



**CITY OF ELKO, NEVADA**

**REQUIREMENTS, SPECIFICATIONS, AND CONTRACT DOCUMENTS**

**TO FURNISH**

**SECONDARY CLARIFIER MECHANISM FOR THE CITY OF ELKO  
WATER RECLAMATION FACILITY**

**AUGUST 2017**

**CITY OF ELKO  
WATER RECLAMATION FACILITY**

**PREPARED BY:**



533 W 2600 S Suite 275 Bountiful, UT 84010  
Phone (801) 299-1327 Fax (801) 299-0153

**SET NO. \_\_\_\_\_**



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**CITY OF ELKO  
INVITATION TO BID**

Sealed bids will be received until **3:00 P.M., local time, on Friday, September 15<sup>th</sup>, 2017**, at the office of the Elko City Clerk; 1751 College Avenue; Elko, Nevada 89801, for the following purchase:

**SECONDARY CLARIFIER MECHANISM FOR THE CITY OF ELKO WATER RECLAMATION  
FACILITY**

Proposals received after the time indicated above will not be accepted. Bidders mailing their bids assume the risk of late delivery.

The submitted bids will be opened at the Elko City Hall immediately after the published deadline for acceptance of bids with City staff present. All interested parties are invited to be in attendance at the bid opening.

The City Council may formally accept or reject the bids at its regular meeting commencing at **4:00 P.M., Pacific Standard Time, Tuesday, September 26<sup>th</sup>, 2017**.

Specifications and other information may be obtained at the office of the Elko City Clerk. **All potential bidders shall register with the City Clerk prior to submitting bids, by contacting the City Clerk by telephone, fax or email, as indicated below:**

City of Elko City Clerk:  
Shanell Owen, MMC  
(775)777-7126  
(775)777-7129 fax  
[sowen@elkocitynv.gov](mailto:sowen@elkocitynv.gov)

The City of Elko reserves the right to accept or reject any or all items specified in the bid request as is deemed in the best interest of the City of Elko.

Dated this August 25<sup>th</sup>, 2017

CITY OF ELKO,  
CITY COUNCIL

BY: \_\_\_\_\_  
Mike Haddenham  
WRF Superintendent

Publish: Elko Daily Free Press- August 25<sup>th</sup>, 2017



**CITY OF ELKO  
BIDDING INFORMATION**

The City of Elko reserves the right to accept or reject any or all items specified in the bid documents and reserves the right to waive any minor technicalities in the bids submitted, so long as the waiver does not give any bidder a competitive advantage over any other bidder.

Subject to the right of the City to reject all bids in its sole discretion and except as otherwise permitted by law (to include giving preference to recycled products in accordance with NRS 332.065(2)), the award will be made to the lowest responsive and responsible bidder. The lowest responsive and responsible bidder will be judged based on price; warranty (including extended warranties); conformance to specifications; qualifications; performance or delivery date; quality and utility of services, supplies, materials or equipment offered and the adaptability of those services, supplies, materials or equipment to the required purpose of the contract; and the best interests of the public. Each of the foregoing factors will be considered in light of any special conditions (e.g., equipment selection criteria) included in the bid documents.

The following requirements shall apply to all bidders and bids:

- A. All bidders must register with the City Clerk’s office in accordance with the Invitation to Bid.
- B. All addenda must be acknowledged and the acknowledgment must be returned to the City via fax or e-mail on a form supplied by the City. The addenda acknowledgement form shall also be attached to the “Bid Proposal Form”.
- C. Three (3) copies of bids shall be submitted to the City.
- D. Sealed bids shall be filed with the Office of the City Clerk; 1751 College Avenue; Elko, Nevada, prior to 3:00 P.M., Pacific Standard Time, on Friday, September 15<sup>th</sup>, 2017
- E. All bids shall be enclosed and sealed in an envelope, and endorsed as follows:  
  
SECONDARY CLARIFIER MECHANISM FOR THE CITY OF ELKO WATER RECLAMATION FACILITY
- F. The submitted bids will be opened at Elko City Hall immediately after the published deadline for acceptance of said bids with Elko City staff present. All interested parties are invited to be in attendance at the bid opening.
- G. The City Council may formally accept or reject bids at their regular meeting commencing at 4:00 P.M. Pacific Standard Time, Tuesday, September 26<sup>th</sup>, 2017.
- H. The following is a summary description of the purchase to be bid:

**SECONDARY CLARIFIER MECHANISM EQUIPMENT FOR THE CITY OF ELKO WATER RECLAMATION FACILITY:**

- Bid Item #1: One Secondary Clarifier Mechanism.

- I. Bidders shall submit a price corresponding to each Bid Item within the Contract Completion Schedule. Award, if made, will be to one (1) bidder for each of the listed Bid Items. Bidders shall include profit, overhead, costs and other amounts for which the bidder is to be compensated within the price corresponding to each Bid Item.
- J. Bids will be accepted only on the Bid Proposal Form provided by the City, along with a completed specification sheet that complies with all instructions and contains any other information requested in the bid documents.
- K. A “Notice of Award” will be provided to the winning Vendor within 30 calendar days of the date the City Council approves the award.
- L. Following the Notice of Award, the City will supply the Vendor with a completed “Purchase Agreement for Supplies, Materials or Equipment (Nevada Revised Statutes Chapter 332)” (the “Purchase Agreement”) substantially similar to the document included in the bid documents. Vendor shall thereupon promptly, but in any case, within no less than five (5) business days, execute and return the Purchase Agreement to the City. The Purchase Agreement will become effective upon approval by the City Council and execution by the Mayor or Mayor Pro Tem.



**PURCHASE AGREEMENT FOR SUPPLIES, MATERIALS OR EQUIPMENT  
(NEVADA REVISED STATUTES CHAPTER 332)**

**THIS PURCHASE AGREEMENT FOR SUPPLIES, MATERIALS OR EQUIPMENT** (the “Agreement”) is entered into this \_\_\_\_ day of \_\_\_\_\_, 2017 (the “Effective Date”), by and between the CITY OF ELKO, NEVADA, a municipal corporation and political subdivision of the State of Nevada (“the City”) and the following person(s):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(“Vendor”).

**RECITALS**

**WHEREFORE**, the City desires to purchase Goods (defined below) from Vendor; and

**WHEREFORE**, Vendor has been selected in accordance with Chapter 332 of the Nevada Revised Statutes for the purpose of selling Goods to the City.

**NOW, THEREFORE**, for and in consideration of the above recitals and the terms and conditions contained herein, the parties agree as follows:

**I.**

**PURCHASE OF GOODS**

The City will purchase from Vendor the supplies, materials or equipment, generally referred to as the Secondary Clarifier Mechanism, described at **Attachment 4 (entitled “CITY OF ELKO, NEVADA EQUIPMENT TECHNICAL SPECIFICATIONS”)** (hereinafter referred to as the “Goods”). No substitutions shall be permitted without the prior written consent of the City.

**II.**

**PURCHASE PRICE, PAYMENT AND TERM**

- A. **DATE OF SALE AND DELIVERY.** Vendor will sell, transfer and deliver the Goods to the City on or before the following date:

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

- B. **PAYMENT.** The City will pay to the Vendor the sum of:

\$ \_\_\_\_\_ (USD) (the “Price”)

on or before the following dates or events:

1. Ten percent (10%) of the Price upon receipt of all documents which must be provided to the City prior to delivery of the Goods;
  2. Eighty percent (80%) of the Price upon delivery of the Goods to the City in accordance with this Agreement;
  3. The remaining ten percent (10%) of the Price following the first successful start-up of the Secondary Clarifier after installation of the Goods.
- C. **SUFFICIENCY OF CONSIDERATION.** Vendor acknowledges that the foregoing is sufficient consideration for its performance under this Agreement.
- D. **TERM.** The Term of this Agreement shall commence on the Effective Date and shall end on either the date the Vendor delivers to Goods to the City or the date the City makes final payment to the Vendor, whichever is later.

### III.

#### **SHIPMENT AND DELIVERY OF GOODS**

- A. **SHIPPING SCHEDULE AND SUBMITTAL DOCUMENTS.** Following the receipt of "Notice of Award," Vendor shall immediately inform the City of Vendor's submittal and shipping schedule for the Goods (the "Schedule"). Vendor shall further promptly thereafter provide all Submittal Documents, including shop drawings and other information required, specified in **Attachment 4** (Equipment Technical Specifications). The City may accept or reject the Schedule and/or Shipping Documents, in its sole discretion.
- B. **RECEIPT UPON DELIVERY.** The Goods will be deemed received by the City when delivered to the City at the following location:
- Elko Water Reclamation Facility, 1600 Sewer Treatment Plant Road, Elko, Nevada.
- C. **SHIPMENT.** Vendor shall be responsible for shipment and delivery by any generally accepted means, to include common carrier.
- D. **COST OF SHIPMENT.** Vendor shall be responsible for the cost of shipment.
- E. **RISK OF LOSS.** Vendor shall bear the risk of loss until delivery to the City.

### IX.

#### **PAYMENT OF TAXES, ASSESSMENTS, LIENS AND THE LIKE**

Vendor agrees to pay any and all taxes, fees or assessments of whatever nature or kind are levied, required or imposed as a consequence of its performance under this Agreement. Vendor shall pay in full for all material furnished to City property, and shall keep City property, free and clear of all materialmen's, laborers and mechanics liens and all other liens, security interests and encumbrances arising from its performance under this Agreement. If

any such lien or liens shall be filed against City property, or any part thereof, Vendor shall have the right to contest any such lien or liens, but shall, within ten (10) days after the filing of such liens, discharge every lien filed against City property by bonding or otherwise.

**X.**

**WORK PERFORMED AT VENDOR'S RISK**

Vendor's performance under this Agreement shall be at its own risk.

**XI.**

**SUPPLEMENTAL TERMS AND CONDITIONS**

The parties agree that any supplemental terms and conditions applicable to this Agreement are contained in the following document(s) attached hereto:

- A. Contract Completion Schedule (**Attachment 1**);
- B. General Condition Specifications (**Attachment 2**);
- C. Supplemental Technical Specifications (**Attachment 5**); and
- D. Drawings (**Attachment 6**).

Except as otherwise specifically provided in this Agreement, in the event of an inconsistency between the terms and conditions contained in this Agreement and the document(s) attached at **Attachments 1, 2, 5 and 6**, the terms and conditions contained in this Agreement shall prevail.

**XII.**

**WARRANTIES AND EXCEPTIONS**

- A. Vendor warrants to the City that the Goods will conform with the specifications, drawings, and other descriptions supplied for the purposes for which they are intended, and that they will be of good material, design and workmanship, free from defects, and will satisfactorily perform under reasonably expected operating conditions at the Elko Water Reclamation Facility.
- B. At the request of the City, Vendor shall promptly, at no cost to the City, either repair or replace (including prepayment of all packing and transportation costs) any Goods which within one (1) year after being placed in regular use by the City in normal use and service and under proper operation, fail to conform with the foregoing warranty of Vendor. Any extended warranties offered to and accepted by the City shall be in addition to the one-year warranty stated in the preceding sentence.
- C. Vendor shall not be responsible for repairs made to the Goods by the City unless Vendor has been given written notice of such failure and thereafter has failed to take prompt and effective action to correct the failure in accordance with the foregoing warranties.

### XIII.

#### **LIMITATION ON DISCLOSURE OF PROPRIETARY INFORMATION SUPPLIED BY VENDOR**

Except as otherwise provided in this Agreement, NRS 239.0115 and NRS 332.061 and this Agreement, proprietary information does not constitute public information and is confidential. Accordingly, unless otherwise required by law, the City will not disclose proprietary information unless the disclosure is made for the purpose of a civil, administrative or criminal investigation or proceeding.

### XIV.

#### **LIQUIDATED DAMAGES**

- A. **LIQUIDATED DAMAGES FOR FAILURE TO MEET DEADLINES IN CONTRACT COMPLETION SCHEDULE.** It is acknowledged that the Vendor's failure to perform by the dates indicated in the Contract Completion Schedule at **Attachment 1** will cause the City to incur substantial economic damages and losses of types and in amounts which are impossible to compute and ascertain with certainty as a basis for recovery by the City of actual damages, and that liquidated damages represent a fair, reasonable and appropriate estimate thereof. Accordingly, in lieu of actual damages for such delay, the Vendor agrees that liquidated damages may be assessed and recovered by the City as against the Vendor, in the event of delayed completion and without the City being required to present any evidence of the amount or character of actual damages sustained by reason thereof; therefore Vendor shall be liable to the Owner for payment of liquidated damages in the amount of Five Hundred Dollars (\$500.00) for each calendar day that performance is delayed beyond the dates stated in the Contract Completion Schedule.
- B. **INTEREST.** Interest shall accrue on all unpaid liquidated damages at a rate equal to the prime rate at the largest bank in Nevada as ascertained by the Commissioner of Financial Institutions on January 1 or July 1, as the case may be, immediately preceding the date of the liquidated damages accrue, plus 2 percent. The rate shall be adjusted accordingly on each January 1 and July 1 thereafter until the liquidated damages are paid in full.
- C. **CITY'S RIGHT OF OFFSET.** In the event there are sums due to Vendor from the City subsequent to the date upon which liquidated damages begin to accrue, the City may thereafter offset and deduct from such sums the amount of any liquidated damages then accrued and Vendor shall not thereafter be entitled to recover the difference from the City.
- D. **REMEDY NOT EXCLUSIVE.** Liquidated damages are intended to represent estimated actual damages and are not intended as a penalty. Vendor shall pay liquidated damages to the City without limiting the City's right to terminate this Agreement for default as provided elsewhere herein. Liquidated damages only represent damages for administrative costs, overhead and loss of public use caused by Vendor's delay. The imposition or recovery of liquidated damages by the City shall in no manner affect the City's ability to recover any other damages caused by Vendor's default to include, without limitation, the cost of procuring substitute goods from another vendor in the event of Vendor's breach.

**XV.**

**GENERAL TERMS AND CONDITIONS**

The following general terms and conditions shall apply to this Agreement:

- A. **TERMS TO BE EXCLUSIVE.** The entire agreement between the parties with respect to the subject matter hereunder is contained in this Agreement, including the exhibits hereto. The provisions of this Agreement are exclusively for the benefit of the parties hereto and not for the benefit of any other person, persons or legal entities.
- B. **WAIVER OR MODIFICATION INEFFECTIVE UNLESS IN WRITING.** No waiver, alteration or modification of any of the provisions of this Agreement shall be binding unless in writing and signed by the parties hereto or their duly authorized representatives.
- C. **ASSIGNMENT.** This Agreement may not be assigned to any other person without the consent of the Elko City Council or its Authorized Representative (as defined in NRS 332.025(1)). Notwithstanding the foregoing, under no circumstances shall this Agreement be assigned to any person who was declared by the Elko City Council or its Authorized Representative (as defined in NRS 332.025(1)) not to be a responsible person to perform the particular contract.
- D. **GOVERNING LAW.** This Agreement or any dispute arising under or in connection with this Agreement shall be governed by the laws of the State of Nevada, United States of America, to include, without limitation, Chapter 332 of the Nevada Revised Statutes.
- E. **JURISDICTION AND VENUE.** The parties agree that in the event of a dispute arising under or in relation to this Agreement, the Fourth Judicial District Court for the County of Elko, State of Nevada, shall have jurisdiction and venue over said dispute.
- F. **PRIOR AGREEMENTS.** This Agreement, together with its attached exhibit, contains the entire agreement between the parties hereto with respect to the subject matter hereof and any prior agreements, discussions or understandings, written or oral, are superseded by this Agreement and shall be of no force or effect.
- G. **COMPLIANCE WITH APPLICABLE LAWS.** Vendor shall at all times comply in all material respects with all municipal, State and Federal ordinances, rules and statutes applicable to Vendor's performance hereunder.
- H. **ATTORNEY FEES.** Should either party pursue legal action to enforce any term of condition of this Agreement, or any legal action arising from or in relation to the performance of services under this Agreement, the prevailing party shall be entitled to reasonable attorney fees and costs.
- I. **CONSTRUCTION OF DOCUMENT.** The parties agree that they were each represented by legal counsel in connection with the preparation of this instrument or had the opportunity to consult with legal counsel; accordingly, the parties waive the usual rule of construction that Agreements are to be strictly construed against the drafting party.

J. **BINDING EFFECT.** This Agreement is binding upon and shall inure to the benefit of the parties' heirs, administrators, successors and assigns, subject to the restriction on assignment herein contained.

K. **NOTICE.** Service of all notices pursuant to this Agreement shall be sufficient if made by certified mail to the specific party involved herein at the respective addresses hereinafter set forth or as such party may provide from time-to-time in writing:

**CITY:** Elko City Clerk  
1751 College Avenue  
Elko, NV 89801

**VENDOR:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

L. **SURVIVAL OF OBLIGATIONS.** All duties and obligations of Vendor contained herein shall survive the Term and shall continue thereafter in perpetuity unless and until satisfied or except as otherwise provided herein.

M. **SUCCESSORS.** References to Vendor in this Agreement shall include its respective successors, heirs, assigns, agents, employees, Vendors, representatives, affiliates, parent companies and subsidiaries. The term "successor" shall mean any person, firm, corporation or other business entity which at any time by merger, purchase or otherwise shall acquire all or substantially all of the assets or business of either party.

N. **COUNTERPARTS.** This Agreement may be executed in counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same.

O. **SIGNATURES.** A facsimile, electronic or pdf signature may be used in lieu of an original signature.

P. **PARTIAL INVALIDITY.** If any term or provision of this Agreement, or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement or the application of such term or provision to persons or circumstances other than those to which it is held invalid or unenforceable, shall not be effected thereby, and each remaining term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

Q. **NO WAIVER.** No waiver of any right under this Agreement shall be effective for any purpose unless in writing, signed by the party hereto possessing the right, nor shall any such waiver be construed to be a waiver of any subsequent right, term or provision of this Agreement. Moreover, the failure to enforce at any time any of the provisions of this Agreement or to require at any time performance by any party any of the provisions hereof shall in no way be construed to be a waiver of such provisions or to affect either the validity of this Agreement or any part hereof, or the right of each party thereafter to enforce each and every provision in accordance with the terms of this Agreement.

R. **FORCE MAJEURE.**

1. **FORCE MAJEURE, SCOPE AND DEFINITION.** Except for payment of sums due, neither party shall be liable to the other nor deemed in default under the Agreement in the event that and to the extent that such party's performance of the Agreement is prevented by reason of force majeure. Force

majeure means an occurrence that is beyond the control of the party affected and occurs without its fault or negligence. Without limiting the foregoing, force majeure includes acts of God, acts of the public enemy, war, riots, mobilization, labor disputes, civil disorders, fire, floods, lockouts, injunctions, failures or refusal to act by government authority, and other similar occurrences beyond the control of the party declaring force majeure which such party is unable to prevent by exercising reasonable diligence.

2. **EXCLUSIONS.** Force majeure shall not include the following occurrences: (a) late delivery of Goods caused by congestion at a manufacturer's plant or elsewhere, an oversold condition of the market, inefficiencies, or similar occurrences; or (b) late performance by a subcontractor.

3. **NOTIFICATION.** If either party is delayed at any time in the progress of its performance by force majeure, then the delayed party shall notify the other party in writing of such delay within forty-eight (48) hours of the commencement thereof and shall specify the causes of such delay in the notice. Such notice shall be hand delivered or sent via overnight mail by means of any national courier services (to include the United States Postal Service, Federal Express or United Parcel Service) and shall make a specific reference to this clause, thereby invoking its provisions. The delayed party shall cause such delay to cease as soon as practicable and shall notify the other party in writing by hand delivery or certified mail when it has done so. The time of completion shall be extended by Agreement modification for a period of time equal to the time that the results or effects of such delay prevent the delayed party from performing in accordance with the Agreement.

- S. **BREACH OF REPRESENTATIONS AND COVENANTS.** Each party shall be responsible to the other for any claims, demands, liabilities, damages, suits, actions, judgments, fines, penalties, loss, costs and expense (including but not limited to attorneys' fees) arising or resulting from, or suffered, sustained or incurred as a result (direct or indirect) of the material untruth or inaccuracy of any of the matters represented and warranted by one party to the other or the material breach of any of the covenants, representations, and warranties of the parties as set forth herein.
- T. **REMEDIES.** This Agreement and any of the requirements contained herein may be enforced by an action at law or in equity to include, without limitation, an action for specific performance.
- U. **AUTHORITY.** Vendor warrants to the City that entering into this Agreement is within its authority, does not violate any agreement to which it is a party and does not require the consent of any other person.
- V. **TIME IS OF THE ESSENCE.** Time is of the essence with respect to all provisions of this Agreement that specify a time for performance.
- W. **LIMITATION ON VENDOR'S DAMAGES.** Vendor's only remedy against the City for a breach of this Agreement shall be recovery of an amount equal to no more than the Price plus any reasonable costs actually incurred in shipping the Goods to the City. Vendor shall not be entitled to recover incidental, consequential, punitive or exemplary damages from the City.
- X. **INDEMNIFICATION.** Vendor shall hold harmless, defend and indemnify the City from and against all liability to others and all claims, causes of action and suits of others, including without limitation employees, subcontractors or agents of the City for personal injury (including death) or property damage, arising out of acts or omissions of Vendor, or its employees, contractors, or agents; or arising out of defects in the Goods; or based on a claim that the manufacture, use or sale of the Goods constitutes infringement of any patent, copyright, trademark, or proprietary information rights of others.

**CITY OF ELKO:**

**VENDOR:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

**ATTEST:**

\_\_\_\_\_  
**SHANELL OWEN  
CITY CLERK**



**CITY OF ELKO  
SPECIAL TERMS AND CONDITIONS**

- A. Bidder is required to submit descriptive data or printed specifications describing the Goods. Failure to comply with this request may be cause for non-acceptance of bid. Include in each proposal the following information. Any additional information shall be requested in the attached Equipment Technical Specifications (**Attachment 4**).
1. Name and address of Vendor and its authorized agent.
  2. Price. (**Attachment 3** – Bid Proposal Form)
  3. Lead time to prepare technical submittals. (**Attachment 1** – Contract Completion Schedule)
  4. Lead time to deliver Goods. (**Attachment 1** – Contract Completion Schedule)
  5. General cut sheets for Goods.
  6. List of at least five (5) references for sales of similar Goods with a design flow of at least 2.0 MGD, including organization, contact person, phone number, and number of years of operating experience at each location where the Goods were installed.
  7. List of recommended spare parts and their costs (not included in Price). In addition to this list, provide information detailing availability and estimated delivery time of each spare part.
  8. Detailed equipment specifications for the City (or its consultant) to evaluate during the selection process.
  9. Name and number of contact person to whom technical questions may be directed.
  10. Materials used in manufacture or fabrication of Goods.
  11. Local service available or nearest service center.
  12. Standard warranties included with the purchase.
  13. Time at which warranties become effective.
  14. Availability and cost of extended warranties.
  15. Estimated operation and maintenance costs associated with normal operation conditions, including but not limited to estimated power and chemical usage.
  16. Schedule of maintenance and description of maintenance requirements.
- B. DEVIATION FROM SPECIFICATIONS: Deviation from any specifications or other requirements set forth in this bid package (also referred to as the “bid documents”) shall be so stated in written form in the space provided or attached on separate sheet if additional space is required. Any deviations may be grounds for rejection of the bid as nonresponsive.

- C. Delivery: Unit shall be transported to the City of Elko WRF; 1600 Sewer Treatment Plant; Elko, Nevada, 89801, and shall be ready for installation upon delivery. The City of Elko and/or its representatives or contractor(s) will inspect the Goods upon delivery and the City may thereafter reject the Goods as nonconforming if not all of the Goods have been delivered or if the Goods are damaged. The failure of the City to reject the Goods as nonconforming following delivery shall not be interpreted as a waiver of any claim that the Goods were nonconforming upon delivery or that the Vendor breached its contractual obligations to the City.
- D. Warranty: Minimum warranty shall be manufacturer's standard warranty, except as otherwise provided in the Purchase Agreement. **Copy of warranty must be furnished with submitted bid.**
- E. **All potential bidders shall register with the City Clerk prior to submitting bids, by contacting the City Clerk by telephone, fax or email, as indicated below:**

City of Elko City Clerk  
Shanell Owen, MMC  
(775)777-7126  
(775)777-7129 fax  
sowen@elkocitynv.gov

- F. Questions pertaining to bid documents shall be directed to the Elko City Clerk; 1751 College Avenue; Elko, NV 89801, or by calling (775) 777-7126. Written questions or objections to specifications or bidding procedures must be received by the City at least ten (10) business days before the date and time upon which bids are scheduled to be opened. Written responses will be issued to all registered potential bidders via an Addendum.
- G. The laws of the State of Nevada shall govern the validity, construction, performance and effect of the Purchase Agreement, which the successful bidder shall execute following approval of the Award by the Elko City Council. Jurisdiction and venue for any action related to the Purchase Agreement shall be in the District Court of the Fourth Judicial District, Elko County, Nevada.
- H. EVALUATION OF BIDS

1. The City (or its designee) shall evaluate the bids and bidders based upon the following criteria:

**Installed Capital Cost** – Compares the actual cost of the Goods to the City, as well as any other factors that may affect the total installation cost associated with the Goods. Each piece of equipment included with the Goods is unique, and the Vendor shall provide as much information as possible to assist the City in determining final installation cost.

**Experience** – Used to compare the experience of the Vendors with respect to facilities of similar size and complexity.

**References** – The City may contact references and a comparison may be made of the level of satisfaction with the products and services provided by the vendors.

**Local Service** – Addresses the location of the nearest service providers and their ability to assist with questions and potential problems.

**Warranties** – Evaluates the warranty(ies) provided and any differences between vendor warranties. Preference will be given to vendors that provide the following:

- Warranties of extended duration.
- Warranties that are not limited by proration.
- Warranties that also include service.
- Warranties that cover all parts and components of the Goods.

**Time of Delivery** – Time to prepare Submittal Documents and deliver the Goods will be considered in the evaluation. Favorable scores will be given to vendors that can provide shorter delivery times.

The following table indicates the established, weighted rating system:

Evaluation Criteria	Weighted Value
Installed Capital Cost	5
Experience *	5
References *	3
Local Service*	3
Warranties*	3
Time of Delivery*	2

\*The bid must address all the above items. If any of the above items are not addressed in the bid, the bid will be rejected as non-responsive.

2. The City will evaluate each bid using the evaluation criteria. A rating score between 1 and 5 will be assigned for the evaluation criteria for each bid. These scores will be totaled and the vendor that submits the bid with the highest score will be awarded the contract, except as other provided by law or permitted under Chapter 332 of the Nevada Revised Statutes. Any information that will assist the City in evaluating the bid based on the evaluation criteria listed above is encouraged.
3. The included Bid Proposal Form (**Attachment 3**) must be completed and attached to the front of each bid submitted.



**CITY OF ELKO, NEVADA**

**ATTACHMENTS**



**CONTRACT COMPLETION SCHEDULE**  
(to be filled in by Bidder)

The Bidder/Vendor shall complete all Work within the following number of calendar days following the date of "Notice to Award":

The Contract Completion Schedule shall commence on the date the Bidder/Vendor receives the Notice to Award.

The Work shall be completed within the number of calendar days listed in the Contract Completion Schedule below under the column titled "Bidder's Completion Time." The time for completion for all Items of Work shall commence on the date shown on the Notice to Award, which is the date the contract is awarded by the City. Time of delivery will be considered in evaluating the Bids, thus, the Bidder may list below an alternate number of calendar days for completion of work. Bidder shall consider and include in the calendar days listed the time necessary for shop drawing review.

**Contract Completion Schedule**

Item of Work (Bid Item)	Calendar Days for Completion	
	Anticipated Contract Completion Time	Bidder's Completion Time
1. Receipt by City of complete, approved manufacturer's shop drawings and installation instructions (includes 14 days for Engineer's review).	45 days*	_____
2. Delivery of Goods to the Water Reclamation Facility:		
a. Complete and Operable Equipment Ready for Delivery	185 days*	_____

\*Commencing on Date of "Notice to Award"

Work shall be completed per the Contract Completion Time, unless Alternate Completion Times, herein references as "Bidder's Completion Time", is proposed by Bidder, as set forth herein, and is approved by Owner.

Vendor is advised that "Liquidated Damages" of \$500.00 per calendar day, including Saturdays, Sundays, and Holidays, may be assessed for each calendar day each item or sub-item of work remains incomplete after the Contract Completion Time stated in this Contract Completion Schedule. Goods shall, upon delivery, be complete and operable requiring only some assembly and installation. Contract is also subject to "Liquidated Damages" due to delays in performing warranty, repair or other remedial work if the Goods do not conform to the specifications or other contract requirements. Total amount of Liquidated Damages shall not exceed ten percent (10%) of the Price.

The City will deliver a "Notice of Award" to winning bidder (Vendor). Thereafter, the Vendor shall immediately commence ordering any items needed to deliver the Goods to the City, procuring any needed transportation (to

include contracting with commercial carriers, if necessary) and preparing all documents that must be delivered to the City in connection with the work, to include shop drawings.



## GENERAL CONDITION SPECIFICATIONS

### A. DELIVERY OF CONFORMING GOODS:

The Goods (as that term is used in the Purchase Agreement) will be delivered by Vendor to and subsequently installed under a separate contract at the City of Elko Water Reclamation Facility located in Elko, Nevada. The Vendor shall be responsible for ensuring the delivery of conforming Goods pursuant to the Purchase Agreement (to include attachments).

### B. SITE CHARACTERISTICS:

Listed below are the general site characteristics:

- Mean daily maximum Temperature = 92<sup>o</sup> F
- Mean daily minimum Temperature = 15<sup>o</sup> F
- Site Elevation = 5,050 feet
- Relative Humidity (max) = 83%
- Relative Humidity (min) = 24%

### C. INFLUENT WASTEWATER CHARACTERISTICS:

#### Plant Influent Design Parameters

- Average Daily Design Flow: 4.025 MGD
- Peak Hour Flow: 7.41 MGD
- Average Water Temperature: 18<sup>o</sup> C
- Minimum Water Temperature: 10<sup>o</sup> C
- Maximum Water Temperature: 24<sup>o</sup> C

#### Effluent Design Parameters

- Effluent BOD: <10 mg/L
- Effluent TSS: <10 mg/L
- Effluent TN: <10 mg/L

### D. General Instructions

1. Scope: Vendor shall furnish the Goods in accordance with the Purchase Agreement, to include complete equipment packages as described below and in the Bid Documents, together with all associated equipment, sufficient for a complete and functional system upon assembly and installation.
2. Field Service: Included in the Price and as part of Vendor's performance under the Purchase Agreement, Vendor shall provide qualified representatives for two (2) site visits for one (1) days each (total of two days) to inspect the mechanical installation of the Goods, assist in start-up/initial operations, and instruct plant personnel in the proper operation and maintenance of the mechanism unless otherwise noted in the specific bid item specifications below. If more or less time is anticipated, the Vendor must indicate how many additional or fewer trips and days of field service will be provided, and provide a cost adjustment with the bid.

3. Operations Service: Unless otherwise noted, the Vendor shall include in the bid the cost of one (1) additional trip of three (3) days after the first six (6) months of operation to determine whether components of the Secondary Clarifier Mechanism are operating properly. At the end of the first year of operation of the Secondary Clarifier Mechanism, the Vendor shall provide written certification that proper operations and maintenance are in place or, alternatively, identify any deficiencies in operation or maintenance. The Vendor shall promptly address and resolve any deficiencies in the Goods during the warranty period and shall exercise best efforts to minimize any potential for plant operation disruptions.
4. Submittals:
  - A. Submittals: Vendor shall submit three copies of all Submittal Documents in accordance with the requirements of the technical specifications (**Attachment 4**).
  - B. Operating and Maintenance Manuals: Vendor shall submit three (3) hard copies and one (1) electronic copy of a complete Operating and Maintenance Manual that complies with all corresponding requirements of the technical specifications (**Attachment 4**) for all Goods. Vendor shall also supply all manufacturer's instructions for equipment start-up, operation, preventive maintenance, servicing, and troubleshooting procedures, together with parts lists for maintenance and servicing.

**CITY OF ELKO, NEVADA  
BID PROPOSAL FORMS**



**CITY OF ELKO  
BID PROPOSAL FORM**

**Bid Proposal to furnish and deliver  
SECONDARY CLARIFIER MECHANISM FOR CITY OF ELKO WATER RECLAMATION FACILITY**

**Bid Item #1: One (1) Secondary Clarifier Mechanism**

**Total Bid Price in Numbers:** \$ \_\_\_\_\_

**Total Bid Price in written form:** \_\_\_\_\_

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**\*\*\*In case of discrepancy bid in written form shall prevail\*\*\***

Model No. : \_\_\_\_\_

Warranty: \_\_\_\_\_

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*The City of Elko reserves the right to award the bid, including any or all of the options listed, based upon the best interests of the public.*

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The undersigned declares that he/she has carefully examined, understands the bid documents and certifies that all information requested in the bid documents has been included with this Bid Proposal Form.

\_\_\_\_\_  
Company Submitting Bid

\_\_\_\_\_  
By: Company Representative

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
City, State, Zip

\_\_\_\_\_  
Fax Number

**\*\*\*USE THIS FORM TO SUBMIT BID PROPOSAL. ATTACH COMPLETED CONTRACT COMPLETION SCHEDULE, SPECIFICATION SHEET, DESCRIPTIVE DATA, BROCHURES, "EXCEPTIONS TO BIDDING CONDITIONS AND SPECIFICATIONS" (IF APPLICABLE) AND ANY OTHER INFORMATION REQUIRED IN THE BID DOCUMENTS\*\*\***



**EXCEPTIONS**

Please provide a detailed description of any and all exceptions to any specifications or other requirements set forth in the bid documents. If not addressed below, the Vendor shall comply with all terms and conditions of the bid documents, to include the proposed Purchase Agreement. Please use additional sheets if necessary.

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**ADDENDUM ACKNOWLEDGEMENT**

Bidder acknowledges receipt of the following addenda:

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**CITY OF ELKO, NEVADA  
EQUIPMENT TECHNICAL SPECIFICATIONS**



BID ITEM #1 – SECONDARY CLARIFIER MECHANISM

GENERAL

1.1 DESCRIPTION

- A. There shall be furnished one (1) clarifier mechanism and one (1) automatic launder brush cleaning system, each suitable for installation in a new, circular, concrete basin with sloped floors (1:12).
- B. Each mechanism shall be a center column supported center feed unit with peripheral effluent collection. A center drive mechanism shall be provided for rotation of the two rake arms with spiral type rake blades.
- C. The equipment shall be designed to effectively settle mixed liquor suspended solids and scrape the settled solids from the basin floor to the sludge withdrawal drum. The clarified effluent shall be collected uniformly by the peripheral launder. Surface scum shall be collected by the scum skimming equipment consisting of and discharged through the scum withdrawal pipe.
- D. The equipment furnished for each clarifier mechanism shall include but not be limited to: center drive assembly, center drive platform, center support column with inlet openings, flocculating feedwell, inner dispersion inlet well (EDI), center cage, two (2) sludge collection arms with spiral rake blades, rotating sludge collection drum, surface scum skimming equipment, walkway access bridge, anchor bolts and assembly fasteners.
- E. Except where specifically indicated otherwise, all plates and structural members designated for submerged service shall have a minimum thickness of 1/4 inch. All structural steel will conform to ASTM A-36 requirements and steel plate will conform to ASTM A283C requirements. All anchor bolts used to secure the mechanism to the tank shall be 316 stainless steel. All fasteners shall be 316 stainless steel. Skimmer, and rake blade squeegee fasteners shall be stainless steel.

1.2 RELATED WORK

- A. SECTION 260513 – Common Motor Requirements for Equipment
- B. SECTION 466115 – Secondary Clarifier Automated Brush System

1.3 PROCESS REQUIREMENTS

- A. The equipment shall be designed according to the following process requirements:
  - 1. Plant design average flow 4.025 MGD
  - 2. Plant design peak flow 7.41 MGD
  - 3. Plant Recycle Flow (RAS Flow) 0.5-1.0 Q
  - 4. Plant Design recycle flow 4.025 MGD
  - 5. Design average flow to secondary clarifier w. RAS 3.02 MGD

6.	Design peak flow to secondary clarifier w. RAS	4.29 MGD
7.	Maximum flow to secondary clarifier	9.96 MGD*
8.	Normal operation design average loading rate	270 GPD/sqft
9.	Maximum design loading rate	1,200 GPD/sqft
10.	Clarifier Influent Suspended Solids Concentration	2,500-3,000 mg/L

\*Maximum flow condition assumes build out peak flow of 11.04 MGD, RAS flow of 6.0 MGD, and one clarifier off line.

#### 1.4 DESIGN REQUIREMENTS

A. The following design requirements shall be met:

1.	Basin diameter	83'-0"
2.	Side water depth	14'-0" +/-
3.	Tank freeboard	18" +/-
4.	Floor slope	1:12
5.	Influent Piping**	24"
6.	Energy Dissipating (EDI) Well Diameter**	9'-6"
7.	EDI Submerged Depth	3'-0"
8.	Feedwell Diameter**	25'-0"
9.	Feedwell Submerged Depth**	7'-0"
10.	Mechanism Drive Continuous Torque**	29,000 ft-lb
11.	Mechanism Drive 100% Design Torque**	70,000 ft-lb
12.	Mechanism Drive Instantaneous Peak Torque	120,000 ft-lb
13.	Mechanism Rotation	Clockwise
14.	Rake Arm Tip Speed	8-12 fpm
15.	Scum Box Width (minimum)	4'-0"
16.	Spiral Blade Height at Wall	10"
17.	Spiral Blade Height at Center Column	30"

\*\*Deviations are acceptable but must be discussed with the Engineer prior to bid opening.

#### 1.5 FIELD SERVICE REQUIREMENTS

A.	Number of eight-hour days	2
B.	Number of trips to jobsite	2

#### 1.6 REFERENCES

- A. American Society of Testing Materials (ASTM):
1. A-36 Structural Steel Specifications
  2. 304 Bolt Specifications
  3. A-123 Hot-Dip Galvanized Coatings
  4. A-153 Hot-Dip Galvanized Bolts

5. A-48 Cast Iron Specifications
6. A-536 Ductile Iron Specifications
7. A-283C Steel Plate Specifications

- B. American Iron and Steel Institute (AISI), Heat Treated Steel Specifications
- C. American Gear Manufacturers' Association (AGMA), Gear Ratings
- D. American Welding Society (AWS), Current Standards
- E. Anti-friction Bearing Manufacturers' Association (AFBMA), Bearing Life Specifications
- F. National Electrical Manufacturer's Association (NEMA), Motor Design Standards and Standards for Control Enclosures

## 1.7 QUALITY ASSURANCE

- A. The clarifier equipment manufacturer shall modify his standard equipment to meet the minimum values specified for dimensions, design, and the intent of this specification.
- B. Manufacturers regularly engaged in the manufacture of the clarifier equipment as specified herein and who can demonstrate equipment of this specified design, in actual service for a period of not less than 10 years will be considered as acceptable manufacturers.
- C. Manufacturers shall show evidence of quality assurance in manufacturing and supplying equipment essential in details to the equipment herein specified.
- D. Acceptable manufacturers:
  1. WesTech
  2. Ovivo
  3. Or equal

## 1.8 SUBMITTALS

- A. The supplier shall submit complete shop drawings of all equipment furnished for this project as covered by these specifications. The submittal must include a certification that the submitted material describes exactly the equipment to be provided. Substitutions of equipment subsequent to submittal approval will not be accepted.
- B. The clarifier equipment manufacturer shall furnish as a minimum the following design and description information to establish compliance with these specifications:
  1. Certified general arrangement and dimensional drawings. Include design details for installation of the specified equipment, include necessary clearances for installation and operation and wiring diagrams of electrical power, control and alarm wiring as well as the following (and any other pertinent information not specifically listed):
    - a. Equipment Data Sheets including catalog cut sheets for purchased sub-components.
    - b. Materials of Construction

- c. Standard Instruction Manual
  - d. Lubrication and Maintenance Schedule
  - e. Equipment Shipment/Storage Instructions
  - f. Spare Parts and Tools List
  - g. Surface Preparation and Painting Details
  - h. Process and Instrumentation Diagrams
  - i. Information and design data required for any utility equipment or service required for normal operation of equipment (for example: wash water connection sizes, flow and pressure requirements, etc.)
2. Assembly and Erection drawings and instructions.
  3. Certificate of design stamped by a Registered Professional Engineer in the State of Nevada stating that the equipment to be provided for this project meets or exceeds all design requirements of these specifications. The certificate shall state the respective loads and design criteria.
  4. Drive mechanism rating calculations, stamped by a Registered Professional Engineer in the State of Nevada, verifying the compliance of the drive gears and bearings with the specified continuous torque rating and bearing life rating.
  5. Calculations to demonstrate that the scraper design has adequate capacity to transport the maximum day sludge loadings per Section 1.2.
  6. Motor data and catalog information. Electrical drawings are as applicable to the supply of the clarifier equipment manufacturer.
  7. Applicable anchoring calculations stamped and signed by Registered Professional Engineer in the State of Nevada.

#### 1.9 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals will be provided by the clarifier manufacturer at least two weeks prior to shipment of all major equipment components. Each manual shall be a bound, indexed binder with drawings and parts lists prepared specifically for this project rather than general instructions that are not designed for this project.
- B. As a minimum, the manual shall contain:
  1. Certified drawings (general arrangement and general arrangement detail drawings).
  2. Assembly and Erection drawings.
  3. A complete bill of materials for the equipment including the weights of all structural steel components.
  4. Installation and maintenance instructions for the specific equipment including the erection sequence, equipment start-up, shut-down, normal and emergency operation procedures, maintenance and trouble-shooting check points, and complete lubrication procedures with recommended grades of lubricants.
  5. Cut sheets for all equipment items purchased from sub-vendors.
  6. A list of the clarifier manufacturer's recommended spare parts specifically denoting wear items, long delivery items, and all items convenient for stocking as optional replacement items. Current spare parts pricing list shall be included.

## 1.10 DELIVERY

- A. Fabricated assemblies shall be shipped in the largest sections permitted by carrier regulations, properly match marked for ease of field erection.
- B. All components shall be erected immediately upon receipt from the clarifier manufacturer or stored in strict conformance with storage recommendations provided by the clarifier manufacturer in the operations and maintenance manual.
- C. The mechanism shall be lubricated in strict accordance with the instructions of the clarifier manufacturer's field service representative. The required lubricants shall be provided by the contractor.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Each clarifier mechanism shall be of the center drive type, supported on a stationary influent column, with the flow entering at the bottom of the influent column and flowing upward to the inlet openings and dispersed into the tank through the EDI and flocculating feedwell. The clarifier shall be designed to remove sludge uniformly from the bottom of the tank.

### 2.2 CENTER DRIVE ASSEMBLY

- A. The center drive assembly shall consist of an integral motor and primary speed reducer coupled through roller chain and sprockets to a secondary worm/worm gear reducer driving the main gear through a pinion and shall have an integral overload protection system.
- B. All gears and bearings shall be oil bath lubricated with the main bearing totally submerged in oil and the teeth of the main spur gear submerged at least 70 per cent in the oil bath. Oil pumps for lubrication or grease lubricated bearings are not considered appropriate for this application and will not be allowed. The oil reservoir for the main bearing and gear shall have a section of minimum depth 5 inches below the main bearing to positively prevent contamination of the main bearing and gears with condensate or other contaminants. Gear and bearing housings must also be fitted with oil level sight glasses and condensate drains. Condensate must be allowed to drain from a low point of the housing. Condensate and contaminants will not be allowed to drain through the lower pinion bearing.
- C. Drive components will be located via a machined, registered fit to preserve the alignment of key drive components under all load conditions. Inspection of the completed drive unit shall be accomplished at the clarifier manufacturer's shop, with reports of all tests and certifications of material hardness being made available for review at the Engineer's request prior to shipment to the job site.
- D. Major drive components, main gears and bearings must be designed to allow for separate and individual replacement by plant personnel to facilitate quick and economical repairs.
- E. The complete center drive assembly, including the overload protection device, shall be a regularly manufactured in-house product of the clarifier manufacturer. The center drive assembly is a key element

in a successful clarifier installation, therefore drive assemblies purchased from third party vendors will not be accepted.

- F. The drive motor shall be minimum 3/4 horsepower and shall be totally enclosed, fan cooled, with a 1.15 service factor, and have bearings with a minimum B10 rating of 50,000 hours. Operating electric current will be 230/460 volt, 3-phase, and 60 hertz. Each motor will be NEMA Design B employing Class H insulation designed for an ambient temperature of 40 degrees C°.
- G. The gearmotor primary speed reducer shall drive a secondary worm gear reducer through a #60 roller chain and steel sprockets enclosed in a galvanized 22-gauge steel guard. A constant speed motor shall drive the speed reducer. Sprockets and chain shall be designed for the connected horsepower of the drive with a minimum service factor of 4.0. Provision shall be made for adjustment of chain tension.
- H. The main drive unit shall consist of a worm gear secondary reduction unit, pinion and main spur gear assembly. The secondary reducer shall be a worm/worm gear reducer specifically designed for this application. The worm gear shall be centrifugally cast high strength manganese bronze. The worm shall be hardened alloy steel. A single piece pinion shall be keyed to the worm gear to transmit power from the worm gear to the spur gear. In order to maintain proper alignment between the pinion and the spur gear, the pinion will be supported by bearings both above and below the spur gear. The bearings shall be fitted into precision machined bearing pilots to positively insure bearing and gear alignment.
- I. The main spur gear material shall be cast iron per ASTM A536 grade 100-70-03 or equal. The main gear shall be made of a solid piece. Split gear design is not acceptable due to potential misalignment of the mating parts and higher deflection under heavy loads. If a split gear design is used, the manufacturer shall provide a spare pinion to compensate the shorter life of the pinion due to excessive wearing. The solid gear shall have a nominal pitch diameter of 40 inches with a 6-inch face width or the equivalent nominal spur gear surface area of 754 square inches. Spur gear surface area is defined as the spur gear pitch diameter multiplied by the spur gear face width multiplied by 3.14.
- J. The main gear shall rotate and be supported on a ball bearing assembly provided with four replaceable liner strips fitted into the main gear and turntable base. Liner strips shall be special vacuum degassed carbon corrected alloy steel hardened to a Rockwell hardness of at least 43 to 46 RC. The turntable base shall be a minimum 1 inch thick to insure adequate structural rigidity to properly support the drive bearing and gear.
- K. The main gear and bearing shall be completely enclosed in an ASTM A-48 Class 40A cast iron housing provided with replaceable neoprene dust seals. In order to ensure the maximum possible base rigidity and vibration dampening, the gear housing shall be of full sidewall construction, integral with the base. The turntable base walls shall be 1-inch thick minimum to insure adequate structural rigidity to properly support the drive bearing and gear. Prior to assembly, the base shall be thoroughly inspected for seep holes or inclusions and given a hydrostatic test to insure no leaks are in the oil containment area. Shop inspection reports must be made available for review. Fabricated base made with welded steel plates are not acceptable due to potential warping during fabrication. If fabricated steel is provided, material shall be in 316 stainless steel for a better corrosion resistance.
- L. The drive unit shall be equipped with an electro-mechanical overload control device actuated by thrust from the worm shaft. The pointer shall be provided with a clear plastic replaceable cover and shall provide a visual reading of the relative main gear output torque on a 0 to 100 percent graduated scale. The 100 percent reading shall equal the 100 percent drive rating. The control device shall also activate an



alarm switch for warning of impending overload, a motor cutout switch for overload protection and a back-up safety motor cutout switch for back up overload protection. In lieu of a back-up safety motor cutout switch, a slip clutch assembly will be acceptable upon review by the Engineer. The respective switches in the overload control device shall be factory calibrated and set to the following settings:

1. Alarm - 40% of scale
  2. Motor cutout - 85% of scale
  3. Back-up motor cutout or slip clutch - 100% of scale.
- M. All drive control components shall be mounted in a weatherproof enclosure of either epoxy coated aluminum construction or stainless steel with a gasket-sealed, removable cover. The pointer shall be covered with a replaceable clear plastic enclosure and shall be above the walkway surface for visibility from the walkway. Amperage sensing devices are not acceptable for torque overload protection due to their inability to react quickly enough to prevent damage to the drive. Overload devices with exposed linkage connections will not be accepted due to possible corrosion problems. Devices which react to rotational movement of the secondary reduction unit will not be allowed due to possible misalignment of gearing created by the movement of the reduction unit.
- N. The center drive unit shall be designed for the continuous torque rating as specified in section 1.4. The continuous torque shall be defined as the minimum torque at which the drive mechanism may operate continuously 24 hours per day, 365 days per year, for 20 years, at the specified sludge collector arm speed. Main gear and pinion calculations shall be based upon ANSI/AGMA 2001-D04 standards for rating the pitting resistance and bending strength of involute spur and helical gear teeth. Calculations shall clearly present the values used for the following design parameters:
1. Number of pinions
  2. Actual face width
  3. Tooth geometry (I and J factors)
  4. Load distribution factor
  5. Allowable contact stress
  6. Allowable bending stress
  7. Pinion pitch diameter
  8. Hardness ratio factor
  9. Elastic coefficient
  10. Life factor
- O. The load distribution factor shall be determined by the empirical method. For parameters which are material dependent, such as allowable contact stress, the calculations shall include a complete description of material and heat treatment used.
- P. Worm gearing shall be designed and rated to equal or exceed the specified continuous torque and life. The basis for rating shall be ANSI/AGMA 6034-B92 standards for durability rating and design of worm gear reducers.
- Q. The continuous torque rating for the drive unit shall be the lowest value determined for the gearing.

## 2.3 WALKWAY ACCESS BRIDGE

- A. The clarifier shall be provided with a 36-inch clear open width walkway extending from the tank wall to the center drive platform. The walkway shall be supported at the center by the drive unit and supported on the opposite end by the tank wall. At a minimum, the walkway shall be designed to safely withstand all dead loads plus a live load of 50 pounds per square foot with a maximum deflection of  $1/360$ , over the entire span. The walkway shall consist of beams or a structural steel truss, with either sufficiently braced to resist the specified design loads. The walkway decking shall be 1-1/4-inch aluminum I-Bar grating. The walkway design shall be such to allow connection to access stairs (not provided by clarifier manufacturer) in accordance with the drawing and details included in the contract documents.
- B. A center drive operations platform shall be provided. It shall be a minimum of 8 feet square to provide clearance around the center assembly and drive control for maintenance and service. The drive platform shall be decked with 1/4-inch aluminum checkered floorplate and have sufficient structural steel supports to meet the specified design load conditions.
- C. Provide handrails with toe plate along both sides of the walkway and around the center drive platform.
  - 1. Handrail shall be 42" tall aluminum 3-rail with 1.5" tubing, and extruded kick plate.
  - 2. Handrail shall meet all applicable OSHA requirements.
- D. All structural steel components shall be hot dipped galvanized.

## 2.4 CENTER CAGE AND RAKE ARMS

- A. The center cage shall be of steel box truss construction, with connections for the two (2) sludge removal arms, rotating sludge collection drum and feedwell supports. The top of the cage shall be bolted to the main gear which shall rotate the cage with the attached arms and feedwell. The minimum angle size used for construction of the cage and rake arms shall be 2-inch x 2-inch x 1/4-inch members.
- B. The clarifier mechanism shall include two (2) sludge removal arms of steel truss construction, with steel spiral rake blades and adjustable 20-gauge 304 stainless steel squeegees. All hardware (bolts, nuts, washers, etc.) shall be 316 stainless steel. The rake blades shall provide complete raking of the basin floor twice per revolution.
- C. The rake blades shall consist of a minimum 3/16-inch thick steel plate. The blades shall be constructed to a logarithmic spiral curve with a constant 30-degree angle of attack. Blade depth shall vary as noted in Article 1.4. Each rake truss support arm shall be provided with the necessary outrigger bracing and other blade support structures, to ensure that the complete blade can be properly located and adjusted in the field.
- D. The rake blades shall terminate in the center to within 1 inch of the rotating sludge collection drum. The 1-inch space shall be sealed with a neoprene seal.
- E. The structural calculations for the rake arm shall include an analysis of the torsional loads from the spiral curve blade.
- F. The cage and rake arms shall be designed such that calculated stresses do not exceed the AISC allowable stress at twice the drive 100% rating.

## 2.5 ROTATING SLUDGE COLLECTION DRUM

- A. A rotating sludge collection drum shall be provided to collect settled solids raked to the center by the rotating spiral blades.
- B. The sludge collection drum shall rotate with the center cage and shall be provided with sludge collection ports located directly in front of each rotating spiral rake blade. The ports shall be sized to collect thickened sludge from the bottom most dense sludge layer to maximize underflow solids concentration. The ports shall be 10" high by 24" wide minimum to avoid plugging. Similar devices using smaller ports shall be prohibited.
- C. The rotating sludge drum shall be constructed of ¼ inch steel plate. A replaceable neoprene seal shall be provided to seal against the center column. A stainless steel seal shall be provided to seal against the tank floor.

## 2.6 CENTER COLUMN

- A. A stationary center column shall be provided which shall serve as the influent pipe. One end shall have a 1-1/4-inch support flange for bolting to the foundation with a minimum of eight (8) 1-1/4-inch diameter 316 stainless steel anchor bolts. A similar flange shall be provided at the top of the column for supporting and securing the center drive assembly. Minimum center column thickness shall be 1/4". All anchor bolts shall be supplied by the clarifier equipment manufacturer.
- B. Influent openings shall be provided in the upper portion of the column to allow unrestricted passage of the flow into the energy dissipating feedwell. Influent velocity shall be reduced by providing a total inlet port area a minimum of 135 percent of the center column cross sectional area.

## 2.7 ENERGY DISSIPATING INLET (EDI)

- A. The clarifier shall be equipped with an energy dispersion inlet (EDI) located inside the rotating flocculation feedwell. The dispersion well shall be designed to dissipate the energy of the incoming flow by way of evenly spaced tangentially oriented vanes along the entire 360 degrees of the EDI circumference.
- B. The influent column discharge ports will be set below the EDI vanes, providing immediate containment and baffling of the influent via the EDI floor and cylindrical shell.
- C. The lower rim of the vane support ring extends back towards the column, forming a lip that provides additional flow baffling and energy dispersion.
- D. The energy dissipating inlet shall have a bottom plate extending to within one inch of the center column. The bottom plate of the EDI shall be provided with properly sized drain holes.
- E. The well shall be constructed of 3/16 inch steel plate.

## 2.8 FLOCCULATING FEEDWELL

- A. The flocculating feedwell shall be supported by structural members attached to the rotating center cage. The feedwell shall be fabricated out of 3/16 inch steel plate with upper and lower reinforcing rim angles and stiffeners as required. Properly sized scum ports shall be equally spaced around the feedwell periphery to allow scum to exit from the feedwell at water level. Scum ports shall be fully adjustable allowing for an operational range from “fully open” to “fully closed”.

## 2.9 SURFACE SCUM SKIMMING EQUIPMENT

- A. Surface scum skimming equipment shall be furnished with the clarifier mechanism. It shall be arranged to have the surface scum swept along an angled skimmer blade to the skimmer assembly, attached at the end of the blade, for discharge to the scum box as shown on the drawings. The surface of the clarifier shall be swept twice per revolution. The skimmer blade shall be tangential to the rotating feedwell and be supported by vertical supports from the rake arm.
- B. Two (2) skimmer assemblies shall be furnished for mounting to a 2” diameter pipe support arm located off of each rake arm. Skimmer assembly components shall mount to the support pipe utilizing clamping collars. No welding, drilling or field modifications to the support arm will be required for mounting any components.
- C. An aluminum wiper blade shall be supplied in that skimmer assembly with replaceable neoprene wipers and aluminum backing bars at both ends and the bottom edge. A UHMW-PE wear block shall be furnished at the baffle end to prevent wear on the outer neoprene wiper as the skimmer travels around the mechanism in contact with the peripheral scum retention baffle. The wiper blade shall be attached utilizing machined aluminum castings which allow the blade to pivot freely both vertically and horizontally. An adjustable stop collar shall permit adjustment of the wiper blade to travel at the desired elevation around the tank and over the ramped scum box. A stainless steel spring acting on a pivoting steel baffle plate shall provide adjustable tension to contain scum and maintain constant contact of the wiper blade with the peripheral scum retention baffle during rotation. The pivoting baffle plate and wiper blade shall function to form a pocket in conjunction with the peripheral scum retention baffle to constrain scum and deliver it into the scum box.
- D. The skimmer shall include a fail safe release to minimize damage to the skimmer and support steel should the skimmer come in contact with the scum box due to any accumulation of ice or scum on the peripheral scum retention baffle surface causing displacement of the skimmer. Assembly fasteners shall be supplied as 316 stainless steel for corrosion resistance.
- E. Two (2) scum boxes shall be furnished at opposite sides of the clarifier. The scum boxes shall be appropriately sized and shall be supported from the tank wall and connected to a 6-inch scum line.
- F. The clarifier equipment manufacturer shall furnish a flush valve assembly for automatic flushing of the scum boxes and scum pipes. The flush valve assembly shall allow approximately 2 to 5 gallons of clarified effluent to enter the box as the skimmer assembly passes over the scum box. It shall consist of an actuator bar and a pivoting assembly that will allow a sealing plate to open the valve. A counterweight shall return the sealing plate to its closed position after the flush cycle. All parts of the flush valve shall be stainless steel.

## 2.10 EFFLUENT WEIR AND SCUM BAFFLE

- A. Effluent weir plates shall consist of 9 inch deep x 1/4 inch thick FRP sections with 2-1/2 inch deep 90 degree V notches at 6 inch intervals. The weir sections shall be fastened to the tank wall using 316 stainless steel cinch anchor bolts hex nuts and 5 inch diameter FRP washers, allowing for vertical adjustment. To prevent leakage all surfaces between the launder walls and weir plates shall be given a seal coat of suitable mastic by the erection contractor.
- B. The scum baffle plates shall consist of 12 inch deep x 1/4 inch thick FRP sections supported from the tank wall by FRP angle brackets secured with 316 stainless steel cinch anchor bolts and hex nuts, allowing for vertical and radial adjustment.

## 2.11 AUTOMATED LAUNDER BRUSH SYSTEM

- A. Requirements for the Automated Launder Brush System are provided in section 466115 in Attachment 5.
- B. The clarifier mechanism manufacturer shall be responsible to coordinate the design with the launder brush system supplier to ensure compatible system.

## 2.12 SURFACE PREPARATION AND PAINTING

- A. All non-submerged and submerged steel shall receive a shop surface preparation per specification SSPC SP 3 and shall be hot dip galvanized.
- B. Prior to assembly of the drive unit, the castings shall have been sandblasted and thoroughly cleaned to remove any foreign particles in the drive base. After assembly, the drive mechanism shall be solvent cleaned and power wire brushed as needed prior to application of manufacturer's standard primer.
- C. At the time of equipment receipt the mechanism assembly shall be subject to inspection. Imperfections in hot-dipped galvanizing and damage of the coating shall be repaired by the equipment supplier prior to final acceptance of equipment.
- D. The drive unit will receive prime paint and finish paint (blue) per the following paint system:

The drive unit shall receive a surface preparation of SSPC-SP-06 and shall be coated with two (2) coats of Tnemec N69 and one (1) coat of Tnemec Endura-shield series 73.

## 2.13 SPARE PARTS

- A. The following spare parts shall be provided.
  - 1. One (1) sight glass or dipstick for each main drive housing containing oil.
  - 2. One (1) set of neoprene skimmer wipers for each mechanism.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. The equipment shall be erected by a General Contractor in strict accordance with the manufacturer's recommendations. The equipment will be installed in a new concrete tank (See Drawings in Attachment 6 for preliminary layout).

### 3.2 SERVICE

- A. The equipment manufacturer shall provide a service representative properly trained in inspection and operation of the mechanism to approve the installation, certify that the torque settings of the drive overload protection device are correct, perform the torque test and instruct the owner's personnel on maintenance and operation. If additional service is required due to the mechanisms not being fully operational, at the time of service requested by the contractor, the additional service days will be at the contractor's expense.

### 3.3 TORQUE TEST

- A. The clarifier mechanism shall be field torque tested. The purpose of the torque test is to verify the structural integrity of the mechanism structural steel design and center drive unit. The testing shall be carried out under the supervision of the equipment manufacturer's representative and as approved by the Engineer before the mechanisms are accepted and placed into operation.
- B. The torque test shall consist of securing the rake arms by nylon straps to anchor bolts installed by the contractor in the tank floor at locations specified by the equipment manufacturer. A load shall be applied gradually to the scraper arm by means of a ratchet lever and cylinder connected to the cable assembly.
- C. The magnitude of the applied load shall be measured by calculating the torque from the distance of the line of action of each cable to the center line of the mechanism. A reading shall be taken at the 100% value of the drive design torque.
- D. The manufacturer's service representative shall verify that the alarm, motor cut out, and back up safety motor cut-out switches are properly set and are in proper operation to protect the clarifier mechanism as specified.

END OF SECTION

**ATTACHMENT 5  
SUPPLEMENTAL TECHNICAL SPECIFICATIONS**





## **SECTION 260513 – COMMON MOTOR REQUIREMENTS FOR EQUIPMENT**

### **PART 1 - GENERAL**

#### **1.1 SCOPE OF WORK**

- A. This Section includes AC induction electric motors to be provided with associated driven equipment. Motor voltage, speed and enclosures are specified in the equipment specifications. Unless otherwise specified, motors shall be provided by the manufacturer of the driven equipment under the provisions of the individual equipment specification.

#### **1.2 MOTOR RATING**

- A. Motor horsepower ratings as shown on the drawings and noted on the specifications are estimates only and it is the responsibility of the CONTRACTOR and/or VENDOR to furnish motors, electric circuits, power feeds and other equipment whose ratings meet the requirements for the submitted horsepower and amperage.
- B. This section applies to electric motors rated 480 V and below.

#### **1.3 CODE AND STANDARDS**

- A. Electrical Code Compliance: Comply with applicable local electrical code requirements of the authority having jurisdiction and NEC Articles 220, 250, and 430, as applicable to installation, and construction of motor controllers.
- B. AFBMA Compliance: Comply with applicable requirements of AFBMA 9 & 11, "Load Rating and Fatigue Life for Ball and Roller Bearings."
- C. UL Compliance: Comply with applicable requirements of UL 674, "Electric Motors and Generators, for Use in Division 1 Hazardous (Classified) Locations" and UL 1004, "Electric Motors".
- D. IEEE Compliance: Comply with recommended practices contained in IEEE Standard 112, "Standard Test Procedures for Polyphase Induction Motors and Generators," and IEEE Standard 841, "Standard for Petroleum and Chemical Industry – Totally Enclosed Fan Cooled (TEFC) Squirrel Cage Induction Motors – Up to and Including 500 HP".
- E. NEMA Compliance: Comply with applicable requirements of NEMA Standard ICS 2, "Industrial Control Devices, Controllers and Assemblies", NEMA Standard ICS 6, "Enclosures for Industrial Controls and Systems, "Pub No. 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)" and NEMA MG 1, "Motors and Generators".

#### 1.4 MAINTENANCE DATA

- A. Submit maintenance data and parts list for each motor and auxiliary component; including troubleshooting maintenance guide. Also, provide product data and shop drawings in a maintenance manual, in accordance with requirements of the Contract Documents.

#### 1.5 SUBMITTALS

- A. As a minimum, the following information shall be provided for each motor:
  - 1. Manufacturer name, type and model number
  - 2. Motor outline, dimensions and weight
  - 3. Manufacturer's general descriptive information relative to motor features
  - 4. Type of bearing and method of lubrication
  - 5. Rated size of motor and service factor
  - 6. Temperature rise and insulation rating
  - 7. Full-load rotative speed
  - 8. Efficiency at full,  $\frac{3}{4}$  and  $\frac{1}{2}$  load
  - 9. Full load current
  - 10. Locked-rotor current
  - 11. Space heater wattage and voltage, if applicable
  - 12. If a winding overtemperature device is required, provide a response curve for the temperature device, wiring diagram and specifications
  - 13. If a moisture detection system is required, provide a typical wiring diagram and a moisture detection relay to be installed by the CONTRACTOR or VENDOR in the associated motor controller.
- B. Shop Drawings: Submit shop drawings of electric motors showing accurately scaled equipment locations and spatial relationships to associated drive equipment.
- C. Wiring Diagrams: Submit power and control wiring diagrams for electric motors showing connections to electrical power panels, feeders, and equipment.
- D. Operations and Maintenance Data: Submit four (4) copies of operation and maintenance information.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Except as otherwise indicated, provide electric motors and ancillary components that comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation.

#### 2.2 SERVICE CONDITIONS

- A. Unless specified otherwise, motors shall be suitable for continuous operation at an elevation of 0 to 5100 feet above mean sea level.
- B. Unless specified otherwise, motors located outdoors shall be suitable for continuous operation from -25 to 50°C; motors located indoors shall be suitable for continuous operation from 0 to 50°C.
- C. All motors shall be able to operate under power supply variations in accordance with NEMA MG 1 – 14.30.

### 2.3 NAMEPLATES

- A. Motor nameplates shall be engraved or stamped stainless steel. Information shall include those items as enumerated in NEMA Standard MG 1, as applicable. Nameplates shall be permanently fastened to the motor frame and shall be visibly positioned for inspection.

### 2.4 CONSTRUCTION

- A. All motors provided under this specification shall have the following features of construction:
  - 1. Frames shall be steel for motors smaller than ½ horsepower and cast iron for motors ½ horsepower and larger.
  - 2. Cast metal shrouds and covers for non-sparking fan blades.
  - 3. Non-hygroscopic motor leads.
  - 4. NEMA Design-B as standard design. Other designs if required must be submitted and approved in writing by the ENGINEER.
  - 5. Motor Service Factor of 1.15 for Sine-Wave and 1.0 for Inverter Duty.
  - 6. Grounding terminal
  - 7. Windings shall be copper
  - 8. Rotor cages shall be die cast aluminum or fabricated copper
  - 9. Shafts shall be made from carbon steel.

### 2.5 MOTORS LESS THAN ½ HORSEPOWER

- A. General:
  - 1. Unless specified otherwise, motors less than ½ horsepower shall be squirrel cage, single phase, capacitor start, induction run type.
  - 2. Single phase motors shall have class B insulation as a minimum.
  - 3. Motors for fans less than 1/8 horsepower may be split-phase or shaded pole type.
  - 4. Winding shall be copper.
- B. Rating:
  - 1. Unless specified otherwise, motors less than ½ horsepower shall be rated for operation at 115 volts, single phase, 60 Hz, and shall be continuous-time rated in conformance with NEMA Standard MG 1 – 10.35.

2. Dual voltage (115/230) rated motors are acceptable if all leads are brought out to the conduit box.
3. Motors shall be non-overloading at all points of the equipment operation.

## 2.6 MOTORS ½ HORSEPOWER AND LARGER

### A. General:

1. Unless specified otherwise, motors ½ horsepower and larger shall be 3 phase, squirrel cage, full voltage start induction type.
2. Unless otherwise specified, motors shall have a NEMA MG 1-1.16 design letter B or C torque characteristic as required by the driven equipment's starting torque requirement.
3. Winding shall be copper.
4. Motors shall be equipped with a set of thermal overload switches with dry contacts available at the motor terminal box:

### B. Rating:

1. Unless specified otherwise, motors ½ horsepower and larger shall be rated for operation at 460 volts, 3 phase, 60 Hz, and shall be continuous-time rated in conformance with NEMA Standard MG 1 – 10.35.
2. Dual voltage (230/460) rated motors are acceptable if all leads are brought out to the conduit box.
3. Motors for variable frequency systems shall not be required to deliver more than 80% of the motor's service factor rating by any load imposed by the driven machine at any specified operating condition or any condition imposed by the driven machine's performance curve at maximum operating speed.

### C. Enclosures and Insulation:

1. Motors shall be classified as Type 1 (Process) or Type 2 (Explosion proof) based upon the location of the motor and the associated area classification.
2. Temperature rise for all motors shall not exceed that permitted by Note II, Paragraph 12.42 of NEMA MG 1.
3. Motor Insulation shall be non-hygroscopic.
4. Type 1 motors (Process):
  - a. Type 1 motors shall be premium energy-efficient motors, totally enclosed, fan cooled (TEFC)
  - b. All outdoor motors shall have Class H insulation with Class B temperature rise. Motors located indoors shall have Class F insulation with Class B temperature rise.
  - c. All internal surfaces shall be coated with an epoxy paint.
  - d. Motors shall be rated for corrosive atmosphere duty.
5. Type 2 Motors (Explosion Proof):
  - a. Explosion proof motors shall be UL listed in accordance with UL 674 for Class I, Group D hazardous atmospheres.

- b. Motors located outdoors shall have Class H insulation. Motors located indoors shall have Class F insulation.
- c. A UL-approved Type 316 stainless steel breather/drain device shall be provided in the motor drain hole.
- d. The motor shall be provided with a frame temperature thermostat which meets the UL frame temperature limit code T2A (280°C). The thermostat shall contain an automatically reset, normally closed contact rated 2 amperes at 230 VAC.

2.7 MOTORS FOR VARIABLE FREQUENCY DRIVES

- A. Motors intended for use with variable frequency drives shall be compatible with the characteristics of the intended variable frequency inverter.
- B. Motors shall be Type 1 or Type 2 as specified in 2.06C.
- C. Motors shall be capable of withstanding a pulse voltage of at least 1750 volts with a rate of rise up to 750V per microsecond.
- D. Motors shall be certified by the manufacturer as suitable for inverter duty and shall have as a minimum a 10:1 turndown ratio (6-60Hz).
- E. Motors shall be capable of running above the rated RPM up to 70 Hz (116.67% of rated RPM) so long as the load current does not exceed the full load amps of the motor.

2.8 MOTOR EFFICIENCIES

- A. Type 1 and Type 2 motors in accordance with NEMA MG 1 Table 12-11 and 12-12 and Type 2 in accordance with IEEE 841 Table 2 motor minimum nameplate efficiency for 900, 1200 and 1800 rpm motors, when operating on a sinusoidal power source shall conform to the following (in accordance with IEEE 112B testing procedures):

Motor Horsepower	Guaranteed Minimum Efficiency (%)		
	900 RPM	1200 RPM	1800 RPM
1	70.0%	78.5%	81.5%
1.5	72.0%	81.5%	82.5%
2	80.0%	81.5%	82.5%
3	81.5%	86.5%	84.0%
5	82.5%	86.5%	84.0%
7.5	82.5%	88.5%	88.5%
10	86.5%	88.5%	88.5%
15	86.5%	89.5%	89.5%
20	87.5%	90.2%	91.7%
25	87.5%	91.0%	91.7%
30	89.5%	91.0%	91.7%
40	89.5%	92.4%	92.4%

50	90.2%	92.4%	92.4%
60	90.2%	93.0%	93.0%
75	91.7%	93.0%	93.6%
100	91.7%	93.6%	94.1%
125	92.4%	93.6%	94.1%
150	92.4%	94.5%	94.5%
200	92.4%	94.5%	94.5%
250	93.6%	94.1%	94.1%

## 2.9 CONDUIT BOXES

- A. Conduit boxes shall be sized based on the conduit number and conduit size indicated on the drawings. Provide over-sized boxes with the number of openings as required to accommodate the conduits required.
- B. Conduit boxes shall be split construction with threaded hubs and shall conform to IEEE 841 for Type 1 and Type 2 motors. Motors shall be furnished with petroleum-resistant gaskets at the base of the conduit box and between the halves of the conduit box.
- C. Conduit boxes shall be designed to rotate in order to permit installation in any of four positions 90 degrees apart.

## 2.10 BEARINGS

- A. Bearings may be oil or grease lubricated ball or angle contact roller bearing rated for a minimum L-10 life of 100,000 hours in accordance with ABMA 9 or 100 at the ambient temperature specified. Motor designs employing cartridge type bearings will not be accepted. Bearings shall be fitted with lubricant fill and drain or relief fittings. Belt loads shall not exceed forces calculated from NEMA MG 1 Table 14-1.

## 2.11 LIFTING EYES

- A. Motors weighing more than 50 pounds shall be fitted with at least one lifting eye and motors weighing over 150 pounds shall be fitted with two lifting eyes.

## 2.12 SPACE HEATERS

- A. Motors that are located outdoors shall be equipped with Space Heaters to prevent condensation inside the motor enclosure after motor shutdown and maintain the temperature of the windings at not less than 5°C above outside ambient temperature.
- B. Heaters shall be flexible wraparound type rated 120 volts, single phase, 60 Hz unless otherwise noted. The space heater rating in watts and volts shall be noted on the motor nameplate or on a second nameplate. Space heater leads H1 and H2 shall be brought to a separate terminal block or pigtails in the motor conduit box or separate conduit box with a threaded conduit opening.

### PART 3 - EXECUTION

- A. Install electric in accordance with equipment manufacturer's written instructions, and with recognized industry practices. Comply with applicable requirements of NEC, UL, and NEMA standards, to insure that products fulfill requirements.
- B. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B, and the National Electrical Code.
- C. Ensure that the motor is properly grounded from the incoming motor leads and that the frame is bonded to the grounding electrode system.
- D. Verify breather/drain fittings have been installed as specified.
- E. Prior to energizing, check circuitry for electrical continuity, and for short-circuits. Winding insulation resistance for motors shall not be less than 10-megohms measured with a 1000-VAC megohmmeter at 1-minute at or corrected to 40°C.
- F. Check rotation of each motor for proper direction.
- G. Upon completion of installation of motor controller equipment and electrical circuitry, energize controller circuitry and demonstrate functioning of equipment in accordance with requirements.

END OF SECTION 260513





## SECTION 466115 – AUTOMATED BRUSH SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The Automated Brush System shall be custom designed, field built and constructed for the individual Clarifier it is to be installed. Because of custom designed application of the automated brush units, variations in poured concrete, differences in the various clarifier providers and variances in the height of the skimmer as travels around the tank and the out of round of each Clarifier/ Thickener, it is required that the Manufacturer of the Brush Weir Cleaning system construct the device on site by Factory trained employees.
- B. The Automated Brush System for algae and debris control shall be designed for a brush to make contact with each of the following surfaces:
  - 1. Inner Baffle
  - 2. Outer Baffle
  - 3. Inner Weir (s)
  - 4. Outer Weir (s)
  - 5. Top Spillway Surface
  - 6. Angled Spillway Surface
  - 7. Inner Launder Wall
  - 8. Launder Bottom
  - 9. Outer Launder Wall
- C. The Automated Brush System shall be designed to work off the power of the existing clarifier drive motor. The system shall be constructed to avoid any noticeable torque increases. The unit shall be capable of encountering an indefinite stall without incurring damage.
- D. The Brush system shall weigh no more than 150 lbs in total for a single Skimmer installation and split Brush systems shall weigh no more than 100 lbs that will be installed on each Skimmer.
- E. The unit shall be designed with an engaged position for cleaning, and a disengaged position allowing the system to ride idle around the tank.
- F. Brush system must be approved by the Clarifier Manufacturer on which it is to be installed to address and prevent any warranty issues.
- G. The system shall be installed in the following clarifiers:
  - 1. New Secondary Clarifier #3

#### 1.2 SPECIAL REQUIREMENTS

- A. The Automated Brush System requires the clarifiers to have the following:

1. Clarifiers shall be circular in design and be completely free of obstructions around the entire periphery of the tank and compatible with automated brush cleaning devices.
- B. Specific problem areas must be avoided:
1. Walkway support - Walkway should extend freely to the outer effluent launder wall or beyond and not be supported on the spillway surfaces.
  2. Water Supply Lines - The area must be kept free of all supply lines.
  3. Baffle Brackets - Brackets with webbing gussets must not be used to attach the baffle. An L-shaped bracket must be used to allow the free passage of the brush system and to promote more efficient cleaning.
  4. Bolt Protrusions - Bolt protrusions should be minimized. Bolts/studs, which attach the weir and baffle, should protrude no more than 1/4 inch past the nuts.
  5. Skimmer arm shall be of a standard design (no "ducking" or submersible skimmers). Skimmer arm must remain at consistent elevation (plus or minus 1") around the entire periphery of the tank. Skimmer arm must be able to support addition of approximately 100 lbs. without inducing metal fatigue.
  6. Distance between baffle and weir shall be at least eight inches. If launder has tangential weir (i.e. multisided launder) then the distance between weir and baffle ideally should be 8" at the closest and 12" at the farthest.
  7. A clearance of at least 18" shall be provided between the top of baffle and the lowest point of the walkway. If weir/baffle or launder has radial variance greater than 4" (i.e. multi-sided inboard launder) this clearance must be a minimum of 24".
  8. Performance of automated brush system is greatly enhanced if top spillway surface is 6" wide.
  9. Interior Concrete surfaces of the launder should be finished as smoothly as possible. This will allow for maximum brush life and also increase the effectiveness of algae removal.
  10. Performance of automated brush system weir cleaning is greatly enhanced when the weirs are anchored in such a way as to allow for at least 5" of the weir surface above the horizontal concrete spillway.

## PART 2 - PRODUCTS

The automated brush system shall be the "Weir Wolf System" as manufactured by Ford Hall Company, or equal.

### 2.1 ATTACHMENT ASSEMBLY

- A. The Attachment Assembly shall provide a means of attaching the Automated Brush System to the skimmer arm and or rake truss so as not to interfere with any other operations of the skimmer arm (such as the effective skimming of floatable solids or the operation of the skimmer blade assembly at the scum box).
- B. The Attachment Assembly shall be custom designed for each specific clarifier. It shall be constructed of 304 stainless steel.

## 2.2 MAINFRAME

- A. The Automated Brush System Mainframe shall be constructed of Type 304 stainless steel and designed to slip easily into the Attachment Assembly and be tightened in position with the use of set screws. The Mainframe shall be designed so that the Brush Arms can be positioned at any point on the Mainframe.

## 2.3 BRUSH ARMS

- A. Brush Arms shall be of Type 316 stainless steel and custom designed and installed for individual applications. Factory service technician will be on site to observe and advise the installation of the Brush Arms to allow for cleaning all aforementioned surfaces and allow for the following:
  - 1. SPRINGS ASSEMBLIES Flexibility to clean effluent surfaces within a plus or minus 4-inch radial variance (specifically: Clarifier walls, both sides of weirs & baffle).
  - 2. To have opposite the Mainframe end, a Brush Holder component allowing for the insertion of a brush.
  - 3. To allow Brush Holder to be adjusted telescopically so that a maximum number of Brush Arm adjustments are possible.
  - 4. To have a means of biasing the arm to the Mainframe so as to provide sufficient force to remove algae and debris.
  - 5. Include a component that allows for each brush arm to be “locked out” or disengaged. This will allow operators to customize cleaning schedule and extend life of the brushes.

## 2.4 SPRING ASSEMBLIES

- A. Each Brush Arm requires spring tension to bias the Brush Arm with the Brush Holder and Brushes into tight engagement with the appropriate effluent surface to be cleaned. The Spring Assemblies require the following.
  - 1. A minimum of one Spring Assembly of 316 stainless steel is required for each Brush Arm.
  - 2. Spring Assemblies consist of two stainless steel springs & one stainless steel guide.
  - 3. Each spring will be composed of 316 stainless steel wire with a minimum diameter of 0.95 inch and a minimum of 260 active coils per spring length.
  - 4. Spring coils will have a mean diameter of 0.655 inches. A minimum inner coil diameter of 0.56 inch and an outer diameter of 0.75 inch are required of each stainless steel spring.
  - 5. Springs to have a minimum initial spring tension of 6.68 lbf and a maximum of 10.02 lbf with a minimum load tolerance of 18.44 lbf.

## 2.5 BRUSH HOLDER

- A. At the end of each Brush Arm, there will be a 316 stainless steel Brush Holder to allow the insertion of a Cleaning Brush.
- B. A Brush Holder shall be aligned with each of the following surfaces: both sides of the baffle, both sides of the weir and each of the effluent launder surfaces. Each Brush Holder will:

1. Consist of a “bolted clamp design” to allow for the easy insertion and removal of Brushes.
2. Include a factory-supplied brush suitable for prolonged exposure to wastewater environment.
3. Contain a Shear Safety Component.

## 2.6 SHEAR SAFETY COMPONENT

- A. Each Brush holder will contain a Shear Safety Component having a frangible point designed to break when subjected to a force within each Brush holder.
- B. The stress value on each Shear Safety Component will be low enough to release the Brush Holder to forgo any damage to Brush Cleaning unit and/or Skimmer equipment but be high enough to allow standard operation of Brush cleaning system.

## 2.7 BRUSHES

- A. Each Brush Holder shall contain one (1) Cleaning Brush. Brushes shall be provided that slip easily into the Brush Holder and provide the cleaning means necessary to remove algae and debris from their respective surfaces. A brush shall be aligned to make contact with both sides of the baffle, both sides of the weir and all the effluent launder surfaces.
- B. Brush construction shall be as follows:
  1. Brush backing shall be of durable plastic able to withstand continuous exposure to sunlight, seasonal temperature changes and the corrosive elements found in wastewater.
  2. Brush bristles shall be polypropylene with adequate trim length, density, and stiffness for extended continuous use.
  3. Brushes shall be cut and shaped appropriately so as to clean their respective surfaces without binding.
- C. Replacement Brushes shall be stocked by the manufacturer to the exact dimensions and will be available for purchase. Brushes provided by the Automated Brush system manufacturer should average approximately one (1) year.

## 2.8 LOCK IN / LOCK OUT DESIGN

- A. Each Automated Brush System shall be designed with an engaged or locked in position for cleaning and a disengaged or locked out position for riding idle around the tank.
- B. Each Brush Arm will have permanently mounted to the Brush Arm a Lock Out Hook that corresponds to a Lock Out Ring, which allows disengagement of the individual Brushes. The Lock Out Ring is mounted to a Lock Out Boss that is attached parallel to the Mainframe.
- C. Each Automated Brush System shall be designed so that the entire Brush system can be disengaged or individual Brush Arms can be disengaged allowing for customized cleaning of weir and effluent surfaces.

## 2.9 BRUSH BRIDGES

- A. Provides the automated brush system Launder Brush Assembly a "Bridge" over the effluent hole on which to travel.
- B. Brush Bridge will also need to be provided over the Scum Boxes. An incline and a decline guide ramps of 304 stainless steel will need to be provided for each Scum Box in the Clarifier.
- C. The Brush Bridge shall be constructed entirely out of Type 304 Stainless Steel.

## 2.10 BRUSH SYSTEM WEIGHT AND COUNTERBALANCES

- A. Weight of the Automated Brush system will not exceed 150 lbs total for all Brush systems attachments, brush arms, components and parts. This is based on a Single skimmer arm design.
- B. Automated Brush system will require a counterbalance to be installed on the opposite rake Mechanism to offset the weight of the Brush system that has been added to the skimmer. Manufacturer of the Automated Brush systems will need to provide additional counterbalances totaling the weight of the installed Brush system, attachment sleeve and mainframe and be responsible for the correct placement and installation. (This is an additional counterweight beyond the counterbalances provided by the Clarifier manufacturers.)

## 2.11 SPARE PARTS/TOOLS

- A. The manufacturer shall supply one (1) full set of spare brushes for each clarifier on which the cleaning system is installed.
- B. The manufacturer shall supply one (1) lock-out pole as necessary for adjustment of the cleaning systems.

## PART 3 - QUALITY ASSURANCE, WARRANTY, EXPERIENCE QUALIFICATIONS

### 3.1 GENERAL

- A. Use of factory trained workmen, who are completely familiar with the specified requirements of automated brush cleaning devices and the methods needed for proper performance of equipment will be required. Factory workmen will be responsible for calculating bridge clearances, calculating skimmer strengths, instruction in building ramps over effluent discharge/ scum box areas and adapting brush system for radial variances of the clarifier walls and weir surfaces. **It will be the responsibility of the Manufacturer of the Automated Brush System to ensure the brush system is cleaning all effluent surfaces called out in the specifications with the proper force and contact at the time of installation as part of the Brush system start up.**

### 3.2 QUALIFICATIONS OF MANUFACTURER

- A. The Manufacturer of Automated Cleaning Brush Systems shall regularly engage in the manufacture of Weir Cleaning systems with a minimum of five (5) years experience in the manufacture and shall have a minimum of seventy-five (75) units (of their own units) in operation. A history of successful installations (with contact names and phone numbers) must be included and contacted for confirmation before approval.

### 3.3 BASIS OF ACCEPTANCE

- A. The manufacturer's recommended installation procedures, when approved by the Engineer, will become the basis for inspecting and accepting or rejecting actual installation procedures used on this work. Clarifier Manufacturers must sign off on Automated Weir Cleaning system which is to be installed on their clarifier mechanisms to ensure Clarifier performance, drive functions, compatibility issues and to validate warranties.

### 3.4 WARRANTY

- A. Automated Brush System will include a 5 year parts warranty and 1 year labor warranty provided by the Manufacturer of the Automated Brush System. The Manufacturer of the Automated Weir Cleaning Brush System is the sole responsible party for the performance, adjustments and modifications of the Automated Brush System.

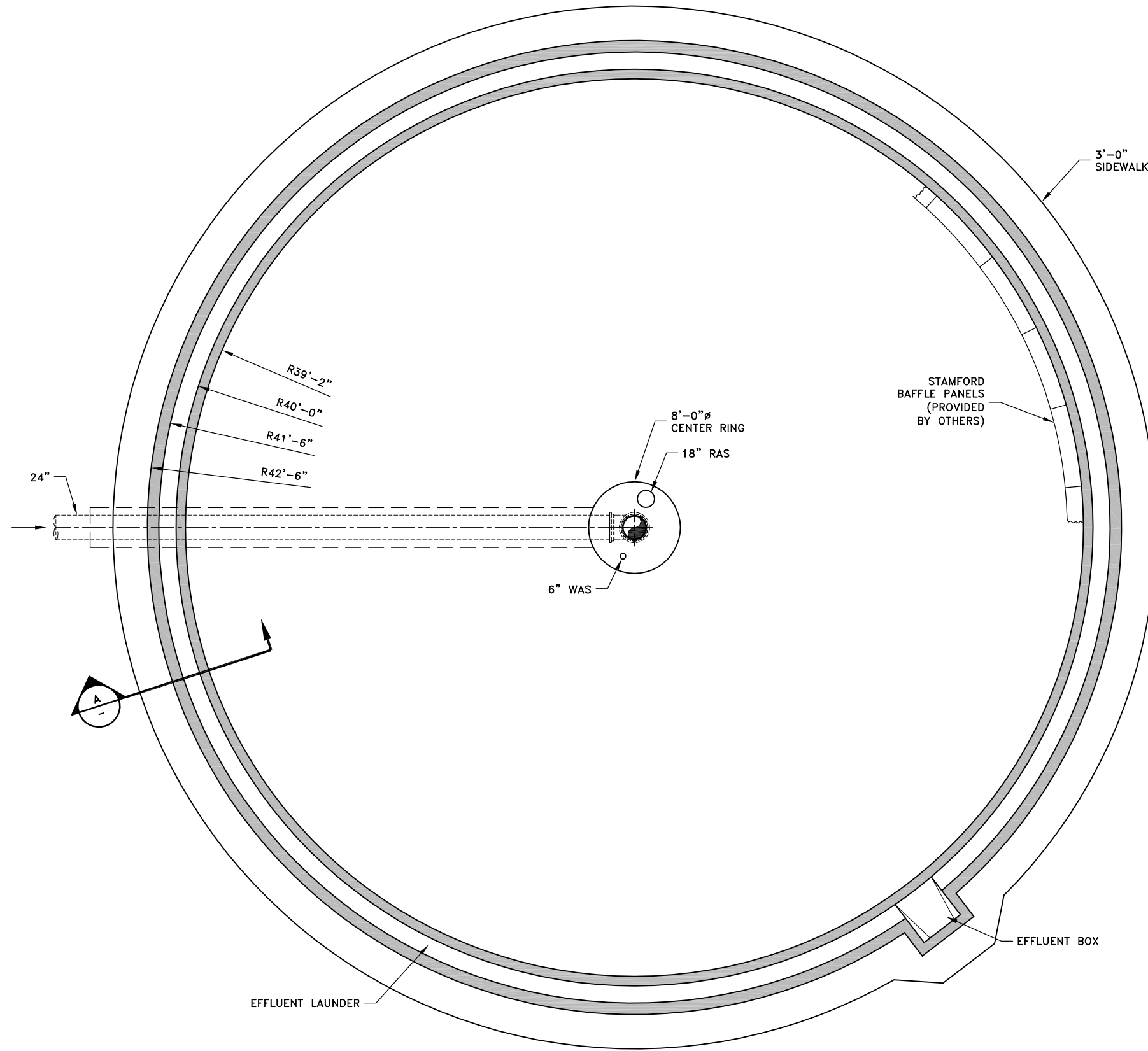
END SECTION 466115

**ATTACHMENT 6  
DRAWINGS**



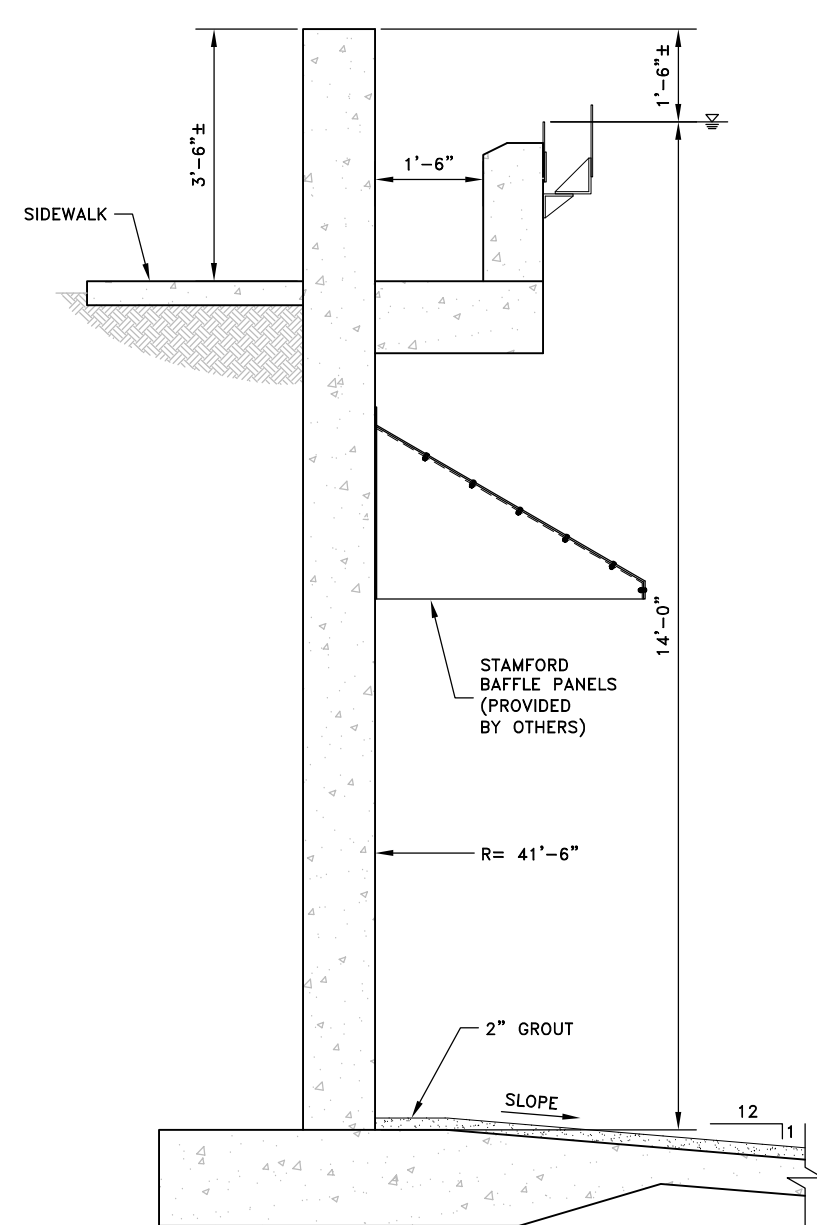
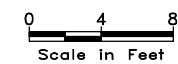


BDP 08/04/2017 X:\Elko\Secondary Clarifier #3 #001111.c\Drafting\Secondary Clarifier\BAFFLE PLAN.dwg



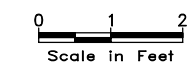
**SECONDARY CLARIFIER PLAN**

SCALE: 3/16" = 1'-0"



**SECTION**

SCALE: 3/4" = 1'-0"



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NO.	DATE	DESIGN	DRAWN	CHECKED
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REVISIONS				

CITY OF ELKO  
WATER RECLAMATION FACILITY  
SECONDARY CLARIFIER #3

**AQUA**  
ENGINEERING

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SHEET  
**SC-1**

DRAWING IS TO SCALE  
IF BAR MEASURES:  
1" = FULL SCALE  
1/2" = HALF SCALE