and informing TMWRF control systems programmer when the TMWRF outfall SWBD is reporting to TMWRF PCU 14 remote and ready for integration into the DCS system and DCS HMI. INTEGRATOR shall be responsible for assisting the TMWRF Control Systems Programmer as required by the OWNER until the system is fully operational and integrated into the DCS system.

PART 3 – EXECUTION

3.01 PCIS/SCADA HARDWARE ADDITIONS AND MODIFICATIONS

- A. The existing PCIS hardware shall be modified as listed throughout this section and contract documents.
- B. New hardware to be installed at sites added or modified as part of this project shall be coordinated between the INTEGRATOR and the CONTRACTOR to assure full compatibility and functionality of all equipment and/or changes to the sites.
- C. The INTEGRATOR shall supply all connection drawings and all technical information regarding the installation, connection, and coordination with the PCIS equipment.
- D. The CONTRACTOR shall be responsible for all entry into, and installation inside of, any hazardous location associated with the project. The INTEGRATOR shall not be required to

enter any hazardous location as part of the installation, startup, or commissioning of this project. Such entries shall be provided solely by the CONTRACTOR or the CONTRACTOR shall mitigate and control the location such that it is no longer considered a classified or hazardous location.

3.02 PCIS/SCADA INTEGRATION

- A. Integration of new PCIS/SCADA equipment shall include new RTU(s), communications equipment and integration, remote site OIT development, alarm development, and other ancillary requirements as required to provide a complete and operational installation up to, but not including the DCS system. This shall include the communication link between the Outfall SWBD RTU and DCS PCU 14 located at the TMWRF. Below is a list of standard alarms required as part of this project:
- a. **Transducer Fail Alarms.** An analog device that functions by producing a 4-20 mA output in relation to the process parameter being measured or controlled. Upon failure of the device or failure of the signal from the device, a transducer signal fail alarm will be triggered. This alarm is monitored and alarmed through the SCADA system. The alarm point is a discrete on/off alarm based on the status of the signal and the scaled value in the PLC. Possible states for this point include NORMAL and ALARM. The alarm is latched within the RTU at the site and will return to a normal state once the alarm condition is returned to normal based upon a good signal which is determined to be in the appropriate range. Parameters for defining the appropriate signal are programmed within the PLC and are operator adjustable (under password) at the local OIT.
 - b. **Flood Alarms.** A fixed level, DC powered discrete float switch (RTU battery backed and not dependent upon AC power and/or control power) shall be included within the PCIS to monitor for a Pump Room Flood and Chemical Room Flood condition and shall be known as the “Pump Room Flood Alarm” and Chem Room Flood Alarm” respectively. These alarms are monitored and alarmed through the SCADA system.
 - c. **RTU Power Fail Alarms.** The RTU power fail alarm point is provided such that the status of utility power supplying the RTU is monitored and alarmed through the SCADA system. This point is a discrete on/off alarm based on the presence of incoming utility power to the RTU. Possible states for this point include NORMAL and ALARM. A short delay period is included in the alarming logic to help eliminate false alarms. This alarm is not latched in the field and will return to a normal state once utility power has been restored.
 - d. **Site Power Fail Alarms.** AC utility power for the Redwood Materials Booster Pump Station shall be monitored at the MCC enclosure using a three-phase power monitoring relay. The power monitoring relay shall alarm upon phase loss, phase reversal, or phase imbalance with the intent of providing status for good power at the site. The phase monitoring relay shall have multiple sets of contacts such that

one set can be used in the hardwired control circuitry for the pumps and the other set can be used for status indication to the RTU. This status point is used by the RTU as a discrete on/off alarm based on the presence of incoming utility power to the MCC enclosure. Possible states for this point include NORMAL and ALARM. A short delay period is included in the alarming logic to help eliminate false alarms. This alarm is not latched in the field and will return to a normal state once utility power has been restored.

- e. **Communications Monitoring Point and Communications Alarm.** Each site in the system is equipped with a basic communications logic system. The PLC in each RTU calculates a communications watchdog value for monitoring by the SCADA or DCS HMI computers at the office or by other remote sites that are requesting process information such as a pump site requesting level information from a tank. The calculated watchdog value represents either the number of elapsed minutes for the day or the number of elapsed seconds for the day divided by two.

The office HMI monitors the watchdog value that it receives from each site. Each time a new watchdog value is received, a timer for monitoring the age of the data from the respective site is reset to zero. The age timer then increases each minute or second until a different watchdog value is received from the site. If the age of the data exceeds a preset limit due to the lack of a new watchdog value, a communications alarm is triggered for the site. Possible states for this alarm include NORMAL and ALARM. This alarm is latched within the HMI and will return to a normal state once the alarm condition is removed by either the reception of a new watchdog value from the site or by a communications system reset or change of IO Servers.

The watchdog age limit is operator adjustable at the HMI for the SCADA system as well as through the OIT for site to site communications such as any site requesting data from another site.

- f. **Temperature High/Low Alarms.** The PLC in the RTU is equipped with a simple on-board temperature sensor for detecting the board temperature within the PLC. The temperature of the sensor is monitored and alarmed through the SCADA system. Upon indicating a high or low temperature in the PLC, the RTU will communicate a respective high or low temperature alarm for the site. The actual value for the PLC temperature is shown on the HMI window for the site. The alarm points are discrete on/off alarms based on the value of the temperature monitored and the alarm parameters set within the controller. Possible states for these alarm points include NORMAL and ALARM. These alarms are latched in the field and will return to a normal state once the temperature within the PLC rises or falls such that the current temperature satisfies the operator adjustable setpoints within the PLC.
- g. Other alarms as required and as outlined within contract documents.

3.03 FIELD TESTING

- A. Field testing shall be provided by the parties as defined by the roles and responsibilities listed throughout this section.
- B. Field testing of the PCIS shall be complete, including documentation where required, prior to system startup and commissioning.
- C. Field testing of the PCIS shall include all loop testing, software testing, and coordination with existing and new process equipment affected by any PCIS equipment added or modified as part of this project.
- D. Field testing schedules and procedures shall be fully coordinated with the OWNER and CONTRACTOR to minimize process interruptions. At no time shall field testing be performed on equipment that may affect existing processes without the participation of a representative of the OWNER.

3.04 PCIS ON-SITE TRAINING - INTEGRATOR

- A. PCIS on-site training shall be provided by the INTEGRATOR with the intent of providing detailed information, hands-on demonstration, and pertinent operational information related to all PCIS functions that were added or modified as part of this project.
- B. On-site training shall include relevant training for each site added or modified as part of this project.
- C. On-site training shall be coordinated with the OWNER such that training schedules allow all operators as designated by the OWNER to attend where feasible. The OWNER shall make all attempts possible to minimize conflicts of schedule for such operators. For the intent of this requirement, the integrator shall plan to provide two (2) training sessions with each session having a duration of two (2) to four (4) hours. The training sessions may or may not necessarily be planned for the same day therefore the INTEGRATOR must plan accordingly.
- D. On-site training shall include the use of the technical manual where feasible. Control descriptions contained within the technical manual shall be the basis for discussion within each training session.
- E. At a minimum, training shall cover the following topics:
 - 1. Hardware overview
 - 2. Software overview
 - 3. Maintenance
 - 4. Troubleshooting

5. Operation

END OF SECTION