Attachment “A” is amended as follows:

Replace bid quantities with “replacement”, Attachment “A1”. Please use the revised attachment to submit bid pricing. All bids must be submitted using Attachment “A1”. Contractors are authorized to download revised quantities from website and paste to a CD-RW (preferably in a live/flash drive format) which must be submitted with the original bid packet. In addition, two hard copies must be signed and submitted with original bid packet. Bid must be submitted from the file (Quantities) provided and downloaded from the City of Huntsville’s website. Failure to do so may be cause for rejection of bid. The City reserves the right to reject any altered bid resulting from altering the bid CD in any manner. Contractors should be mindful of making changes to formatting already established in column for Bid Unit Price, as it may affect the outcome of their bid. In order to verify calculations are correct, Contractor may choose to manually multiply those unit costs x bid quantities to ensure extensions are correct, prior to printing and submitting with bid packet. If a price discrepancy is found on the CD-RW, or the correct version of bid quantities is not submitted on the CD-RW which corresponds to the printed hard copy, then printed hard copy prices submitted with original bid documents, with Contractor signature, will prevail. However, calculations must be accurate and will be verified manually.

- Any bidder who designates a change on the outside of the envelope understands that any deletions or additions designated, bidder must further indicate the particular bid item relative to the deletion or addition, even if the deletion or addition references to deduct or add to the Total Base Bid.

QUANTITY REVISIONS

Delete
14
Pre-negotiated firm price for all materials and manufacturer support defined in Sections 46 21.26, 46 21.60, and 44 42 27.20 for the stop screen, sluice way, and screenings washer compactor. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3. 1 LS
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Sections 46 21 26, 46 21 60, and 44 42 27.20 for the step screens, sluice way, and screenings washer compactor. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$1,135,837.00</td>
</tr>
<tr>
<td>15</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Section 44 23 23 for the vortex grit removal equipment. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$165,800.00</td>
</tr>
<tr>
<td>16</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Sections 44 44 20 and 44 42 56.80 for the grit classifier equipment and grit pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$359,201.00</td>
</tr>
<tr>
<td>17</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Section 44 42 46 for the submersible mixers. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 4.</td>
<td>1</td>
<td>LS</td>
<td>$32,115.00</td>
</tr>
</tbody>
</table>
Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.39 for the submersible chopper pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 6. 1 LS $20,925.00

Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.29 for the wet-pit submersible pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 7. 1 LS $262,915.00

Addenda will only be emailed to those bidders who attend and have signed in at the pre-bid meeting. All addenda, as well as other project information, are available for downloading on Engineering's website at www.huntsvilleal.gov/engineeringbids. Acknowledgement of receipt/download from website of addenda is mandatory using Attachment “C” located in the Specifications and attachment must be submitted with bid package. Failure to do so shall be cause for rejection of the bid. It is the responsibility of all bidders to refer to the website for any updates. The attached pre-bid meeting minutes, all addenda and attachments for the above-referenced project will become part of the contract documents.

Attachments: Revised Quantities-Attachment A1

END OF ADDENDUM #2
# Western Area WWTP Phase 1 Expansion

**COH Project No.: 71-22-SF01**  
**Garver Project No.: 21W10220**

## Unit Bid Sheet

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Bid Qty</th>
<th>Bid Unit</th>
<th>Bid Unit Price</th>
<th>Bid Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization and Demobilization: For all costs associated with project mobilization and demobilization, in accordance with the Drawings and Specifications (50% for mobilization, 50% for demobilization, not to exceed 5% of the total bid).</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>2</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 05 – Site Civil</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>3</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 10 – Existing Headworks Expansion</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>4</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 20 – Process Train Splitter Box No. 1</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>5</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 30 – Oxidation Ditch No. 3</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>6</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 40 – Final Clarifier No. 5</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>7</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 50 – RAS WAS Pump Station No. 2</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>8</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct Facility 90 – Electrical</td>
<td>1</td>
<td>LS</td>
<td></td>
<td>$0.00</td>
</tr>
</tbody>
</table>
### WESTERN AREA WWTP PHASE 1 EXPANSION

**COH Project No.: 71-22-SF01**  
**Garver Project No.: 21W10220**

**UNIT BID SHEET**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Removal and replacement of existing asphalt pavement, including sawing, milling, surface preparation, excavation, compaction, tack and prime coats, and all incidentals necessary to complete the work above the quantity required by the documents or to be replaced during completion of the Work. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,000</td>
<td>SY</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Over excavation, handling, and disposal onsite of unsuitable soils determined to be unsuitable for structural support as identified by the geotechnical engineer and Owner. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,750</td>
<td>CY</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Furnishing and placement of granular fill meeting the recommendations of the geotechnical report to replace unsuitable soil. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,750</td>
<td>CY</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Huntsville Utilities Electrical Aid to Construction and Contingency Allowance for extra Work relating to miscellaneous structural, electrical, yard piping, or process mechanical items required during the completion of the project. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>1</td>
<td>LS</td>
<td>$400,000.00</td>
<td>$400,000.00</td>
</tr>
<tr>
<td>13</td>
<td>Pre-negotiated firm price for all reinforcing steel including manufacturer support services (cut, tagged, bundled, and development of placing plans) delivered to the project site. Installation of this material furnished under this bid item, coordination with material supplier, and all other items not specifically included in the scope of supply shall be provided by the Contractor in the corresponding facility-specific bid items above.</td>
<td>1,500</td>
<td>TONS</td>
<td>$1,550.00</td>
<td>$2,325,000.00</td>
</tr>
<tr>
<td>14</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Sections 46 21.26, 46 21.60, and 44 42.27.20 for the step screens, sluice way, and screenings washer compactor. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$1,135,837.00</td>
<td>$1,135,837.00</td>
</tr>
</tbody>
</table>
## UNIT BID SHEET

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 23 23 for the vortex grit removal equipment. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$166,800.00</td>
<td>$166,800.00</td>
</tr>
<tr>
<td>16</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Sections 44 44 20 and 44 42 56.60 for the grit classifier equipment and grit pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>$359,201.00</td>
<td>$359,201.00</td>
</tr>
<tr>
<td>17</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 46 for the submersible mixers. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 4.</td>
<td>1</td>
<td>LS</td>
<td>$32,115.00</td>
<td>$32,115.00</td>
</tr>
<tr>
<td>18</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.39 for the submersible chopper pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 6.</td>
<td>1</td>
<td>LS</td>
<td>$20,925.00</td>
<td>$20,925.00</td>
</tr>
<tr>
<td>19</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.29 for the wet-pit submersible pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 7.</td>
<td>1</td>
<td>LS</td>
<td>$262,915.00</td>
<td>$262,915.00</td>
</tr>
<tr>
<td>UNIT BID SHEET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL BASE BID</td>
<td>$4,702,793.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALL ITEMS SHALL BE CONSIDERED IN-PLACE. PRICES SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND REMOVALS AS REQUIRED FOR CONSTRUCTION OF THE REQUIRED WORK.

COMPANY ____________________________
SIGNATURE __________________________
DATE ________________________________
Date: June 24, 2022
Project Name: Western Area Wastewater Treatment Plant Phase 1 Expansion
Owner: City of Huntsville Water Pollution Control
Owner Project No. 71-22-SF01
Garver Project No. 21W10220

This addendum shall be a part of the Plans, Contract Documents and Specifications to the same extent as though it were originally included therein, and it shall supersede anything contained in the Plans, Contract Documents, and Specifications with which it might conflict. This addendum, including all attachments, shall become part of the Contract and all provisions of the Contract shall apply thereto, with exception of the items listed under “Other Project Information” at the end of this Addendum No. 2, which are supplements provided for the Contractor’s convenience and not part of the contract documents. The time provided for completion of the Contract has not been changed as noted in this addendum. Acknowledgement of receipt of this addendum must be noted in the appropriate section of the Bid Form and included with the Contract Documents.

A. SPECIFICATIONS – Volume 1 and 2
1. Remove the following specification sections in their entirety, and replace with the same, attached hereto:
   a. Attachment A – Bid Quantities
   b. 40 72 23 – Radar Level Meters
   c. 44 23 23 – Vortex Grit Removal Equipment
   d. 44 42 23 – Suction Pipe Type Clarifier Mechanism
   e. 44 42 27.20 – Screenings Washer Compactor
   f. 44 42 56.29 – Wet-Pit Submersible Pumps
   g. 44 42 56.60 – Induced Flow (Recessed Impeller) Centrifugal Pumps
   h. 46 21 26 – Step Screens

2. Remove the following specification sections in their entirety:
   a. 40 71 63 – Ultrasonic Flow Meters

3. Revise Section 46 21 60 – Water Sluice System as follows:
   a. Change paragraph 2.4.7 from 6-inch size to 3-inch size.

4. Revise the following specification sections to require no provision of spare parts:
   a. Division 44 Pollution Control Equipment
   b. Division 46 Water and Wastewater Equipment

5. Revise Section 40 92 13 – Motorized Operators as follows:
   a. Add the following to paragraph 2.1.A: “4. Rotork”
B. STANDARD DETAILS – Volume 3

1. Add the following standard detail sections in their entirety, attached hereto:
   a. D40 2339-005 – Process Line Clean Out Setting
   b. D40 2400-002 – Wall/Floor Pipe Sleeve
   c. D40 2400-003 – Floor Sleeve
   d. D40 2400-004 – Floor Pipe

C. DRAWINGS – Volume 4

1. Add the following drawings in their entirety, attached hereto:
   a. Drawing No. 08-I101 Headworks Screens P&ID
   b. Drawing No. 08-I102 Grit Removal P&ID
   c. Drawing No. 08-I103 Headworks Distribution Structure P&ID
   d. Drawing No. 10-X101 Headworks Demolition Plan
   e. Drawing No. 10-X301 Headworks Demolition Section and Details
   f. Drawing No. 10-S101 Headworks Expansion Overall Foundation Plan
   g. Drawing No. 10-S102 Headworks Expansion Overall Intermediate Plan
   h. Drawing No. 10-S103 Headworks Expansion Overall Top of Wall Plan
   i. Drawing No. 10-S104 Headworks Expansion Enlarged Existing Screenings Foundation Plan
   j. Drawing No. 10-S105 Headworks Expansion Enlarged Existing Screenings Intermediate Plan
   k. Drawing No. 10-S106 Headworks Expansion Enlarged Existing Screenings Top of Wall Plan
   l. Drawing No. 10-S107 Headworks Expansion Enlarged New Grit Processing Foundation Plan
   m. Drawing No. 10-S108 Headworks Expansion Enlarged New Grit Processing Intermediate Plan
   n. Drawing No. 10-S109 Headworks Expansion Enlarged New Grit Processing Top of Wall Plan
   o. Drawing No. 10-S110 Headworks Expansion Enlarged New Screenings Foundation Plan
   p. Drawing No. 10-S111 Headworks Expansion Enlarged New Screenings Intermediate Plan
   q. Drawing No. 10-S112 Headworks Expansion Enlarged New Screenings Top of Wall Plan
   r. Drawing No. 10-S301 Headworks Expansion Sections and Details I
   s. Drawing No. 10-S302 Headworks Expansion Sections and Details II
   t. Drawing No. 10-S303 Headworks Expansion Sections and Details III
   u. Drawing No. 10-S304 Headworks Expansion Sections and Details IV
   v. Drawing No. 10-S305 Headworks Expansion Sections and Details V
   w. Drawing No. 10-S306 Headworks Expansion Sections and Details VI
   x. Drawing No. 10-S307 Headworks Expansion Sections and Details VII
   y. Drawing No. 10-P101 Headworks Expansion Overall Plan
   z. Drawing No. 10-P102 Headworks Expansion Screening Plan
   aa. Drawing No. 10-P103 Headworks Expansion New Grit System Plan
   bb. Drawing No. 10-P104 Headworks Expansion New Grit System Top of Wall Plan
   cc. Drawing No. 10-P105 Headworks Expansion Grit Pump Station Plan
   dd. Drawing No. 10-P301 Headworks Expansion Overall Process Sections
   ee. Drawing No. 10-P302 Headworks Expansion Process Sections and Details I
   ff. Drawing No. 10-P303 Headworks Expansion Process Sections and Details II
   gg. Drawing No. 10-P304 Headworks Expansion Process Sections and Details III
   hh. Drawing No. 10-P305 Headworks Expansion Process Sections and Details IV
   ii. Drawing No. 10-M101 Grit Pump Station HVAC
   jj. Drawing No. 10-M601 Grit Pump Station HVAC Schedule and Airflow Diagram
   kk. Drawing No. 10-E131 Headworks Expansion Power Plan – Overview
   ll. Drawing No. 10-E132 Headworks Expansion Power Plan – Enlarged 1
   mm. Drawing No. 10-E133 Headworks Expansion Power Plan – Enlarged 2
   nn. Drawing No. 10-E134 Headworks Expansion Power Plan – Enlarged 3
   oo. Drawing No. 10-E601 Headworks I&C Conduit Schedule
pp. Drawing No. 10-E602 GTLP1 Panel Schedule
qq. Drawing No. 10-E701 Headworks Expansion Control Schematics 1
rr. Drawing No. 10-E702 Headworks Expansion Control Schematics 2
ss. Drawing No. 10-E703 Headworks Expansion Control Schematics 3
tt. Drawing No. 90-E504 New Grit MCC One-Line Diagram
uu. Drawing No. 90-E505 New Headworks Power Panels One-Line Diagrams

2. Remove the following drawings in their entirety, and replace with the same, attached hereto:
   a. Drawing No. 05-C101 Existing Site Plan – Overview
   b. Drawing No. 05-C203 Grading and Paving Plan – Enlarged 1
   c. Drawing No. 05-C209 Grading and Paving Plan – Enlarged 5
   d. Drawing No. 05-C210 Grading and Paving Plan – Enlarged 6
   e. Drawing No. 05-C303 Proposed Yard Piping Plan – Enlarged 1
   f. Drawing No. 05-C306 Proposed Yard Piping Plan – Enlarged 3
   g. Drawing No. 05-C309 Proposed Yard Piping Plan – Enlarged 5
   h. Drawing No. 05-C318 Yard Piping – Profiles 8
   i. Drawing No. 08-I501 RAS/WAS Pump Station No.3 P&ID
   j. Drawing No. 10-S901 Headworks Expansion Isometric I
   k. Drawing No. 10-S902 Headworks Expansion Isometric II

D. OTHER PROJECT INFORMATION (uploaded to the online plan room’s Q&A section)

1. No items for Other Project Information are included in this addendum.

By: __________________________________________

Wes Cardwell, P.E.
Project Manager

Attachments:

A. Specifications
   1. Attachment A – Bid Quantities
   2. 40 72 23 – Radar Level Meters
   3. 44 23 23 – Vortex Grit Removal Equipment
   4. 44 42 23 – Suction Pipe Type Clarifier Mechanism
   5. 44 42 27.20 – Screenings Washer Compactor
   6. 44 42 56.29 – Wet-Pit Submersible Pumps
   7. 44 42 56.60 – Induced Flow (Recessed Impeller) Centrifugal Pumps
   8. 46 21 26 – Step Screens

B. Standard Details
   1. D40 2339-005 – Process Line Clean Out Setting
   2. D40 2400-002 – Wall/Floor Pipe Sleeve
   3. D40 2400-003 – Floor Sleeve
   4. D40 2400-004 – Floor Pipe
C. Drawings

1. Drawing No. 05-C101 Existing Site Plan – Overview
2. Drawing No. 05-C203 Grading and Paving Plan – Enlarged 1
3. Drawing No. 05-C209 Grading and Paving Plan – Enlarged 5
4. Drawing No. 05-C210 Grading and Paving Plan – Enlarged 6
5. Drawing No. 05-C303 Proposed Yard Piping Plan – Enlarged 1
6. Drawing No. 05-C306 Proposed Yard Piping Plan – Enlarged 3
7. Drawing No. 05-C309 Proposed Yard Piping Plan – Enlarged 5
8. Drawing No. 05-C318 Yard Piping – Profiles 8
9. Drawing No. 08-I101 Headworks Screens P&ID
10. Drawing No. 08-I102 Grit Removal P&ID
11. Drawing No. 08-I103 Headworks Distribution Structure P&ID
12. Drawing No. 08-I501 RAS/WAS Pump Station No.3 P&ID
13. Drawing No. 10-X101 Headworks Demolition Plan
14. Drawing No. 10-X301 Headworks Demolition Section and Details
15. Drawing No. 10-S101 Headworks Expansion Overall Foundation Plan
16. Drawing No. 10-S102 Headworks Expansion Overall Intermediate Plan
17. Drawing No. 10-S103 Headworks Expansion Overall Top of Wall Plan
18. Drawing No. 10-S104 Headworks Expansion Enlarged New Screens Foundation Plan
19. Drawing No. 10-S105 Headworks Expansion Enlarged Existing Screenings Intermediate Plan
20. Drawing No. 10-S106 Headworks Expansion Enlarged Existing Screenings Top of Wall Plan
21. Drawing No. 10-S107 Headworks Expansion Enlarged New Grit Processing Foundation Plan
23. Drawing No. 10-S109 Headworks Expansion Enlarged New Grit Processing Top of Wall Plan
24. Drawing No. 10-S110 Headworks Expansion Enlarged New Screenings Foundation Plan
25. Drawing No. 10-S111 Headworks Expansion Enlarged New Screenings Intermediate Plan
26. Drawing No. 10-S112 Headworks Expansion Enlarged New Screenings Top of Wall Plan
27. Drawing No. 10-S301 Headworks Expansion Sections and Details I
28. Drawing No. 10-S302 Headworks Expansion Sections and Details II
29. Drawing No. 10-S303 Headworks Expansion Sections and Details III
30. Drawing No. 10-S304 Headworks Expansion Sections and Details IV
31. Drawing No. 10-S305 Headworks Expansion Sections and Details V
32. Drawing No. 10-S306 Headworks Expansion Sections and Details VI
33. Drawing No. 10-S307 Headworks Expansion Sections and Details VII
34. Drawing No. 10-S901 Headworks Expansion Isometric I
35. Drawing No. 10-S902 Headworks Expansion Isometric II
36. Drawing No. 10-P101 Headworks Expansion Overall Plan
37. Drawing No. 10-P102 Headworks Expansion Screening Plan
38. Drawing No. 10-P103 Headworks Expansion New Grit System Plan
39. Drawing No. 10-P104 Headworks Expansion New Grit System Top of Wall Plan
40. Drawing No. 10-P105 Headworks Expansion Grit Pump Station Plan
41. Drawing No. 10-P301 Headworks Expansion Overall Process Sections
42. Drawing No. 10-P302 Headworks Expansion Process Sections and Details I
43. Drawing No. 10-P303 Headworks Expansion Process Sections and Details II
44. Drawing No. 10-P304 Headworks Expansion Process Sections and Details III
45. Drawing No. 10-P305 Headworks Expansion Process Sections and Details IV
46. Drawing No. 10-M101 Grit Pump Station HVAC
47. Drawing No. 10-M601 Grit Pump Station HVAC Schedule and Airflow Diagram
48. Drawing No. 10-E131 Headworks Expansion Power Plan – Overview
49. Drawing No. 10-E132 Headworks Expansion Power Plan – Enlarged 1
50. Drawing No. 10-E133 Headworks Expansion Power Plan – Enlarged 2
52. Drawing No. 10-E601 Headworks I&C Conduit Schedule
53. Drawing No. 10-E602 GTLP1 Panel Schedule
54. Drawing No. 10-E701 Headworks Expansion Control Schematics 1
55. Drawing No. 10-E702 Headworks Expansion Control Schematics 2
56. Drawing No. 10-E703 Headworks Expansion Control Schematics 3
57. Drawing No. 90-E504 New Grit MCC One-Line Diagram
58. Drawing No. 90-E505 New Headworks Power Panels One-Line Diagrams

END OF ADDENDUM NO. 2
ATTACHMENT “A”

CITY OF HUNTSVILLE WATER POLLUTION CONTROL
HUNTSVILLE, AL

WESTERN AREA WWTP PHASE 1 EXPANSION
COH No. 71-22-SFS01

Note: In the event of conflict between the following requirements and City of Huntsville documents, City of
Huntsville requirements shall prevail.

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:
CITY ENGINEER
320 Fountain Circle
Huntsville, Alabama 35801

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement
with Owner in the form included in the Bidding Documents to perform all Work as specified or
indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in
accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without
limitation those dealing with the disposition of Bid security. This Bid will remain subject to
acceptance for the period of time stated in the CITY OF HUNTSVILLE SUPPLEMENT TO
GENERAL REQUIREMENTS after the Bid opening, or for such longer period of time that Bidder
may agree to in writing upon request of Owner.

2.02 In submitting this Bid, Bidder acknowledges and accepts Contractor’s representations as more fully
set forth in the Agreement Form.

2.03 In submitting this Bid, Bidder certifies Bidder is qualified to do business in the State of Alabama as
required by laws, rules and regulations or, if allowed by statute, covenants to obtain such
qualification prior to contract award.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and
reference items identified in the Bidding Documents and acknowledges receipt of all Addenda.
Contractor shall acknowledge all addenda on Attachment “C”.

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and
adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site
conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect
cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions
at or adjacent to the Site and all drawings of physical conditions relating to existing surface or
subsurface structures at the Site that have been identified in the Supplementary Conditions,
especially with respect to Technical Data in such reports and drawings, and (2) reports and
drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site
that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder’s safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER’S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D, unless stated differently in CITY OF HUNTSVILLE documents:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
ARTICLE 5 – BASIS OF BID

5.01 Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor’s overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

5.02 Bidder will complete the Work in accordance with the Contract Documents for the following price(s). ALL ITEMS SHALL BE CONSIDERED IN-PLACE. PRICES SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND REMOVALS AS REQUIRED FOR CONSTRUCTION OF THE REQUIRED WORK:
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>BID QUANTITY</th>
<th>BID UNIT</th>
<th>BID UNIT PRICE</th>
<th>BID AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization and Demobilization: For all costs associated with project mobilization and demobilization, in accordance with the Drawings and Specifications (50% for mobilization, 50% for demobilization, not to exceed 5% of the total bid).</td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 05 – Site Civil</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 10 – Existing Headworks Expansion</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 20 – Process Train Splitter Box No. 1</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 30 – Oxidation Ditch No. 3</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 40 – Final Clarifier No. 5</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 50 – RAS WAS Pump Station No. 2</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>All Work as defined in the Contract Documents including installation of Owner furnished items indicated in the project documents, except those items listed separately below, to construct <strong>Facility 90 – Electrical</strong></td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITEM</td>
<td>DESCRIPTION</td>
<td>BID QUANTITY</td>
<td>BID UNIT</td>
<td>BID UNIT PRICE</td>
<td>BID AMOUNT</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>9</td>
<td>Removal and replacement of existing asphalt pavement, including sawing, milling, surface preparation, excavation, compaction, tack and prime coats, and all incidentals necessary to complete the work above the quantity required by the documents or to be replaced during completion of the Work. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,000</td>
<td>SY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Over excavation, handling, and disposal onsite of unsuitable soils determined to be unsuitable for structural support as identified by the geotechnical engineer and Owner. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,750</td>
<td>CY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Furnishing and placement of granular fill meeting the recommendations of the geotechnical report to replace unsuitable soil. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>12,750</td>
<td>CY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Huntsville Utilities Electrical Aid to Construction and Contingency Allowance for extra Work relating to miscellaneous structural, electrical, yard piping, or process mechanical items required during the completion of the project. This bid item is to be used solely at the discretion of the Owner and Engineer, on a change authorization basis.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$400,000</td>
</tr>
<tr>
<td>13</td>
<td>Pre-negotiated firm price for all reinforcing steel including manufacturer support services (cut, tagged, bundled, and development of placing plans) delivered to the project site. Installation of this material furnished under this bid item, coordination with material supplier, and all other items not specifically included in the scope of supply shall be provided by the Contractor in the corresponding facility-specific bid items above.</td>
<td>1,500</td>
<td>TONS</td>
<td>$1,550</td>
<td>$2,325,000</td>
</tr>
<tr>
<td>ITEM</td>
<td>DESCRIPTION</td>
<td>BID QUANTITY</td>
<td>BID UNIT</td>
<td>BID UNIT PRICE</td>
<td>BID AMOUNT</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>14</td>
<td>Pre-negotiated firm price for all materials and manufacturer support defined in Sections 46 21 26, 46 21 60, and 44 42 27.20 for the step screens, sluice way, and screenings washer compactor. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$1,135,837</td>
</tr>
<tr>
<td>15</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 23 23 for the vortex grit removal equipment. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$166,800</td>
</tr>
<tr>
<td>16</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Sections 44 44 20 and 44 42 56.60 for the grit classifier equipment and grit pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in these specification sections shall be provided by the Contractor and included in Bid Item No. 3.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$359,201</td>
</tr>
<tr>
<td>17</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 46 for the submersible mixers. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 4.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$32,115</td>
</tr>
<tr>
<td>18</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.39 for the submersible chopper pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 6.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$20,925</td>
</tr>
</tbody>
</table>
**UNIT BID SHEET**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>BID QUANTITY</th>
<th>BID UNIT</th>
<th>BID UNIT PRICE</th>
<th>BID AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Pre-negotiated Firm Price for all materials and manufacturer support defined in Section 44 42 56.29 for the wet-pit submersible pumps. Installation of equipment furnished under this bid item, coordination with equipment supplier, electrical work, and all other items not specifically included in this specification section shall be provided by the Contractor and included in Bid Item No. 7.</td>
<td>1</td>
<td>LS</td>
<td>N/A</td>
<td>$262,915</td>
</tr>
</tbody>
</table>

**TOTAL BASE BID =**
5.03 BID ALTERNATES
   A. None

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be complete within the timeframe stated in CITY OF HUNTSVILLE ATTACHMENT “B” – PROPOSAL.
6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:
   A. Required Bidder Qualifications Statement (Section 00 45 13) with supporting data.
   B. Required Bid security in the form of a certified or bank check, or a Bid Bond, issued by a surety meeting the requirements of the General Conditions.
   C. Bid Proposal (ATTACHMENT “B”)
   D. Addenda Acknowledgment Form (ATTACHMENT “C”)
   E. List of Proposed Subcontractors (ATTACHMENT “D”)
   F. List of Project References (ATTACHMENT “E”)
   G. Notice to Contractors (ATTACHMENT “F”)
   H. W9-Taxpayer Form (ATTACHMENT “H”)
   I. City of Huntsville Report of Ownership Form (ATTACHMENT “I”)
   J. Alabama Act 2016-312 Acknowledgement Form (ATTACHMENT “J”)
   K. Certification of Compliance with Alabama Act 2016-312 (ATTACHMENT “K”)

EJCDC® C-410, Bid Form for Construction Contracts. Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.
ARTICLE 8 – BID SUBMITTAL

BIDDER: [Indicate correct name of bidding entity]

By: 
[Signature] 
[Printed name] 
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: 
[Signature] 
[Printed name] 
Title: 
Submittal Date:  
Address for giving notices: 

__________________________________________________________________________

__________________________________________________________________________

Telephone Number:  
Fax Number:  
Contact Name and e-mail address:  

Bidder’s License No.:  
(Where applicable)
SECTION 40 72 23 - RADAR LEVEL METERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Radar-level measurement devices.
   2. Transmitters.

B. Related Requirements:
   1. Section 40 70 00 – Instrumentation for Process Systems

1.2 REFERENCE STANDARDS

A. International Electrotechnical Commission:
   2. IEC 61511 - Corrigendum 1 - Functional safety - Safety instrumented systems for the process industry sector.

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 COORDINATION

A. Refer to Specification 40 70 00 for requirements.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for system materials and component equipment, including connection requirements.

C. Shop Drawings:
   1. Indicate system materials and component equipment.
   2. Submit installation requirements and other details.

D. Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

E. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

H. Qualifications Statement:
   1. Submit qualifications for manufacturer.
1.5 CLOSEOUT SUBMITTALS
   A. Section 01 77 00 – Closeout Procedures: Requirements for Closeout Submittals
   B. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1.6 QUALITY ASSURANCE
   A. Test and calibrate meter to demonstrate that it meets specified accuracy requirements.
   B. Refer to Specification 40 70 00 for additional requirements.

1.7 QUALIFICATIONS
   A. Refer to Specification 40 70 00 for requirements.

1.8 DELIVERY, STORAGE, AND HANDLING
   A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
   B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
   C. Store materials according to manufacturer instructions.
   D. Protection:
      1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
      2. Provide additional protection according to manufacturer instructions.

1.9 WARRANTY
   A. Section 01 77 00 – Closeout Procedures: Requirements for warranties.
   B. Furnish five-year manufacturer's warranty for radar-level measurement devices.

PART 2 - PRODUCTS

2.1 RADAR-LEVEL MEASUREMENT DEVICES
   A. Manufacturers:
      1. Vega
      2. Siemens
      3. Endress & Hauser, Inc.
      4. Rosemount
      5. Approved Equal
   B. Description:
      1. Measuring Range: Up to 66 feet.
      2. Operating Temperature Range: Minus 40 to plus 176 degrees F.
      3. Operating Pressure: Up to 580 psig.
      4. Accuracy: Plus or minus 0.4 inch.
C. Communications Protocol: HART

D. Operation: Menu guided.

E. Transmitters:
   1. Selected by sensor manufacturer to match sensor.
   2. Visual Display: LCD
   3. Input Signals
      a. Two (2) channel input for applications where multiple sensors are shown connected to a single transmitter.
   4. Output Signals
      a. 4- to 20-mA DC for each measured level signal.
      b. Two (2) discrete output contacts for duplex pump control applications.
   5. Location: As indicated on Drawings.
   6. Control Power: 120-V ac, single phase, 60 Hz or 24VDC loop powered. Coordinate with drawings.
   7. Enclosure: NEMA 4X.
   8. Mounting: As shown on the drawings.
   9. Furnish cable, field preamplifiers, and signal conditioners as required to maintain accuracy from sensor to terminal device.

2.2 SOURCE QUALITY CONTROL

A. Section 01 45 00 – Quality Control: Requirements for testing, inspection, and analysis.

B. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 75 60 – Testing, Training, and Facility Start-Up: Requirements for installation examination.

B. Verify that items provided by other Sections of Work are ready to receive Work of this Section.

3.2 INSTALLATION

A. Coordinate location and orientation of level probe assemblies with final equipment installations.

B. Ensure that instruments are located to be easily accessible for maintenance.

3.3 FIELD QUALITY CONTROL

A. Section 01 75 60 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than 1 day on Site for installation, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.

C. Equipment Acceptance:
1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer’s representative.

D. Furnish installation certificate from equipment manufacturer’s representative attesting that equipment has been properly installed and is ready for startup and testing.

3.4 DEMONSTRATION

A. Section 01 79 00 – Demonstration and Training

B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner’s personnel.

3.5 ATTACHMENTS

A. Radar Level Meter Schedule:

<table>
<thead>
<tr>
<th>Instrument Tag</th>
<th>Application</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Transmitter: 10LIT101 Sensor(s): 10LE101, 10LE102</td>
<td>Screen Channel 1 Upstream and Downstream Levels</td>
<td>0-6 ft</td>
</tr>
<tr>
<td>*Transmitter: 10LIT201 Sensor(s): 10LE201, 10LE202</td>
<td>Screen Channel 2 Upstream and Downstream Levels</td>
<td>0-6 ft</td>
</tr>
<tr>
<td>*Transmitter: 10LIT301 Sensor(s): 10LE301, 10LE302</td>
<td>Screen Channel 3 Upstream and Downstream Levels</td>
<td>0-6 ft</td>
</tr>
<tr>
<td>*Transmitter: 10LIT401 Sensor(s): 10LE401, 10LE402</td>
<td>Screen Channel 4 Upstream and Downstream Levels</td>
<td>0-6 ft</td>
</tr>
<tr>
<td>Transmitter: 40LIT501 Sensor(s): 40LE501</td>
<td>Final Clarifier #5 Scum Pit</td>
<td>0-20 ft</td>
</tr>
<tr>
<td>Transmitter: 50LIT001 Sensor(s): 50LE001</td>
<td>RAS/WAS Wetwell #1 Level</td>
<td>0-25 ft</td>
</tr>
<tr>
<td>Transmitter: 50LIT002 Sensor(s): 50LE002</td>
<td>RAS/WAS Wetwell #2 Level</td>
<td>0-25 ft</td>
</tr>
</tbody>
</table>

*Provided as part of vendor scope of supply

END OF SECTION
SECTION 44 23 23 – VORTEX GRIT REMOVAL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to completely furnish and install the vortex grit removal equipment including all related equipment, material, and appurtenances as shown on the drawings and specified herein.

B. Related sections:
1. Section 01 33 00 – Submittal Procedures
2. Section 01 60 00 – Product Requirements
3. Section 01 78 23 – Operation and Maintenance Data
4. Section 01 79 00 – Demonstration and Training
5. Section 05 50 00 – Metal Fabrications
6. Section 09 90 00 – Painting and Protective Coatings
7. Division 26 – Electrical

1.2 COSTS OF PRE-NEGOTIATED ITEMS

A. Owner has entered into a pre-negotiated cost agreement with the specified manufacturer for some items in this section of the specification. Refer to Attachment “A” BID FORM for more details. The pre-negotiated cost agreement and proposal from the specified manufacturer is provided as an attachment to this specification section. The Contractor shall carefully review the pre-negotiated proposal and scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. In addition to the pre-negotiated costs indicated in Attachment “A” BID FORM, the Contractor shall include in the Lump Sum Bid Price the costs for the following:
1. All items not specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal but required by the Contract Documents and/or necessary to provide a complete and operational system.
2. All items specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal which are designated to be provided by others, provided by the customer, provided by the Owner, or any similar designation.
3. All labor, materials, and all other associated costs not included in the pre-negotiated proposal but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Equipment Numbers: 10MIX301

B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts, and manufacturer’s services.

C. Unit Responsibility: The Work requires that the vortex grit removal equipment, instruments, and components complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment. The supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor’s responsibilities under the Contract Documents. The Contractor is responsible to
the Owner for providing the equipment systems as specified herein and in the pre-negotiated agreement which is provided as an attachment to this specification section.

D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:

1. Shop Drawings:
   a. Make, model, weight, and horsepower of each component.
   b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
   c. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and details of anchorage and of connections to other work, and weights of associated equipment.
   d. Test reports demonstrating required performance at existing installations.
   e. External utility requirements (quantity and connection details) such as air, water, power, drain etc., for each component.
   f. Motor nameplate data, motor manufacturer, and any motor modifications.
   g. Wiring diagrams for motors, including terminals and numbers.
   h. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
   i. List of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
   j. Instrumentation and Control Submittals: In conformance with Division 26, ELECTRICAL.

2. Quality Control Submittals:
   a. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating systems.
   b. Special shipping, storage and protection, and handling instructions.
   c. Test procedures.
   d. Test results, reports, and certifications.
   e. Manufacturer's Certificate of Proper Installation.
   f. Operation and maintenance manual.
   g. In addition, Quality Control Submittals shall conform to the requirements of Section 01 60 00, PRODUCT REQUIREMENTS.


1.5 QUALITY CONTROL

A. The materials covered under these specifications are intended to be standard equipment of proven reliability and as manufactured by a reputable manufacturer having experience in the production of screening equipment. The equipment furnished shall be designed and constructed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the Contract Drawings and operated per the manufacturer's recommendations.

B. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.
C. Balancing: Rotating elements of equipment, except small, commercially packaged equipment, shall be statically and dynamically balanced at the factory prior to final assembly. The Contractor shall furnish certified copies of all test results.

1.6 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, format, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY

A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided and modified as required to conform to the performance, functions, features, and materials of construction as specified herein.

B. Materials, equipment, and accessories specified in this section shall be products of:
   1. Smith and Loveless

2.2 GENERAL REQUIREMENTS

A. Noise Level: When in operation, no piece of equipment shall exceed the OSHA noise level requirements for a 1 hour exposure, 105 dBA.

B. Service Factors: Service factors shall be applied in the selection and design of components where so indicated in individual sections. When not indicated there, minimum service factors shall be 1.25, except for gears and gear drives as specified herein.

C. Safety Devices: The completed work shall include all necessary permanent safety devices, such as machinery guards, emergency stops, and other federal, state, and local health and safety regulations.

D. Flanges and Pipe Threads: Comply with ANSI B 16.1, Class 125; or B 16.5, Class 150, unless otherwise indicated. Threaded flanges and fittings shall have standard taper pipe threads complying with ANSI/ASME B 1.20.1.

E. Bearings:
   1. Conform to the standards of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA).
   2. Except where otherwise indicated, bearings of process equipment shall have a minimum L-10 life expectancy of 100,000 hours.
F. Gears and Gear Drives:
   1. Except as otherwise indicated, gears shall be of the helical or spiral-bevel type, designed and manufactured in accordance with AGMA Standards, with a minimum service factor of 1.7, a minimum L-10 bearing life of 60,000 hours, and a minimum efficiency of 94 percent.
   2. Gear speed reducers or increasers shall be of the enclosed type, oil- or grease-lubricated and fully sealed, with a breather to allow air to escape but keep dust and dirt out. The casing shall be of cast iron or heavy-duty steel construction with lifting lugs and an inspection cover for each gear train. An oil level sight glass and an oil flow indicator shall be provided and installed for easy reading.
   3. Gears and gear drives as part of an equipment assembly shall be shipped fully assembled for field installation.
   4. Material selections shall comply with AGMA values and the manufacturer’s recommendations. Input and output shafts shall be properly designed for the service and load requirements. Gears shall be computer-matched for minimum tolerance variation. The output shall have two positive seals to prevent oil leakage.
   5. Oil level and drain location shall be readily accessible. Oil coolers or heat exchangers with all required appurtenances shall be included where indicated.
   6. Where gear drive input to output shafts connect to couplings or sprockets, the gear drive manufacturer shall supply matching key.

G. Anchor bolts shall be specified in Section 05 50 00, METAL FABRICATIONS. Number and size as recommended by manufacturer.

H. Stainless Steel: Stainless steel components shall be 304 stainless steel, or higher, as specified.

I. Nameplates: Equipment nameplates of stainless steel shall be engraved or stamped and fastened to the equipment in accessible locations with stainless steel screws or drive pins. Nameplates shall contain the manufacturer’s name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.3 SUPPLEMENTS

A. See supplements to this section for additional equipment product, component, or accessory information.

2.4 SERVICE CONDITIONS

A. The grit removal equipment will be used to remove grit from screened wastewater. Grit pumps will transfer grit from the bottom of the grit basin to the grit concentrator/classifier. The classifier will discharge grit into a chute/dumpster for disposal and return overflow to the main process flow.

B. Total Wastewater Flow per Unit:
   1. Design Average Daily Flow: 12 MGD
   2. Design Peak Flow: 30 MGD

C. All grit removal equipment, devices, and accessories shall be suitable for installation and operation outside, unprotected from exposure to the atmosphere. The equipment shall be designed for ambient temperatures ranging from −10°F to 120°F.

D. Grit Characteristics
   1. Type: Typical municipal wastewater grit characteristics and quantities for average daily flow and “first flush” conditions.
2.5 SYSTEM PERFORMANCE AND FUNCTIONAL REQUIREMENTS

A. The grit chamber shall be capable of treating 30 MGD of raw, screened wastewater.

B. The new Vortex Grit Removal System shall be comprised of the following components:
   1. One (1) Mechanical Vortex Grit Removal System

C. Grit Collection Mechanism
   1. Consisting of a vortex type, nonaerated, grit removal mechanism; complete with drive unit, mechanical gearhead, drive tube, and items necessary for complete grit removal assembly.
   2. Capable of removing grit from raw wastewater and suitable for installation in a concrete basin as shown on drawings.
   3. Mechanism shall have no moving parts below the water surface which require lubrication, or which will be subject to wear or blockage.
   4. Aerated grit chambers are not acceptable.
   5. Drives, bearings, and support equipment for grit mechanism shall be supported or readily accessible from a concrete walkway above the water surface as shown on drawings.

D. Grit Propeller Mechanism
   1. Designed to promote the removal of grit and assist in sweeping grit to the center chamber floor and into the lower grit hopper.
   2. Grit moving across the bottom of the grit chamber shall be hydraulically scoured as the propeller blades pass over the moving grit and cause hydraulic currents to maintain organics in suspension.

E. Equipment using air to supplement or induce a vortex shall not be accepted.

F. Performance Requirements
   1. Remove 95% of all grit particles with specific gravity of 2.65 or greater that are greater than or equal to 50 mesh at a hydraulic capacity of 30 MGD.
   2. Remove 85% of all grit particles with specific gravity of 2.65 or greater that are greater than or equal to 70 mesh at a hydraulic capacity of 30 MGD.
   3. Remove 65% of all grit particles with specific gravity of 2.65 or greater that are greater than or equal to 100 mesh at a hydraulic capacity of 30 MGD.
   4. Grit output is to be less than 5% organic solids at conditions equal to or less than a hydraulic peak flow of 30 MGD.
   5. No more than 18 inches of head loss.

2.6 EQUIPMENT AND/OR MATERIALS

A. General
   1. Welding: All welded joints which will be fully or partially submerged shall be sealed watertight by continuous welds.
   2. Edge Grinding: Sharp projects of cut or sheared edges of ferrous metals which will be submerged in operation shall be ground to a radius by multiple passes of a power grinder as required to ensure satisfactory paint adherence.
   3. Stainless Steel: All welds in stainless steel subassemblies shall be electrochemically cleaned or acid passivated after welding for corrosion resistance and to provide a superior finish. This shall be done by electrochemically removing heat tint and discoloration with a device designed for that purpose or by full dipping of weldments; or by using an acid passivation paste in the weld and heat affected areas and spray on acid solutions elsewhere. After passivation, the weldments shall be thoroughly rinsed with clean water and allowed to air dry. No heat tint or carbon steel contamination shall be evident after this process. If there is contamination evident, the contaminated areas will be cleaned by the above method and rechecked after rinsing and drying. Sandblasting, bead blasting, or grit
blasting of stainless steel surfaces shall not be allowed in lieu of the above procedures. The motor and reducer will be provided with the manufacturer’s standard finish.

4. Surface Preparation: All welds shall be thoroughly cleaned and ground smooth in preparation for painting. All ferrous metal surfaces, except motors, speed reducers, and stainless steel, shall be cleaned in accordance with paint manufacturer recommendations before shop primer is applied.

5. Bolts and Anchor Bolts: All assembly and anchor bolts, nuts, and washers shall be 316 stainless steel. An anti-seize thread compound shall be applied to all field installed nuts and bolts.

B. Grit chamber
1. All wetted components to be 316 stainless steel.
2. The flow in the chamber shall travel a full 360° rotation through the inlet and outlet clockwise, providing maximum travel for effective grit removal.

C. Grit Removal Mechanism
1. Axial flow pitch propeller driven by drive tube powered through a gear motor.
2. Bearing Life
   a. All bearings of drive unit: L-10 bearing life of 100,000 hours
   b. Turntable bearing supporting propeller assembly: L-10 bearing life of 20 years
3. Pinion and Bull Gear Service Factor: 5 or greater

D. Gear Box: Sealed and furnish air bell around bottom opening of drive tube to prevent water from entering gearbox.

E. Grit Fluidizer
1. The Grit Collection System shall be provided with means of fluidizing the grit prior to extracting the grit from the lower storage hopper. The system shall be equipped with Grit Fluidizer vanes. The Grit Fluidizer vanes shall be located within 6” of the elevation of the pump suction inlet. The Grit Fluidizer vanes shall be connected to the propeller drive tube in a helical fashion.
2. The Grit Fluidizer vanes shall be fabricated of the same material as the drive tube. The Grit Fluidizer vanes shall be bolted to the drive tube to facilitate easy removal of the drive tube.
3. The Grit Fluidizer system shall eliminate the need for additional water lines to the chamber.

F. Grit Storage Hopper
1. The grit hopper dimensions shall be as indicated on the Drawings. This is to allow for adequate volume for grit pile expansion if backwashing is performed plus allow adequate storage to prevent excessive numbers of grit removal cycles and grit handling equipment wear. As an integral part of the equipment installation, the Manufacturer shall supply a floor plate to cover the storage hopper if required. The plate shall consist of two (2) sections with lifting slots to allow access to the storage area. Attaching this plate as part of the rotating assembly will not be allowed.

2.7 ELECTRICAL COMPONENTS AND ACCESSORIES

A. General:
1. Conform with Division 26, ELECTRICAL.
2. Provide all necessary electrical components and wiring for a complete, functional system.
3. Where indicated, motor starters shall be provided in a separate motor control center specified in Division 26, ELECTRICAL. Provide all necessary control functions to properly interface with this motor starter.

B. Labeling: All electrical materials, devices, appliances, and equipment used shall be indicated as acceptable by established standards. Indication shall be by a valid label affixed to the item.
C. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.

D. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

E. Motors:
   1. Provide squirrel-cage ac induction motors meeting the requirements of Division 26, ELECTRICAL, and as specified herein.
   2. For additional specific requirements on motors, refer to the Motor Data Sheets at the end of the Section.

2.8 INSTRUMENTATION AND CONTROLS

A. All instrumentation and controls shall be provided in accordance with the requirements of Division 40.

2.9 TOOLS AND SPARE PARTS

A. Spare parts
   1. All equipment shall be furnished with the specified manufacturers spare parts, if required, as indicated in the individual equipment sections.
   2. Spare parts, if required, shall be tagged by project equipment number and identified as to part number, equipment manufacturer, and subassembly component (if appropriate). Spare parts subject to deterioration such as ferrous metal items and electrical components shall be properly protected by lubricants or desiccants and encapsulated in hermetically sealed plastic wrapping. Spare parts with individual weights less than 50 pounds and dimensions less than 2 feet wide, or 18 inches high, or 3 feet in length shall be stored in a wooden box with hinged wooden cover and locking clasp. Hinges shall be strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words “spare parts.” A neatly typed inventory of spare parts shall be taped to the underside of the cover.
   3. Supply the following spare parts, if required, at a minimum:
      a. Drive Pinion Gear
      b. Nylock Capscrew
      c. Motor Bearings

2.10 FABRICATION

A. Shop Assembly: The system shall be factory assembled and tested.

B. Shop/Factory Finishing: Shop prime coatings shall conform to the requirements of Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs, and features required by the manufacturer including safety interlocks.
3.2 ASSEMBLY AND PREPARATION FOR SHIPMENT

A. Each drive unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.

B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Pumps, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.4 FIELD QUALITY CONTROL

A. Functional Testing: Prior to startup, all equipment described herein shall be inspected for proper alignment, quite operation, proper connection, and satisfactory performance by means of a functional test. Provide certification of test results. Tests and certification shall be as specified in Section 01 79 00, DEMONSTRATION AND TRAINING.

3.5 INSTALLATION

A. As shown on the Drawings. All anchors, bolts, and accessories shall be 316 stainless steel. The manufacturer shall provide templates for anchor bolt locations.

B. Lubricants: Include oil and grease for initial operation.

3.6 START-UP, TRAINING AND MANUFACTURER'S SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereunder, travel time excluded:
   1. Installation, Startup, and Testing Services:
      a. 1 person-day for installation assistance, inspection, and Certificate of Proper Installation.
      b. 1 person-day for functional and performance testing.
      c. Provide Qualifications of Manufacturer’s Representative.
   2. Training Services:
      a. 1 person-day of prestart classroom or jobsite training of Owner’s personnel.
      b. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.
B. See Section 01 79 00, DEMONSTRATION & TRAINING of Division 01, GENERAL REQUIREMENTS.

3.7 MANUFACTURER'S CERTIFICATE(S)

A. Provide Manufacturer's certificate of installation and commissioning following functional testing and startup.

B. Provide Manufacturer's certificate(s) in accordance with Section 01 79 00, DEMONSTRATION & TRAINING, of Division 01, GENERAL REQUIREMENTS.

3.8 SUPPLEMENTS

A. The supplements listed below and following “END OF SECTION” are part of this Specification:
   1. 44 23 23.1 DS-Grit Chamber Drive Motor

END OF SECTION
Section 44 23 23.1: Grit Chamber Drive Motor Data Sheet

<table>
<thead>
<tr>
<th>PROJECT:</th>
<th>Western Area WWTP Phase 1 Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWNER:</td>
<td>City of Huntsville</td>
</tr>
<tr>
<td>EQUIPMENT NAME(S):</td>
<td>Grit Chamber No. 3</td>
</tr>
<tr>
<td>EQUIPMENT TAG NUMBER(S):</td>
<td>10MIX301</td>
</tr>
<tr>
<td>CONTROL PANEL(S):</td>
<td>See on Drawings</td>
</tr>
</tbody>
</table>

**MOTOR DATA**

- **Type:** Squirrel-cage induction meeting requirements of NEMA MG1.
- **Manufacturer:** For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.
- **Hazardous Location:** Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking.
- **Motor Horsepower:** 2 (Max)
- **Voltage:** 460
- **Phase:** 3
- **Frequency:** 60
- **Synchronous Speed:** 1760 rpm
- **Load Class:** Constant Torque
- **Service Factor:** 1.0 1.15

Additional Motor Requirements: See Section 26 05 15, ELECTRIC MOTORS

- **Enclosure Type:** TEFC
- **Material:** Cast Iron; A48 Class 35B
- **Mounting Type:** Vertical
- **Winding:** One
- **Thermal protection embedded in windings:** Yes
- **Additional Motor Requirements:** See Section 26 05 15, ELECTRIC MOTORS

Special Features / Notes:

- **Provide:** Space Heater
- **Oversize main terminal (conduit) box for motors**
- **Moisture Detection Switches**
Smith & Loveless, Inc., having an office at 14040 Santa Fe Trail Drive, Lenexa, Kansas 66215 (hereinafter referred to as “Seller”), hereby agrees to sell to the buyer designated below (hereinafter referred to as “Buyer”), the following equipment subject to all of the provisions set forth in this Sales Agreement. The Sales Representative is not an agent or employee of Seller and is not authorized to enter into any agreement on Seller’s behalf or bind Seller in any way.

Western Area WWTP Phase 1 Expansion

**Section 44 23 23 – Vortex Grit Removal Equipment**

ONE Smith & Loveless Model 30.0A PISTA® 360™ GRIT CHAMBER™ complete system consisting of the vortex grit removal mechanism as described below.

The PISTA® Grit Chamber system will include the following:

**ONE** Model 30.0A PISTA® 360™ GRIT CHAMBER™ suitable for installation in a concrete structure 18’-0” diameter x 9’-6” deep with a concentric 5’-0” diameter x 7’-0” deep grit well and concrete bridge – concrete structure by others. The mechanism shall include a helical gear reducer driven by 2.0 HP, 3 phase, 60 hertz, 460 V, explosion-proof, drive motor, spur gear final drive head, propeller, drive tube, PISTA® GRIT FLUIDIZER™ vane, removable grit well cover plates and accessories as described herein. All wetted parts shall be constructed of 316 stainless steel.

**CORROSION PROTECTION:**

All fabricated steel components, except for stainless steel, shall be commercial blasted and coated by the Manufacturer with one 6-mil DFT coat of VERSAPOX® epoxy prior to shipment. All motors and gearboxes shall be furnished with the original manufacturer’s coating.

Approximate weight of the PISTA 360® GRIT CHAMBER™ mechanism 3,000 lbs.

**THE TRAIN WILL BE SHIPPED IN MAJOR PIECES AS FOLLOWS:**

- Gear head/gear motor assembly
- Propeller drive tube
- Propeller mounting ring and blades – 2 pieces
- Grit well cover plate – 2 pieces
- GRIT FLUIDIZER™ vane

**WARRANTY:**

The equipment shall be covered in accordance with our standard Warranty Certificate and warrants our equipment to be free from defects in materials and workmanship for a period of 12 months from start-up but not to exceed 18 months from date of shipment. The cost of labor is not included.
NOT INCLUDED:

Grit pump
Grit Screw Conveyor and concentrator
Control Panel
Concrete or concrete work
Field assembly/erection or installation
Interconnecting piping, wiring and conduit
Field paint or painting
Lubricants
Anchorage or anchor bolts
Field testing if required
Performance Testing of grit chamber, concentrators and grit classifiers (previous testing from similar system will be provided)
Grouting
PLC Program Copy (if applicable)

Smith & Loveless, Inc. will provide one electronic copy of the O&M on CD in PDF format and four hard copies of the O&M. Additional copies can be provided for $50 per copy

PRICE, SUBMITTAL DATA & DELIVERY:

$_____________

F.O.B. factory plus any taxes, which may apply. Truck/Rail freight allowed to the job site, rail siding or nearest unloading area-unloading to be by Buyer. Due to the spike in gas prices, which is beyond the control of Smith & Loveless at the time of our quotation/bid, a fuel surcharge may need to be assessed at time of shipment.

We are currently experiencing large increases in the price of materials and components with very little advance notice. Therefore, the sales price of the equipment quoted herein is subject to an escalation in price. Escalation shall be based upon the increase incurred by Smith & Loveless for the material or components in excess of 5% from the time of quote. The escalation shall be calculated as the % of increase over 5% of the material/component item and shall include material handling factor and overhead. Such escalation shall be verified through quotes, invoices or receipts from suppliers to Smith & Loveless.

Pricing is firm for 30 days from bid date.

Two (2) days over one (1) trip for supervision of initial operation, start-up and training are included. If additional days are required, Seller will furnish a factory-trained supervisor for $950 per day including travel time plus actual travel expenses.

Seller to send Submittal Data for approval 6-8 weeks after receipt of complete details at Seller’s factory.

With continuing approval of the Smith & Loveless Credit Department, payments terms are 100% Net 30 days from date of shipment, or at time of start-up, whichever occurs first.

Manufacturing completion is estimated 20-22 weeks after receipt in Seller’s office of approved Submittal Data and/or after all notations or comments have been clarified, approved and inserted into the manufacturing documents by the Seller. Variations in the time Submittal Data is returned to Seller and/or Submittal Data marked approved, but which contain contingencies or variations may impact the completion time of the equipment.
**ADDITIONAL TERMS AND CONDITIONS**

1. **GENERAL** A. Buyer’s execution of this Agreement constitutes Buyer’s offer to purchase, on the terms and conditions set forth herein, the equipment described in this agreement, and such offer is irrevocable for thirty (30) days after Buyer executes and delivers to Seller this Agreement together with all necessary engineering data and information. Prices are firm for thirty (30) days after the bid date provided a firm order is received at the factory within that time period and provided approved Submittal Data is received at the factory within forty-five (45) days from the date submittals are forwarded from the factory. In the event firm orders and Submittal Data are not received by Seller within the times set forth above, then price and delivery estimates may change due to changes in the costs of material and labor and/or factory capacity at the time when the firm orders or approved Submittal Data is received by Seller. Seller reserves the right to amend this Sales Agreement if not signed and returned within thirty (30) days from the quotation date. In the event we are unable to ship within estimated period for reasons beyond our control, including a request by the Buyer to defer shipment, the prices are subject to adjustment to those prevailing at the time of shipment.

B. **THIS AGREEMENT IS NOT BINDING ON SELLER UNLESS SIGNED ON SELLER’S BEHALF BY AN OFFICER OR MANAGER OF SELLER.**

C. This Agreement constitutes the entire contract between the parties with respect to said equipment (any prior agreement, representation, covenant or warranty, written or oral, being superseded hereby) and may not be amended or modified except by a written instrument duly executed by both parties, the provisions of any purchase order or other document submitted by or on behalf of Buyer to the contrary notwithstanding.

D. All notices hereunder are to be in writing and mailed postage prepaid to the party being notified at the address indicated in this agreement or at such other address as may be designated in writing.

E. Remedies provided for herein are cumulative and are in addition to all other remedies as may be available at law or in equity.

F. This Agreement is governed by and subject to the laws of the State of Kansas and the Buyer by executing this agreement agrees to submit to the Jurisdiction of the State of Kansas and the venue for any disputes between the parties will be in the District Court of Johnson County, Kansas, or the Federal District Court of Kansas.

2. **NOTICE TO PROCEED**- Return to Seller of approved Submittal Data or notification to Seller that the submission of submittals will be waived, constitutes notice to Seller to proceed with manufacture. In the event Seller does not receive approved Submittal Data within forty-five (45) days after Seller’s submission of submittal data for approval, then Seller reserves the right to amend price and delivery of the equipment being sold. Final approved Submittal Data means approval by Buyer (or Buyer’s representative) of Seller’s Submittal Data and/or after all notations or comments have been clarified, approved and inserted into Seller’s manufacturing documents at which point Sellers estimated completion schedule commences. Variations in the time Submittal Data is returned to Seller and/or Submittal Data marked approved but which contain contingencies or variations may impact the completion time of the equipment. Seller agrees to furnish only the equipment included in Seller’s quotation and/or as described and modified in the Submittal Data. Approval of the Submittal Data constitutes acceptance of the equipment in the configuration described therein. If Seller is directed to change the scope of the equipment after notice to proceed to manufacture, then Seller reserves the right to amend the price and delivery of the equipment.

3. **EXCUSED PERFORMANCE**- Seller is not liable for any failure or delay in performance hereof, with respect to delivery or otherwise, if such failure or delay is due to any cause beyond Seller's control including, but not limited to, any Act of God, war, civil disturbance, riot, labor difficulty, factory capacity, fire, other casualty, accident or supplier's failure or inability to perform.

4. **CREDIT APPROVAL**- The credit terms specified herein are subject to Seller’s continuing approval of Buyer’s credit and if, in Seller’s sole judgment, Buyer’s credit or financial standing is impaired as to cause Seller to deem itself insecure, Seller may withdraw the extension of credit and require other payment terms.

5. **PAYMENT**- Subject only to any credit terms, which Seller may extend, the total purchase price hereunder is due at such time, within or after the estimated shipment period specified herein, as said equipment is ready to be shipped. Buyer shall pay in full all invoices within the time for payment specified therein and Buyer’s payment obligation is in no way dependent or contingent upon Buyer’s receipt of payment from any other party. Any balance owed by Buyer for thirty (30) days or more after the same becomes due is subject to a 2% per month delinquency charge until paid. In addition to all other amounts due hereunder, Buyer shall reimburse Seller in full for all damages, costs and expenses, including reasonable attorneys’ fees, which Seller may incur with respect to Buyer’s breach of this Sales Agreement or the collection of past due amounts from Buyer. If Buyer is in default under this or any other agreement with Seller, Seller may, at its option, defer performance hereunder until such default is cured.

6. **SECURITY INTEREST**- Until all amounts due hereunder have been paid in full, Seller has a security interest in said equipment and has all rights of a secured party under the Uniform Commercial Code including, without limitation, the right to take possession of said equipment without legal process and the right to require Buyer to assemble said equipment and make it available to Seller at a place reasonably convenient to both parties. At Seller’s request, Buyer shall execute any financing statement or statements submitted by Seller in order that Seller’s security interest in said equipment may be perfected.

7. **WARRANTY & LIABILITY**- Seller warrants only that said equipment is free from defects in materials and workmanship as set forth in Seller's standard Certificate of Warranty furnished to Buyer at the time of final shipment. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR DESIGN AND WHICH ARE EXPRESSLY DISCLAIMED BY SELLER. Seller’s sole responsibility with respect to any equipment which proves to be defective as to materials or workmanship is either to replace or to repair the same as is set forth in said Certificate of Warranty. Unless authorized in writing by Seller, Seller is not responsible for any charge or expense incurred for the modification, servicing or adjusting of said equipment after the same has been delivered to Buyer. Seller is not liable in association with its warranty or in any other capacity for any consequential, incidental or liquidated damages, late fees/damages or penalties.

8. **CLAIM PERIOD**- Buyer shall immediately inspect said equipment upon receipt thereof and immediately notify the carrier of any damage, shortage or other nonconformance. Seller is not obligated to consider any claim for damages, shortages or non-conformance unless notified by Buyer within ten (10) days after Buyer’s receipt of said equipment.

9. **CANCELLATION**- Should Buyer cancel this agreement without Seller's prior written consent, Seller may, at its option, recover from Buyer a cancellation charge of not less than 20% of the purchase price hereunder. This cancellation charge is intended to compensate Seller for difficult-to-calculate economic losses, including but not limited to, material and labor costs, as well as loss of anticipated profits suffered due to cancellation.
10. **SEVERABILITY** – If any provision or provisions of this Agreement shall be held to be invalid, illegal, unenforceable or in conflict with the law of any jurisdiction, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

11. **STORAGE**- If at such time, within or after the estimated shipment period specified herein, as Seller notifies Buyer that said equipment is ready to be shipped Buyer requests a delay in shipment, Seller may, at its option, agree to store said equipment for a period of time determined by Seller, provided that such agreement will not affect Buyer's obligation to pay in full all invoices as they become due, and provided further that for each month, or portion thereof, said equipment is so stored by Seller, Buyer shall pay to Seller as a storage fee an amount equal to 2% of the purchase price.

12. **DRAWINGS, ILLUSTRATIONS AND MANUALS**- Catalog and proposal drawings, bulletins, and other accompanying literature are solely for purpose of general style, arrangement and approximate dimensions. Seller may make any changes Seller deems necessary or desirable. Submittal for approval, if required, will be made after receipt of complete information from Buyer. Unless otherwise specified at the time of quotation, six sets will be furnished. Additional sets are at $25.00 per set. Installation, maintenance and operation manuals will be furnished in the number of copies specified at the time of quotation. If none specified, four will be provided at no added cost, with additional copies at $50.00 each.

13. **PERMITS, LICENSES**- Buyer at its sole cost and expense shall obtain all building or other permits or licenses with respect to the installation and operation of said equipment required by any federal, state or local governmental body.

14. **PATENT INDEMNIFICATION**- Seller shall, at its own expense, defend any suit instituted against Buyer, based on any claim that equipment furnished hereunder infringes any Letters Patent of the United States, and Seller shall pay any damages assessed against Buyer in any such suit, provided that Buyer, upon service of process upon Buyer, gives to Seller notice in writing of the institution of such suit, and permits Seller, through counsel chosen by Seller, to defend the same, and gives Seller all information in Buyer's possession and reasonable assistance and authority to enable Seller so to do. Seller shall have no liability or obligation to Buyer for patent infringement resulting from compliance by Seller with written instructions or specifications of Buyer concerning the structure, operation, material, or method of making equipment furnished hereunder.

---

Agreed to this ______ day of ______________________, ________

By __________________________

Print Name

By __________________________

Authorized Signature

Physical Address

Email Address

Agreed to this ______ day of ______________________, ________

at Lenexa, KS.

By __________________________

Authorized Signature

SMITH & LOVELESS, INC

Prepared by __________________________

Sales Representative

**NOTE:** The Sales Representative is not an agent or employee of Seller and is not authorized to enter into any agreement on Seller's behalf or to bind Seller in any way.

If **YES**, attach Sales Tax Exemption Certificate. Failure to provide tax exempt certificate prior to shipment will result in Buyer being responsible for all applicable taxes.
SECTION 44 42 23 – SUCTION PIPE TYPE CLARIFIER MECHANISM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to completely furnish and install the suction pipe type clarifier mechanism including all related equipment, material, and appurtenances as shown on the drawings and specified herein.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 01 60 00 – Product Requirements.
   3. Section 01 78 23 – Operation and Maintenance Data.
   4. Section 01 79 00 – Demonstration and Training.
   5. Division 05 – Metals.
   6. Division 26 – Electrical.

1.2 OWNER FURNISHED MATERIALS

A. Owner has pre-purchased portions of the clarifier system to be provided to the Contractor for installation. The detailed scope of supply for Owner furnished items is provided in the designated volume of the project documents. The Contractor shall carefully review the scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. Costs for installation of Owner furnished materials shall be included in the relevant Lump Sum Bid Price items of the bid form and shall include costs for the following:
   1. All items not specifically itemized in the Owner’s scope of supply but required by the Contract Documents and/or necessary to provide a complete and operational system.
   2. All items specifically itemized in the Owner’s scope of supply which are designated to be provided by others, provided by the customer, or any similar designation.
   3. All labor, materials, and all other associated costs not included in the Scope of Supply but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Equipment Numbers: See Supplemental Data Sheet(s) at end of section.

B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts and manufacturer’s services.

C. Unit Responsibility: The Work requires that the clarifier mechanisms, walkways, scum beaches, weirs, baffles, and components, complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment, which supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.
D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 REFERENCES

A. The following is a list of standards which may be referenced in this Section:


E. American National Standards Institute/American Gear Manufacturers Association (ANSI/AGMA):
   7. 6001-D97, Design and Selection of Components for Enclosed Gear Drives.
   10. 6034-B92, Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors.
   11. 9005-D94, Industrial Gear Lubrication.


G. American Welding Society (AWS):
   3. QC 1, Standard for AWS Certification of Welding Inspectors.

H. ASTM International (ASTM):
14. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

I. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   1. NEMA MG-1.

1.5 DEFINITIONS

A. Alarm Torque: 90 percent of design running torque.
B. Cutout Torque: 120 percent of design running torque.
C. Design Running Torque:
   1. Torque used to select size, strength, and type of materials and components for mechanism and drive system.
   2. At which or below will provide continuous 24 hour per day mechanism operation for period of not less than 20 years at design torque condition and rotational speed without damage, permanent deformation or overload.
   3. Equal to 50 percent on overload device scale.
D. Slenderness Ratio: Ratio of unbraced length to least radius of gyration.
E. Submerged Metal: Metal below gear head drive and a plane 18 inches above weir elevation indicated.
F. Ultimate Torque: 200 percent of design running torque and below which no portion of mechanism will be damaged if operated for only a short period of time (a few seconds) and equal to 100 percent on overload device scale.
G. Certified Welding Inspector (CWI): As defined in AWS QC 1.

1.6 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control and contract close-out submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.
B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
   1. Shop Drawings:
   2. Equipment Assembly: Make, model, weight, and horsepower of each.
   3. Manufacturer’s Catalog: Product information, descriptive literature, dimensional layouts, specifications, standard and specialized equipment assembly cuts, and identification of materials of construction.
   4. Detailed Drawings:
1). Structural, Mechanical, and Electrical: Show equipment fabrications and interface with other items including dimensions, size, and locations of connections to other work, and weights of associated equipment.

2). Structural and Mechanical: Details of walkway bridge, rotating rake arm trusswork.

5. Design Details:
   1). Running, Alarm, Cutout, and Ultimate Torque ratings of drive unit assembly.
   2). Ultimate Torque load capabilities of drive unit assembly, torque cage, rotating rake arm trusswork.

6. Hydraulic calculations and performance verification data.

7. Certification of Structural Calculations: Letter of certification for structural design of mechanism shall be signed and sealed by a registered professional engineer (Designer) in the state where the Project is located. Copies of detailed structural design calculations shall not be submitted for review. If submitted, calculations will be returned without review.

8. Structural Loads: Static, dynamic, and torque reaction loads to be transferred into structure at center column and access bridge support locations.

9. Details of torque sensing and load indication device.

10. Identification of outside utility requirements for each component such as air, water, and power.

11. Power and control wiring diagrams, including terminals and numbers.

12. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.

13. Painting/Coating System(s): Include manufacturer’s descriptive technical catalogue literature and specifications.

14. Diameter of ball race.

15. Motor nameplate data per NEMA MG-1, motor manufacturer and any appurtenances.


17. Quality Control Submittals:
   1). Designer qualifications:
      1). Designer: Professional engineer registered in the state of the Project.
      2). Must show 10 years of experience with clarifier mechanism design.
   19. Manufacturer’s Certificate of Compliance, in accordance with Division 01, GENERAL REQUIREMENTS.

20. Special shipping, storage and protection, and handling instructions.

21. Test procedures.

22. Test results, reports, and certifications.

23. Operation and Maintenance Data: As specified in Division 01, GENERAL REQUIREMENTS.

24. Manufacturer’s Certificate of Proper Installation.


1.7 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, form, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.8 WARRANTY

A. The warranty shall be for a minimum period of 12 month from start-up. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as
specified, the Manufacturer shall promptly repair or replace the defective equipment without additional cost to the Owner.

B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a manufacturer’s standard equipment name and/or model number is listed, the equipment system shall be provided as modified to conform to the performance, functions, features, and materials of construction as specified herein.

B. Materials, equipment, and accessories specified in this Section shall be products of:
   1. Ovivo – C3S Suction Tube Clarifier

2.2 SUPPLEMENTS

A. See supplemental data sheets to this Section for additional equipment system product, component, and accessory information and requirements.

2.3 SERVICE CONDITIONS

A. All of the equipment specified herein is intended to be standard equipment for use with mixed liquor suspended solids from the activated sludge process.

B. Provide each mechanism for installation in a circular concrete tank having the dimensions as shown in the drawings and specified herein. Each mechanism shall be designed to:
   1. Disperse the influent waste liquid into the tank and control short circuiting.
   2. Collect and remove settled solids from the clear liquid.
   3. Remove clear liquid equally from the clarifier.
   4. Transport and thicken settled sludge.
   5. Prevent dilution of the sludge at the sludge withdrawal points.
   6. Collect floating scum from the liquid surface and discharge to scum handling system.

2.4 SYSTEM PERFORMANCE AND FUNCTIONAL REQUIREMENTS

A. Furnish units meeting performance and design requirements as specified and as shown on the Drawings.

B. Design Requirements:
   1. Design Running Torque: Drive unit shall be sized such that worm gear (if used), spur gear, and pinion all meet Design Running Torque in accordance with AGMA 2001 and 6034. Design Running Torque shall be selected by Manufacturer for service conditions specified.
   2. Rotational Speed: Constant speed between 0.03 rpm and 0.04 rpm.
   3. Capable of withstanding, without failure or permanent deformation of any part, torque load of at least twice Design Running Torque and loads generated while sweeping in clarifier floor bottom grout.
   5. Drive Mechanism: Design to allow removal of internal gears, balls, and strip liners without walkway bridge removal.
   6. Base design upon all-welded construction except at locations requiring periodic field adjustment and as specifically approved.
   7. At Ultimate Torque load, stresses in members shall not exceed 90 percent of material yield strength.
8. Slenderness Ratio: Maximum of 200 for any compression member and maximum of 300 for any tension member.

2.5 CENTER DRIVE UNIT 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 85 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.

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 F insulation designed for an ambient temperature of 40 degree 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 18 gauge steel guard. Sprockets and chain shall be designed for the connected horsepower of the drive with a minimum service factor of 1.4. 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 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 gear shall have a minimum pitch diameter of 40 inches with a 6.0 inch face width or the equivalent 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 neoprene dust seals. In order to ensure the maximum possible base rigidity the gear housing shall be of full sidewall construction, integral with the base. Fabricated steel housing drives are not acceptable. 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.

L. The drive unit shall be equipped with an electro-mechanical overload control device actuated by thrust from the worm shaft. The pointer 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 as specified in section 1.03. 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; 100% of scale.

M. All drive control components shall be mounted in a NEMA 4X enclosure of either epoxy coated aluminum construction or stainless steel with a gasket sealed removable cover. The pointer shall be covered with a plexi-glass 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 this section. 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-C95 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 wormgear reducers.

Q. The continuous torque rating for the drive unit shall be the lowest value determined for the gearing.

2.6 STATIONARY CENTER INFLUENT 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 anchor bolts as shown on the plans. A minimum ¾” flange shall be provided at the top of the column for supporting and securing the center drive assembly.

B. Two (2) sets of ports shall be included at the upper end. One set of upper ports shall convey the return sludge from the overflow valves to the central discharge pipe. The other set of ports shall diffuse the flow entering the tank and insure low velocity into influent well. Influent velocity shall be reduced by providing a minimum total column port area of at least 135% of the column cross sectional area. Upper and lower ports shall be separated by a neoprene seal with steel backing ring.

C. Inside the support column there shall be a sludge discharge pipe minimum diameter as specified in supplemental data sheet by 1/4” wall thickness. It shall extend from the bottom of the sludge collection drum to one foot above the tank bottom of the stationary influent column and shall connect to the sludge discharge pipe cast in the concrete by the contractor. A backing ring and clamp shall be provided to seal the two pipes together. The contractor shall provide a suitable packing or nylon rope to seal the discharge (RAS) pipes at the energy dissipating inlet.

2.7 ENERGY DISSIPATING INLET

A. An inner energy dispersion well shall be located within the larger rotating feedwell. See Supplemental data sheet for minimum EDI dimensions. Eight (8) tangential inlet gates shall be provided with a means of adjustment. The dispersion well shall be fabricated out of 3/16-inch plate and shall be provided with a steel bottom plate to within one inch of the center column.

2.8 FEEDWELL

A. The feedwell shall be supported by structural members attached to the rotating center cage. The feedwell shall be fabricated from 3/16 inch steel plate with upper and lower reinforcing rim angles and stiffeners as required. A minimum of eight (8) scum ports, 4 inches high x 16 inches long, shall be provided equally spaced around the feedwell periphery to allow scum to exit from the feedwell at water level. Scum ports shall be free to allow scum to escape with an adjustable, angled baffle plate to impart a tangential direction of the flow exiting the scum port. See Supplemental data sheet for minimum feed well dimensions. The feedwell design shall include 6-inches freeboard.

2.9 ACCESS WALKWAY

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. As 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 truss supports, sufficiently braced to resist the specified design loads. The walkway decking shall be 1-1/4 inch aluminum I-Bar grating.
B. A center drive operations platform shall be provided. It shall be a minimum of 9 feet square or 3-feet clear around drive unit, whichever is greater, to provide clearance around the center assembly and drive control for maintenance and service. The drive platform shall be decked with 3/8 inch aluminum checkered floor plate and have sufficient structural steel supports to meet the specified design load conditions.

C. Provide handrails with toe plate around the center drive platform. The handrailings shall be 1-1/2 inch diameter aluminum pipe, 2-rail design, with fittings factory assembled to posts. Rails are to be shipped to the job site in stock lengths for cutting and fitting. The toe plate shall be a 4 inch x 1/4 inch plate or a 4" tall aluminum extruded channel. The walkway truss supports may be used in place of handrailings along the walkway if it meets OSHA standards for this application.

2.10 CENTER CAGE AND RAKE ARMS

A. The center cage shall be of steel box truss construction. It shall be provided with connections for the two (2) sludge removal arms 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 two (2) sludge removal arms shall be of steel truss construction, with 1/4" steel raking blades and adjustable 20 gauge, 304 stainless steel squeegees. The rake blades shall be properly spaced to insure complete raking of the basin floor twice per revolution. At the sludge withdrawal pipe locations an additional blade shall be provided opposite the raking blade to direct sludge to the pipe in a "V" shape.

C. The cage and rake arms shall be designed such that calculated stresses do not exceed the AISC allowable stress at the 200% of the drive rated AGMA continuous torque.

D. Each rake arm shall be provided with withdrawal pipes of PVC ASTM 3034 piping. Change of direction shall be through long radius elbows. The PVC pipes shall be arranged for easy assembly with minimum trimming. The maximum total sludge return flow specified shall be based on utilization of withdrawal pipes of the diameter specified in Supplemental data sheet. The withdrawal pipes shall be attached to the rake arms at their lower end by means of 304 stainless steel clamps and shall pass along the arms and vertically upward to the rotating sludge discharge well.

2.11 ROTATING SLUDGE COLLECTION BOX:

A. Inside the feedwell, and supported from the rotating cage, shall be provided a sludge collection box. It shall contain a sludge control valve for each sludge draw off pipe. A neoprene seal shall be provided between the rotating sludge collection box and center column. An adjusting handle for each mechanism shall be provided with sufficient chain and be attached to the platform handrail. Each valve shall control the sludge by a rotating action, increasing or decreasing the valve opening.

2.12 SCUM COLLECTION

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 plans. The surface of the clarifier shall be swept once per revolution.

B. The skimmer blade shall be tangential to the rotating feedwell and be supported by vertical supports from the rake arm. The skimmer assembly shall be a pivoting aluminum skimmer device.
equipped with manual out-of-service lockout. The skimmer shall have replaceable neoprene rubber wipers on all three sides to form a pocket to trap the scum and discharge the scum into the scum box.

C. The scum box shall be 10 feet wide, shall be supported from the tank wall and connected to a six (6) inch scum line, all as shown on the contract drawings.

D. The clarifier equipment manufacturer shall furnish a flush valve assembly for automatic flushing of the scum trough and scum pipe. The flush valve assembly shall be adjustable to allow 0 to 20 gallons of clarified effluent to enter the scum trough as the skimmer assembly passes over the scum trough. The assembly shall consist of a stainless-steel lever, UHMW seal plate and neoprene diaphragm mounted to the scum box. The diaphragm shall be opened and closed by an easily adjustable, submerged actuation arm mounted to the rotating skimmer blade. The flush volume adjustment mechanism shall be above the water level and shall include at least three settings.

2.13 WEIRS AND BAFFLES
A. Minimum ¼ inch thick aluminum v-notch weirs. 3-inch notch at 6-inches on center. 9 in overall plate height.
B. Aluminum scum baffles shall be provided to prevent scum from flowing over the weirs and entering the effluent trough.

2.14 PAINTING AND SURFACE PREPARATION
A. Submerged fabricated steel will receive surface preparation of SSPC-SP-10 and will be prime coated with one (1) coat of Tnemec Series 66HS to 4-6 mils.
B. Non-submerged fabricated steel will receive surface preparation of SSPC-SP-10 and will be prime coated with one (1) coat of Tnemec Series 66HS to 4-6 mils.
C. The drive unit will receive a surface preparation of SSPC-SP-06 and will be finish coated by manufacturer with two (2) coats of Tnemec 66HS and one (1) coat of Tnemec Endura-shield series 73. Gear motors shall be furnished with manufacturer's standard enamel.
D. Gear motors shall be furnished with manufacturer's standard enamel.

2.15 ELECTRICAL COMPONENTS AND ACCESSORIES
A. General:
1. Conform to Division 26, ELECTRICAL.
2. Provide all necessary electrical components and wiring for a complete, functional system.
3. Motor starter for the clarifier is provided in a separate motor control center specified in Division 26, ELECTRICAL. Provide all necessary control functions to properly interface with this motor starter, including clarifier torque switches, motor space heater, and motor thermal protection switch.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.
C. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

2.16 INSTRUMENTATION AND CONTROLS

A. All instrumentation and control components shall be provided in accordance with the requirements of Division 40.

B. General: The Drawings and these Specifications depict the minimum functional requirements of the control system to be provided. Provide all items not specifically called out which are required to implement the functions described herein. The supplier shall provide all instrumentation and controls necessary to provide a safe and operable system. The specific control system proposed shall be subject to the approval of the Engineer.

C. Instrumentation: Provide and install an electromechanical torque sensing-device that is actuated by thrust from the worm gear. The device shall provide indication of torque sensed and shall provide two independently adjustable SPDT torque alarm contacts (HIGH and HIGH-HIGH). The device shall be mounted in a NEMA 4X enclosure with an integral conduit box and terminals. Contacts shall be rated for a minimum of 5A at 120V ac.

2.17 DISSIMILAR METALS

A. Isolate dissimilar metals or connectors to prevent direct contact and electrical conductivity. Use 1/8-inch thick continuous neoprene gasket to insulate aluminum gratings, checker plate and handrail post bases from access walkway support bridge and other components.

2.18 ACCESSORIES

A. Lifting Lugs: Provide on equipment assemblies and components weighing over 100 pounds.

B. Anchor Bolts: Provide coated Type 316, stainless steel bolts, sized by equipment manufacturer and at least 1/2 inch in diameter.

C. Equipment Identification Plates: Provide 16-gauge, Type 316 stainless steel, identification plate securely mounted on each separate equipment component and panel in a readily visible location. Plate shall bear 1/4-inch high engraved block type black enamel filled equipment identification number and letters.

2.19 TOOLS AND SPARE PARTS

A. Tools: The work includes furnishing one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:
   1. None

2.20 FABRICATION

A. General: Fabricate bridge beam or stringer sections in continuous unbroken pieces.

B. Shop Assembly:
1. Shop fabricate and assemble mechanism components in the largest sections practicable and permitted by transportation carrier regulations.
2. Properly match-mark units for ease of field erection.
3. Completely assemble center drive unit in manufacturer’s shop and test to assure proper operation, and calibration of torque controls.
4. Completely shop assemble and test control panels.
5. Divide large assemblies into flanged sections. Bolt together with Type 316 stainless steel fasteners and provide continuous field seal welds at all connections.

C. Finishes:
1. Exposed metal surfaces of motors, gear reducers, and assemblies shall be factory prepared and primed and field finish coated in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 3.
2. Submerged surfaces shall be factory prepared, primed, and field finished in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 2.
3. Seal welding shall be provided for submerged welded joints. Skip welds are not acceptable.

PART 3 - EXECUTION

3.1 ASSEMBLY AND PREPARATION FOR SHIPMENT

A. Each drive unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.

B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Mechanisms, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.3 INSTALLATION

A. Installation shall be by the Contractor with coordination from Manufacturer.

B. Anchor Bolts: Provide templates and specify bolts for furnishing by Contractor.

C. Manufacturer shall coordinate with Contractor during all phases of installation to ensure that manufacturer’s representative is present during critical installation operations.
3.4 FIELD QUALITY CONTROL

A. Prior to placement of clarifiers into service, check weir plate settings by filling clarifiers with water to design elevation shown on the Drawings. Readjust as recommended by Engineer.

B. Weirs: Level to within plus or minus 1/16 inch of design elevation.

C. Functional Tests: Conduct on each mechanism. Test for continuous 3-hour period without malfunction, as witnessed by and approved by Owner or Engineer.

D. Performance Test:
   1. Conduct on each completed assembly in accordance with accepted test procedures.
   2. Perform under actual or approved simulated operating conditions.
   3. Perform to confirm mechanical and structural compliance with specified torque requirements.
   4. Load each mechanism to 120 percent of Design Running Torque to demonstrate mechanism’s structural capability to withstand resulting loads with one of the following methods:
      5. Apply loads to mechanism’s rake arms through cables or other means anchored to basin floor or wall. Utilize hydraulic cylinder, springs, or other means that allows machine to rotate for peripheral distance of at least 3 feet under load.
      6. Conduct static torque test on mechanism. Anchor both collector arms, start collector drive, and load drive to 120 percent of Design Running Torque to demonstrate mechanism’s structural capability to withstand resulting loads.

E. Demonstrate mechanism overload devices; verify actual torques at which Alarm and Cutout (shutdown) contacts are actuated.
   1. Correlate with scale indications.
   2. Prepare test report containing results.

3.5 MANUFACTURERS’ SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereunder for each unit provided, travel time excluded:
   1. Installation, Startup, and Testing Services:
   2. 1 person-day for installation assistance, inspection, and Certificate of Proper Installation.
   3. 1 person-day for functional and performance testing.
   4. Provide Qualifications of Manufacturer’s Representative.
   5. Training Services:
   6. 1 person-day of prestart classroom or jobsite training of Owner’s personnel.
   7. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 79 00, DEMONSTRATION & TRAINING of Division 01, GENERAL REQUIREMENTS.

3.6 MANUFACTURER’S CERTIFICATES

A. Provide Manufacturer’s certificate(s) in accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.
3.7 SUPPLEMENTS

A. The supplements listed below and following "END OF SECTION" are part of this Specification.
1. Section 44 42 23.1 – Final Clarifier Mechanism Data Sheet.

END OF SECTION
**Section 44 23.1 – FINAL CLARIFIER MECHANISM DATA SHEET**

**PROJECT:** Western Area WWTP Phase 1 Expansion  
**OWNER:** City of Huntsville  
**EQUIPMENT NAME(S):** Final Clarifier No. 5  
**EQUIPMENT TAG NUMBER(S):** 40SC501  
**LOCAL CONTROL PANEL(S):** 40LCP501

### MANUFACTURERS

Ovivo, LLC

#### SERVICE CONDITIONS

<table>
<thead>
<tr>
<th>Liquid Handled:</th>
<th>Mixed Liquor Suspended Solids</th>
<th>The clarifier shall perform as specified at the following flow rates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influent MLSS</td>
<td>2,000 – 5,000 mg/L</td>
<td>Influent Flow Rate: 1 – 17.5 MGD</td>
</tr>
<tr>
<td>Liquid Temperature</td>
<td>50 – 85°F</td>
<td>Under Flow Rate: 0.5 – 5 MGD</td>
</tr>
<tr>
<td>Liquid pH</td>
<td>5.5 – 9.0</td>
<td>Under Flow Solids: 3,000 – 10,000 mg/L</td>
</tr>
<tr>
<td>Elevation</td>
<td>See Drawings</td>
<td></td>
</tr>
</tbody>
</table>

#### EQUIPMENT DESCRIPTION

- **Clarifier Diameter:** 130’-0”
- **SWD:** 15’-10”
- **Floor Slope:** 1:12
- **Center Pier Dia.:** 42” max.
- **Type:** Pier Supported, Center Drive
- **Scrapers:** Suction Pipe
- **Min. Sludge Collection Pipe:** 6" Dia.
- **EDI Diameter:** 14’-0”
- **EDI Side Depth:** 5’-0”
- **EDI & Inlet Well Freeboard:** 6”
- **Scum Baffles:** Yes

#### MOTOR DATA

- **Type:** Squirrel-cage induction meeting requirements of NEMA MG1.
- **Manufacturer:** For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.
- **Hazardous Location:** Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking.
- **Motor Horsepower:** 0.75 (min)
- **Voltage:** 460
- **Phase:** 3
- **Frequency:** 60
- **Max. Synchronous Speed:** 1,800 rpm
- **Service Factor:** 1.15
- **Variable Speed Drive:** See Division 26, ELECTRIC, Provide Inverter Duty Rated Motors.
- **Winding:** One
- **Motor nameplate horsepower shall not be exceeded at any operational point.**
- **Provide:** Space Heater, Oversize main terminal (conduit) box for motors, Moisture detection switches

#### SPECIAL FEATURES / NOTES
WESTERN AREA WASTEWATER TREATMENT PLANT
HUNTSVILLE, AL

PREPARED FOR

City of Huntsville, AL

AREA REPRESENTATIVE

Eco-Tech
Steven Bishop
sbishop@eco-tech.net

NOTES

No Addendum have been received at this time.

PLEASE NOTE – Pricing is only valid for 30 days from date listed on this proposal. Ovivo will not accept purchase orders for this proposal past that date without reviewing pricing and delivery of items proposed.

PREPARED BY

Thomas Holt
Phone (801) 931-3000
Fax (801) 931-3080
thomas.holt@ovivowater.com

Ovivo USA, LLC
4246 Riverboat Road – Suite 300
Salt Lake City, Utah 84123-2583
DATE: May 9, 2022

TO: Western Area WWTP
    Huntsville, AL

Ovivo USA, LLC is pleased to submit a proposal for the following equipment (the “Products”) on the project indicated above (the “Project”). This proposal, either in its original form or in its “as sold” format, constitutes Ovivo’s contractual offer of goods and services in connection with the Project. Please contact Ovivo’s sales representative in your area for any questions or comments you may have in connection with this proposal. The address is:

Eco-Tech
156 Hickory Springs Industrial Dr.
Canton, GA 30115

Attention: Steven Bishop
Telephone: 770-345-2118
Facsimile: 770-345-2699
Email: sbishop@eco-tech.net

BID PRICING

<table>
<thead>
<tr>
<th>ITEM</th>
<th>OPTION</th>
<th>EQUIPMENT</th>
<th>ESTIMATED SHIP DATE*</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>One</td>
<td>Clarifier Mechanism</td>
<td>*</td>
<td>$584,500</td>
</tr>
</tbody>
</table>
DELIVERY

* Ovivo will submit drawings and other information for approval within eight (8) weeks after Purchaser’s receipt of Ovivo’s written acknowledgement of an approved purchase order. Ovivo intends to ship all Products twenty-four (24) to twenty-six (26) weeks after receipt of approved submittals from Purchaser.

GENERAL NOTES

The dates of drawing submission and shipment of the Products represents Ovivo’s best estimate, but is not guaranteed, and Ovivo shall not be liable for any damages due to late delivery, including but not limited to liquidated damages. The Products shall be delivered to the delivery point or points in accordance with the delivery terms stated in this proposal. If such delivery is prevented or postponed by reason of Force Majeure, as defined in Ovivo’s standard terms and conditions of sale, Ovivo shall be entitled at its option to tender delivery to Purchaser at the point or points of manufacture, and in default of Purchaser’s acceptance of delivery, to cause the Products to be stored at such a point or points of manufacture at Purchaser’s expense. Such tender, if accepted, or such storage, shall constitute delivery for all purposes of this proposal. If shipment is postponed at request of Purchaser, or due to delay in receipt of shipping instructions, payment of the purchase price shall be due on notice from Ovivo that the Products are ready for shipment. Handling, moving, storage, insurance and other charges thereafter incurred by Ovivo with respect to the Products shall be for the account of Purchaser and shall be paid by Purchaser when invoiced.

*** CORONAVIRUS ADVISORY ***

The coronavirus situation may cause disruptions in our normal business practices, capacity, and supply chain. Any schedule statements made by Ovivo at this time are our best estimate and subject to change. Design will begin upon order acceptance; sourcing, manufacturing and fabrication will not begin until the formal submittal package is approved by owner and/or contractor.

BUY AMERICAN REQUIREMENTS

The Infrastructure Investment and Jobs Act signed into law on November 15, 2021, includes substantive changes to Buy America requirements compared to those specified in the preceding American Iron and Steel Act. While Ovivo fabricates and procures the vast majority of steel domestically for our equipment for the United States market, there are certain components that are either unavailable domestically or impractical to procure domestically through long-established supply chains, while meeting other project specifications, internal requirements, and project schedules. This challenge is further exacerbated by supply chain and labor shortages in pandemic and post pandemic times. As with previous legislation, we are awaiting any additional guidance for the US Environmental Protection Agency or other Agencies for further clarification relating to current Buy America requirements. As of now, the industry at large is unable to ascertain the parameters of the Buy America requirement. Thus, Ovivo cannot make any guarantee that its scope of supply will be in compliance with any Buy America requirements under the Infrastructure Investment and Jobs Act. Accordingly, any offer for sale, proposal, or budgetary quote/estimate submitted by or on behalf of Ovivo should not be construed as meeting such Buy America requirements unless explicitly stated otherwise.
ITEM I - CLARIFIER MECHANISM

Ovivo USA, LLC proposes to supply one (1) Clarifier Mechanism suitable for installation in 130’ diameter x 15'-10” SWD concrete tank by others. The design of the proposed mechanisms is based upon previous supplied clarifier listed under the SO# BAP1246-04 and our standard engineering practices and details which will meet the intent of the specification 11227 provided.

OPTION ONE - ITEMS INCLUDED:

- Complete Ovivo standard C60LT drive assembly. Drive unit is completely factory assembled, calibrated and tested.
- Complete motor drive package, including 1 HP gearmotor, sprockets, chain and guard.
- Drive torque control with micro switches and actuating pin:
  - Premium Ovivo paint scheme, two (2) coats of Tnemec Series 66HS epoxy @ 4-6 mils DFT:
    - Top coated with (1) coat of Tnemec Series 73 Endura Shield urethane paint @ 3-5 mils DFT (sky blue color).
    - Topcoat is highly resistant to abrasion, wet conditions, corrosive fumes, chemical contact and weathering.
- Walkway, 3 ft wide, pony truss, tank wall to tank wall, walkway truss to serve as handrails with 1 1/4” aluminum I-bar grating.
- Platform, 9’-6” x 9’-0”, with 3/8” aluminum checker plate decking.
- Handrail around platform, aluminum, 1 1/2” diameter, 2-rail with 4” toe plate, sub-assembled systems with fittings factory mounting to posts.
- 5’-0” Cage, square box truss design.
- Primary rake arms, two full radius square box design with rake blades, with 304 SS.
- Secondary rake arms, two partial radius square box design with rake blades, with 304 SS squeegees.
- Influent Column, 3’-6” diameter x 1/4” plate with a 24” SCH 10 RAS pipe inside.
- Dispersion well- 14’-0” Dia. x 5’-0” Deep w/ 8 hinged gates.
- Feedwell, 40’ diameter x 7’-6” deep x 3/16” plate, with supports.
- Sludge collection box with seals.
- PVC return activated sludge collections pipes, 12’-6” diameter (6 each primary rake arm) with PVC adjustable collection valves.
- Two (2) skimming blades with 10’ skimmer assemblies and one (1) 10’ scum box with supports and stub nozzle.
- Installation fasteners & shim kit (304 SS).
- O & M manuals.
- One (1) year warranty.
- Freight, FCA factory, freight allowed to jobsite.
ITEMS NOT INCLUDED (But not limited to the following):

- Motor starters, mounting plate brackets, conduit, wiring, mounting channels, photocells, VFD’s, etc.
- Local control panel.
- Access platforms outside of tank wall.
- Weirs & Baffles.
- Density Current Baffles.
- Demolition or installation.
- Tank or tank modifications.
- Unloading.
- Field welding.
- Finish Paint / Touch up Paint.
- Lubricants.
- Handrail or stairs approaching, outside of, or around tank.

WEIGHTS:

APPROXIMATE TOTAL WEIGHT OF ONE (1) MECHANISM _____ Lbs.

APPROXIMATE WEIGHT OF THE HEAVIEST SINGLE COMPONENT _____ Lbs.

FIELD SERVICE:

Our proposal includes the service of a qualified service engineer for the following:

- Two (2) Days / Two (2) Trips at the site to assist in adjusting, servicing, and checking out these mechanisms, and in training the operators in maintenance, troubleshooting, and repair of the equipment. Static torque testing is included in these services.
- Additional service days can be purchased at the current rate.

SURFACE PREPARATION AND PAINT:

Carbon steel to be prepared and coated as follows:

- Submerged Steel: Surface Blast SSPC-SP10 followed by:
  - One (1) Prime coat of Tnemec Series 66.
- Non-Submerged Steel: Surface Blast SSPC-SP6 followed by:
  - One (1) Prime coat of Tnemec Series 66.
ADDITIONAL FIELD SERVICE

When included and noted in the Product pricing of each proposal item, Ovivo will supply the service of a competent field representative to inspect the completed installation and adjustment of equipment, supervise initial operation, and instruct Owner’s personnel in the operation and maintenance of each proposal item for the number of eight (8) hour days. Notwithstanding Ovivo’s performance of the above-referenced services, Ovivo shall not be held liable for any faulty workmanship or other defects in the Products’ installation, or for other goods and/or services, performed by third parties unless such goods and/or services are expressly included under Ovivo’s scope of work.

If additional service is required, it will be furnished to the Purchaser and billed to him at the current rate for each additional day required, plus travel and lodging expenses incurred by the service personnel during the additional service days.

It shall be the Purchaser’s responsibility to provide for all necessary lubrication of all equipment prior to placing equipment in operation. All equipment must be in operating condition and ready for the Field Service Engineer when called to the project location. Should the Purchaser/Owner not be ready when the Field Service Engineer is requested or if additional service is requested, the Ovivo current service rates will apply for each additional day required, plus travel and lodging expenses incurred by the service personnel during the additional service days.

SURFACE PREPARATION AND PAINTING GENERAL INFORMATION

If painting the Products is included under Ovivo’s scope of work, such Products shall be painted in accordance with Ovivo’s standard practice. Shop primer paint is intended to serve only as minimal protective finish. Ovivo will not be responsible for condition of primed or finished painted surfaces after equipment leaves its shops. Purchasers are invited to inspect painting in our shops for proper preparation and application prior to shipment. Ovivo assumes no responsibility for field service preparation or touch-up of shipping damage to paint. Painting of fasteners and other touch-up to painted surfaces will be by Purchaser’s painting contractor after mechanism erection.

Clarifier motors, gear motors and center drives shall be cleaned and painted with manufacturer’s standard primer paint only.

It is our intention to ship major steel components as soon as fabricated, often before drives, motors and other manufactured components. Unless you can insure that shop primed steel shall be field painted within thirty (30) days after arrival at the jobsite, we encourage you to purchase these components in the bare metal (no surface prep or primer) condition.

Ovivo cannot accept responsibility for rusting or deterioration of shop applied prime coatings on delivered equipment if the primed surfaces have not been field painted within thirty (30) days of arrival at the jobsite using manufacturers’ standard primers. Other primers may have less durability.
PRICING TERMS

The prices quoted are based upon Purchaser’s acceptance of this proposal, through the submission of a purchase order or other written acceptance, being placed no later than thirty (30) days after date of bid opening, or upon Purchaser’s acceptance of this proposal by June 10, 2022, whichever date is earlier. After expiration of the pricing effectivity period, prices will be subject to review and adjustment. Prices quoted are FCA surface point of shipment, with freight included to an accessible point nearest the jobsite. Federal, state or local sales, use or other taxes are not included in the sales price.

PAYMENT TERMS

Payment terms are as follows:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Cumulative Percent Invoiced – Type Muni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovivo Acknowledgement of P.O.</td>
<td>5%</td>
</tr>
<tr>
<td>Submittals First Sent to Purchaser</td>
<td>10%</td>
</tr>
<tr>
<td>Submittal Approval</td>
<td>30%</td>
</tr>
<tr>
<td>Fabrication Complete and Ready to Ship¹</td>
<td>90%</td>
</tr>
<tr>
<td>Equipment Delivery</td>
<td>95%</td>
</tr>
<tr>
<td>Field Service Trips Per Contract</td>
<td>100%</td>
</tr>
</tbody>
</table>

¹This milestone will only be invoiced if delays from Purchaser or due to parties other than Ovivo occur. Additional storage and other terms may apply per paragraphs below.

Invoice will be billed at 100% of the work complete in accordance with the schedules above. No more than 5% retention shall be withheld from each invoice. The final 5% (Retention) shall be invoiced at Substantial Completion of Ovivo’s Scope, which may be different that Substantial Completion of the overall project, not to exceed sixty (60) days from equipment delivery of the Major Item.

Purchaser shall remit payment for proper invoices received from Ovivo in accordance with the payment terms stated above even if the Purchaser has not been paid by the Purchaser’s customer (the “Owner”), if Purchaser is not the end-user of the Products. Payments are due within thirty (30) days after Purchaser’s receipt of invoice. Overdue and unpaid invoices are subject to a service charge of 2% per month until paid.

Any postponement of delivery dates requested by the Purchaser; or if Purchaser requests or causes cancellation, suspension or delay of Ovivo’s work, for delays of up to ninety (90) days, Purchaser shall pay Ovivo all appropriate charges incurred up to date of such event, per the schedules above, which may include partial completion of milestones. Additionally, all charges related to and risks incidental to storage, disposition and/or resumption of work shall be borne solely by Purchaser. For delays less than ninety (90) days, Ovivo will delay portions of fabrication and delivery, to the extent possible. Delays greater than ninety (90) days are subject to price escalation at 1.5% per month for each month
or partial month of delay, further subject to the steel escalation clause; or, if possible, equipment shall be stored at the cost of the Purchaser. For delays greater than ninety (90) days, Purchaser shall accept transfer of title and make full payment for all work due and payable, thirty (30) days from the date work is placed into storage.

Credit is subject to acceptance by Ovivo’s Credit Department.

**PRICE ESCALATION**

The prices submitted are based upon Purchaser’s acceptance of this proposal by June 10, 2022, not to exceed 30 days from the date of this proposal.

If a binding purchase order is not received by Ovivo prior to the above referenced date, prices and shipping dates are subject to review and adjustment by Ovivo.

Additionally, due to the unpredictability of material and labor prices and availability, including but not limited to recent sharp increases in carbon steel, stainless steel, aluminum, other metal prices, electrical components, coatings, FRP, shipping, and labor prices in the North American and worldwide markets (the “Labor and Material Price(s)”), Ovivo, shall not assume responsibility for such possible escalations and impacts to schedule beyond the validity date of its proposal or between the date of the executed Contract and the procurement of such labor and material.

Ovivo may increase the price of its proposal or require additional payment in the form of a change order due to any Labor and Material Price increase (a) that exceeds 5% per annum of the price of the specific labor or material in place on the date of Ovivo’s proposal or (b) when product fabrication utilizing labor or materials does not commence until more than 6 months after the purchase order date, due primarily to actions of parties other than Ovivo. Furthermore, Ovivo is entitled to adjust its delivery date to account for such delay.

Any Labor and Material Price increase shall be based on an industry-standard pricing measure or index for that particular labor or material that accurately represents the market increase or, at Ovivo’s reasonable discretion, actual increases incurred by Ovivo. The resulting cost and schedule impact shall be disclosed to the Buyer prior to fabrication.

Notwithstanding the above, should requested shipment dates be extended primarily due to actions of parties other than by Ovivo or its suppliers, Ovivo reserves the right to charge 1.5% per month of the Contract Price for each month or partial month of delay, unless said delay is agreed to in writing by all affected parties.

Any additional duties and tariffs invoked after the date of its proposal will be added to the total proposed price.
TAXES

Federal, State or local sales, use or other taxes are not included in the sales price. Such taxes, if applicable, shall be for Purchaser's account.

BONDS

Any performance and/or payment bond agreed to be provided by Ovivo will extend to supply of equipment and services for a period not to exceed the first twenty-four (24) months of the service or warranty period, and for a value not to exceed the total price of this Proposal.

BACKCHARGES

In no event shall Purchaser/Owner do or cause to be done any work, purchase any services or material or incur any expense for the account of Ovivo, nor shall Ovivo be responsible for such work or expenses, until after Purchaser/Owner has provided Ovivo's PROJECT MANAGER full details (including estimate of material cost and amount and rate of labor required) of the work, services, material or expenses, and Ovivo has approved the same in writing. Ovivo will not accept Products returned by Purchaser/Owner unless Ovivo has previously accepted the return in writing and provided Purchaser/Owner with shipping instructions.

**PURCHASE ORDER SUBMISSION**

In an effort to ensure all purchase orders are processed timely and efficiently, please submit all purchase order documentation to the following department and address:

Ovivo USA, LLC
4246 Riverboat Road, Suite 300
Salt Lake City, Utah 84123

Attn: Amy Harrison / Thomas Holt
Tel.: 801-931-3000
Email: amy.harrison@ovivowater.com

Ovivo USA, LLC
4246 Riverboat Road, Suite 300, Salt Lake City, Utah 84123 USA | Tel: (801) 931-3000 | Fax: (801) 931-3080
ovivowater.com

CONFIDENTIAL
GENERAL ITEMS NOT INCLUDED

Unless specifically and expressly included above, prices quoted by Ovivo do not include unloading, hauling, erection, installation, piping, valves, fittings, stairways, ladders, walkways, grating, wall spools, concrete, grout, sealant, dissimilar metal protection, oakum, mastic, field painting, oil or grease, electrical controls, wiring, mounting hardware, welding, weld rod, shims, leveling plates, protection against corrosion due to unprotected storage, special engineering, or overall plant or system operating instructions or any other products or services.

Performance and payment security, including but not limited to bonds, letters of credit, or bank guarantees, are not included, but can be provided if purchased for an additional cost.

MANUALS

The content of any and all installation, operation and maintenance or other manuals or documents pertaining to the Products are copyrighted and shall not be modified without the express prior written consent of Ovivo. Ovivo disclaims any liability for claims resulting from unauthorized modifications to any such manuals or other documents provided by Ovivo in connection with the Project.

WARRANTY AND CONDITIONS

Ovivo standard Terms and Conditions of Sale is attached and made an essential part of this proposal. These terms and conditions are an integral part of Ovivo’s offer of Products and related services and replace and supersede any terms and conditions or warranty included in Purchaser or Owner requests for quotation or specifications and cannot be changed without written approval from an authorized representative of Ovivo.

PERFORMANCE WARRANTY DISCLAIMER

The performance of the Products is dependent upon many factors, including, but not limited to, the influent or feed quality and quantity, additives required, time, temperature, rates of change, sizing criteria used, operating conditions, etc. Therefore, Ovivo cannot assume any liability or responsibility for performance or process results that Purchaser is expecting or has predicted. No verbal or written information or advice given by any personnel of the Ovivo shall create a warranty or in any way increase the scope of the warranties.

THE PARTIES AGREE THAT OTHER THAN ITS MECHANICAL WARRANTY SET FORTH IN THIS PROPOSAL, OR ANY PERFORMANCE WARRANTY SET FORTH ON OVIVO’S STANDARD ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY PROCESS OR PERFORMANCE RELATED WARRANTIES OR WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHETHER WRITTEN, ORAL OR STATUTORY, ARE EXCLUDED TO THE FULLEST EXTENT PERMISSIBLE BY LAW.
CONFIDENTIALITY

This document is not to be reproduced or submitted to any third party without the written consent of Ovivo.

This document contains, or Ovivo may have previously disclosed to Purchaser, certain technical and business information of Ovivo and/or Ovivo’s affiliated entities, including certain copyrighted material, which is considered to be confidential. Such information, hereinafter referred to individually and collectively as the “Information”, may include, without limitation, ideas, concepts, development plans for new or improved products or processes, data, formulae, techniques, flow sheets, designs, sketches, know-how, photographs, plans, drawings (regardless of what name, if any, is stated on the title block), specifications, samples, test specimens, reports, customer lists, price lists, findings, studies, computer programs and technical documentation, trade secrets, diagrams, and inventions, notes, and all information pertaining thereto and/or developed there from. This Information is disclosed in good faith solely for the purposes of our proposal, and in addition on the understanding that its confidentiality will be properly maintained and safeguarded.

Neither this proposal, the Information nor any part thereof may be copied, reproduced or used for any purpose other than that for which it is disclosed by Ovivo. Except as reasonably necessary for the evaluation of this proposal, no part thereof may be disclosed to any other person, without Ovivo’s prior consent in writing.

Ovivo will retain the rights to any intellectual property rights (“IPR”) related to the Products. Ovivo will grant a non-exclusive royalty free license to use the IPR for the sole purposes of operating and maintaining the equipment supplied by Ovivo.

The duties, obligations, restrictions, and responsibilities described hereinabove shall apply to the Purchaser, their agents, affiliates, and all related parties regardless of whether any transaction occurs between Ovivo and Purchaser, and shall survive termination, cancellation, and expiration of any transaction between Ovivo and Purchaser.

In the event of a breach of the terms herein, Ovivo maintains the right to seek any and all remedies and damages available to it, including but not limited to the amount, including interest, by which Purchaser profited from the breach, any gains made by Purchaser or any third party who received Information from Purchaser, compensation for all Ovivo loss or injury, and the value of Ovivo's expectation created by the promise of Purchaser. The parties agree Ovivo would suffer irreparable harm in the event of any breach of these terms, and therefore Ovivo shall be entitled to any and all injunctive relief available.

Very truly yours,

Ovivo USA, LLC

Attachment:

Ovivo USA, LLC General Terms and Conditions
1. ACCEPTANCE. The proposal of Ovivo USA, LLC (“SELLER”), as well as these terms and conditions of sale (collectively the “Agreement”), constitutes SELLER’s contractual offer of goods and associated services, and is subject to the terms and conditions set forth herein. Upon execution of this Agreement, the proposed price for the goods and terms and conditions of this Agreement represent the entire offer by SELLER and supersede all other solicitations, discussions, agreements, understandings and representations between the parties. Any scope or terms of the proposal different from those appearing in the offer are expressly rejected. The provisions of this Agreement are in addition to and not limitations of any other rights of SELLER.

2. DELIVERY. SELLER reserves the right to card, sort, assemble, sort, load, and ship the Products (as defined below) represent SELLER’s best estimate, but is not guaranteed, and SELLER shall not be liable for any damages due to late delivery. The Products shall be delivered to the delivery point or points in accordance with the delivery terms stated in SELLER’s proposal. The title to the equipment and products shall pass to PURCHASER upon the actual shipment of the Products. SELLER shall be entitled to return the cost of any valid claims made by the PURCHASER under the terms of this Agreement. SELLER reserves the right to ship the Products to the order point or place of manufacture, and in default of the order point or place of manufacture, to Salt Lake City, Utah, or any other place of manufacture designated by SELLER.

3. TITLE AND RISK OF LOSS. SELLER shall retain the full title, right, and interest in the Products to the extent permitted by law. In the event of any partial default or nonconformity is received by SELLER within thirty (30) days of SELLER’s delivery of the Products.

4. PAYMENT TERMS. SELLER reserves the right to ship the Products and be paid for such on a pro rata basis, as shipped: if payments are not made by the due date, interest at a rate of two percent (2%) per month, calculated daily, shall apply from the due date for payment. PURCHASER is liable to pay SELLER’s legal fees and all other expenses in respect of enforcing or attempting to enforce any of SELLER’s rights relating to a breach or threatened breach of the terms by PURCHASER in the event of nonpayment. SELLER is entitled to set off any claim, which may arise from any third party, held against the Products.

5. TARIFFS. Unless otherwise specified provided in SELLER’s quotation/proposal, PURCHASER shall pay all expenses, taxes, duties, and other charges which may be levied against any Products. Any customs, import, or export duties and taxes, including any duties incurred on repatriation of goods, shall be paid by PURCHASER. If SELLER designates, any Product or parts thereof returned to SELLER, which examination shall show to have failed under normal use and service operation by PURCHASER due to defects or nonconformity be entitled to sue for stated balance at request, without notice or demand, shall be entitled to sue for said balance and reasonable legal fees plus out-of-pocket expenses and interest; and/or to enter any place where the Products are located and to take immediate possession of and remove the Products; without or with legal process, and retain all payments made as compensation for the goods and services of the PURCHASER. SELLER reserves the right to claim for damages and to apply the net proceeds from such sale (after deduction from the sale price of all expenses of such sale and all expenses of retaking possession, repairs necessary to put the Products in saleable condition, storage charges, taxes, liens, collection and other expenses in connection therewith) to the balance then due to SELLER for the Products and to receive from the PURCHASER the deficiency between such non-sets of sale and such balance. PURCHASER hereby waives all trespass, damage and claims resulting from any entry, repossession, removal, retention, repair, alteration and sale. The remedies provided in this paragraph are in addition to, and not limitations of any of SELLER’s other rights and remedies, and in no event more than thirty (30) days after the expiration of the Warranty Period.

6. MECHANICAL DEFECTS. PURCHASER shall be responsible for any reasonable costs of installation and operation and for any reasonable charges paid by PURCHASER for any unauthorized repairs. SELLER reserves the right to ship the Products and be paid for such on a pro rata basis, as shipped: if payments are not made by the due date, interest at a rate of two percent (2%) per month, calculated daily, shall apply from the due date for payment. PURCHASER is liable to pay SELLER’s legal fees and all other expenses in respect of enforcing or attempting to enforce any of SELLER’s rights relating to a breach or threatened breach of the terms by PURCHASER in the event of nonpayment. SELLER is entitled to set off any claim, which may arise from any third party, held against the Products.

10. WAIVER. Any waiver by SELLER to enforce PURCHASER’s strict performance of any provision of this Agreement shall not constitute a waiver of a right of SELLER’s to subsequently enforce such provision or any other provision of this Agreement.

11. SOFTWARE. PURCHASER shall have the right to use and distribute information and data furnished to PURCHASER hereunder, including but not limited to price, size, type, design and other technical or business information relating to the Products is the sole property of SELLER and submitted FOR PURCHASER’s sole use in connection with Agreement and is not to be made known or available to any third party without PURCHASER’s prior written consent.

12. PATENT INFRINGEMENT. SELLER will defend at its own expense, liability arising from fees and expenses associated with any action by PURCHASER based upon claims that SELLER’s Product hereunder in and of itself constitutes an infringement of any valid apparatus claims of any United States patent issued and existing as of the date of this Agreement, if notified promptly in writing and given all information, assistance, and sole authority to defend and settle the same. This grant to PURCHASER shall not be construed as an admission by SELLER of any liability or infringement, or that the use of the Product is enjoined in such suit or in case SELLER otherwise deems it advisable, SELLER shall, at its own expense and discretion, (a) procure for the PURCHASER the right to continue using the Product under such suit or action, (b) defend and settle the suit or action, or (c) if necessary, modify the Product so that it is then not infringing, or (d) remove the Products and refund the purchase price less freight charges and depreciation. The results of any such action shall be reported to PURCHASER. PURCHASER shall be responsible for all legal fees and other costs or charges, including costs of litigation, with respect to the use of the Products for any purpose other than that for which it was furnished by SELLER, (b) with co-operation with equipment designs not furnished by SELLER or (c) use of the Products in combination with equipment other than and not furnished by SELLER, all sets forth in this Agreement are hereby rejected.

21. INDEPENDENT CONTRACTOR. It is expressly understood that SELLER is an independent contractor, and that neither SELLER nor its principals, partners, parents, subsidiaries, affiliates, employees or representatives, agents or subcontractors, is, in any way, an agent, partner, joint venturer, or joint employer of PURCHASER, or due to delay in receipt of shipping instructions, payment of the purchase price shall be made to SELLER.

22. PATENT INFRINGEMENT. SELLER will defend at its own expense, liability arising from fees and expenses associated with any action by PURCHASER based upon claims that SELLER’s Product hereunder in and of itself constitutes an infringement of any valid
SECTION 44 42 27.20 – SCREENINGS WASHER COMPACTOR

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to completely furnish and install the screenings washer compactor system including all related equipment, material, and appurtenances as shown on the drawings and specified herein.

A. Equipment specified within the following sections shall be coordinated and supplied by a single manufacturer:
1. Section 44 42 27.20 – Screenings Washer Compactor
2. Section 46 21 26 – Step Screen
3. Section 46 21 60 – Water Sluice System

B. Related sections:
1. Section 01 33 00 – Submittals
2. Section 01 66 00 – Product Storage and Handling Requirements
3. Section 01 78 23 – Operation and Maintenance Data
4. Section 01 79 00 – Electrical Demonstration and Training
5. Section 05 50 00 – Miscellaneous Metal Fabrications
6. Division 26 – Electrical Sections

1.2 COSTS OF PRE-NEGOTIATED ITEMS

A. Owner has entered into a pre-negotiated cost agreement with the specified manufacturer for some items in this section of the specification. Refer to Attachment “A” BID FORM for more details. The pre-negotiated cost agreement and proposal from the specified manufacturer is provided as an attachment to this specification section. The Contractor shall carefully review the pre-negotiated proposal and scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. In addition to the pre-negotiated costs indicated in Attachment “A” BID FORM, the Contractor shall include in the Lump Sum Bid Price the costs for the following:
1. All items not specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal but required by the Contract Documents and/or necessary to provide a complete and operational system.
2. All items specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal which are designated to be provided by others, provided by the customer, provided by the Owner, or any similar designation.
3. All labor, materials, and all other associated costs not included in the pre-negotiated proposal but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Equipment Numbers: 10WA001, 10WA002

B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts and manufacturer’s services.

C. Unit Responsibility: The Work requires that the screenings washer/compactor, local control panel, instruments, and components complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless
otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment. The supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.

D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTALS.

B. In addition to the requirements of Section 01 33 00, SUBMITTALS, submit the following additional specific information:

1. Shop Drawings:
   a. Make, model, weight, and horsepower of each component.
   b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
   c. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and details of anchorage and of connections to other work, and weights of associated equipment.
   d. External utility requirements (quantity and connection details) such as air, water, power, drain etc., for each component.
   e. Motor nameplate data, motor manufacturer, and any motor modifications.
   f. Wiring diagrams for motors, including terminals and numbers.
   g. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
   h. List of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
   i. Instrumentation and Control Submittals: In conformance with Division 26, ELECTRICAL.

2. Quality Control Submittals:
   a. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating systems.
   b. Special shipping, storage and protection, and handling instructions.
   c. Test procedures.
   d. Test results, reports, and certifications.
   e. Manufacturer's Certificate of Proper Installation.
   f. Operation and maintenance manual.
   g. In addition, Quality Control Submittals shall conform to the requirements of Section 01 66 00, PRODUCT STORAGE AND HANDLING REQUIREMENTS.


1.5 QUALITY CONTROL

A. The materials covered under these specifications are intended to be standard equipment of proven reliability and as manufactured by a reputable manufacturer having experience in the production of screening equipment. The equipment furnished shall be designed and constructed in accordance with the best practices and methods and shall operate satisfactorily when
installed as shown on the Contract Drawings and operated per the manufacturer’s recommendations.

B. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.

1.6 OPERATION AND MAINTENANCE DATA
A. O&M Manuals: Content, format and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY
A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided and modified as required to conform to the performance, functions, features, and materials of construction as specified herein.
B. Materials, equipment, components, and accessories specified in this section shall be, products of:
   1. Huber Technology, Inc.

2.2 GENERAL REQUIREMENTS
A. Noise Level: When in operation, no piece of equipment shall exceed the OSHA noise level requirements for a 1 hour exposure, 105 dBA.
B. Service Factors: Service factors shall be applied in the selection and design of components where so indicated in individual sections. When not indicated there, minimum service factors shall be 1.25, except for gears and gear drives as specified herein.
C. Safety Devices: The completed work shall include all necessary permanent safety devices, such as machinery guards, emergency stops and similar items required by OSHA, and other federal, state, and local health and safety regulations.
D. Flanges and Pipe Threads: Comply with ANSI B 16.1, Class 125; or B 16.5, Class 150, unless otherwise indicated. Threaded flanges and fittings shall have standard taper pipe threads complying with ANSI/ASME B 1.20.1.
E. Bearings:
1. Conform to the standards of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA).
2. Except where otherwise indicated, bearings of process equipment shall have a minimum L-10 life expectancy of 100,000 hours.

F. Gears and Gear Drives:
1. Except as otherwise indicated, gears shall be of the helical or spiral-bevel type, designed and manufactured in accordance with AGMA Standards, with a minimum service factor of 1.7, a minimum L-10 bearing life of 60,000 hours, and a minimum efficiency of 94 percent.
2. Gear speed reducers or increasers shall be of the enclosed type, oil- or grease-lubricated and fully sealed, with a breather to allow air to escape but keep dust and dirt out. The casing shall be of cast iron or heavy-duty steel construction with lifting lugs and an inspection cover for each gear train. An oil level sight glass and an oil flow indicator shall be provided and installed for easy reading.
3. Gears and gear drives as part of an equipment assembly shall be shipped fully assembled for field installation.
4. Material selections shall comply with AGMA values and the manufacturer's recommendations. Input and output shafts shall be properly designed for the service and load requirements. Gears shall be computer-matched for minimum tolerance variation. The output shall have two positive seals to prevent oil leakage.
5. Oil level and drain location shall be readily accessible.
6. Where gear drive input to output shafts connect to couplings or sprockets, the gear drive manufacturer shall supply matching key.

G. Anchor bolts shall be specified in Section 05 50 00, MISCELLANEOUS METAL FABRICATIONS. Number and size as recommended by manufacturer.

H. Stainless Steel: Stainless steel components shall be 316 stainless steel, or higher, as specified.

I. Nameplates: Equipment nameplates of stainless steel shall be engraved or stamped and fastened to the equipment in accessible locations with stainless steel screws or drive pins. Nameplates shall contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.3 SUPPLEMENTS
A. See supplements to this section for additional equipment system product, component or accessory information.

2.4 SERVICE CONDITIONS
A. The screenings washer/compactor shall be located outdoors on the bottom slab of the headworks, as shown in the drawings.
B. All washer/compactor equipment, devices, and accessories shall be suitable for installation and operation outside unprotected from exposure to the atmosphere.
C. The system shall perform as specified with wash water supplied at 60 psi.

2.5 SYSTEM PERFORMANCE AND FUNCTIONAL REQUIREMENTS
A. System Definition
1. The system will consist of two (2) screenings washer/compactors with discharge chutes and associated control panels.
2. The configuration and location of the systems and their components shall be as shown on the Drawings.
3. The system shall include all components and accessories which are required for a properly and fully functioning system.

B. Washer/Compactor
1. Each washer/compactor shall receive screenings removed by the step screens from the waste stream and conveyed to the washer/compactor equipment via a hydraulic sluiceway. The screened solids shall be washed to removed organic matter from the screenings. The screenings shall then be compacted through the screw compactor and discharge through a conveyance pipe into a discharge duct to a screenings bin as shown on the Drawings.
2. The washer/compactor shall be capable of:
   a. Washing the screenings to remove fecal matter and other organics from the screenings.
   b. Feeding the washed screenings by gravity to the compactor.
   c. Dewatering and compacting the screenings.
   d. Returning all recovered water to the plant drain system.
   e. To minimize odors and nuisance, the conveyance, dewatering and compaction zones shall be completely enclosed.
   f. The spray wash system shall be enclosed such that spray water, aerosols or leakage do not contaminate the operating floor.
   g. Conveying the screenings to a container beneath the discharge duct. (See Drawings)
3. Unit Capacity: 35 ft³/hr (Minimum)
4. Minimum Screenings Volume Reduction: 60%
5. Minimum solids content of washed, dewatered screenings: 8%

2.6 EQUIPMENT AND/OR MATERIALS

A. The screenings washer/compactor shall be a motorized screw type designed to receive, convey, and compact the screenings. The washer/compactor system shall be a complete assembly including, but not limited to, the following items:
1. Inlet hopper
2. Washing chamber
3. Wash water manifold system
4. Drainage zone
5. Screw assembly
6. Compaction zone
7. Discharge chute/pipe
8. Drive unit
9. Controls

B. The system shall be designed to permit simple, easy disassembly and re-assembly of any pieces which must be removed to service the screenings washer/compactor.

C. Components:
1. Inlet Chamber: Shall be designed to direct the screenings material from the step screens into the screw housing. The inlet hopper shall be constructed of 316 stainless steel.
2. Compactor Screw: The compactor screw shall be constructed of 316 stainless steel and have a minimum outside diameter of 8-1/2". The distance between the flights shall be arranged to allow transportation into the washing zone and compaction in the dewatering zone. The final flight shall be constructed of a Hardox or equivalent hardened steel alloy for abrasion resistance. A reinforced nylon brush shall be attached to the screw for the full length of the washing zone.
3. Screw Housing: The screw housing shall be constructed of 316 stainless steel. The
dewatering section shall incorporate anti-rotation bars (if applicable) around the complete
circumference to contain screenings.
4. Washing System: The screening washing system shall be installed in the screw housing.
5. Wash Sprays: The wash zone shall include a spray wash system to wash organic residue
from screenings. The wash zone spray will consist of one (1) spray header, four (4) water
injection points, one (1) ball valve and one (1) solenoid valve. The solenoid valve body
will be of brass construction with Buna seals. The ball valve will be of brass construction
with a stainless steel ball. The system will have an output of 10 GPM at 60 psi. The spray
connection will be ½ inch NPT.
6. Flush Sprays: The press shall include a single point spray wash system to flush organic
residue trapped in the outer trough. The flush spray will consist of one (1) spray
header, one (1) ball valve and one (1) solenoid valve. The solenoid valve body will be of
brass construction with Buna seals. The ball valve will be of brass construction with a
stainless steel ball. The system will have an output of 15 GPM at 60 psi. The spray
connection will be 1/2 inch NPT.
7. Drain Pan: Shall be fabricated from a minimum of 1/8 inch thick stainless steel and shall
connect to the screenings washer body housing with stainless steel clasps for easy
removal. The drain pan shall have a resilient seal along its top edge to from a watertight
seal with the housing.
8. Discharge Pipe: A steel plate discharge duct or round pipe shall be flanged and bolted at
the end of the compaction zone. The discharge pipe shall be constructed of 316 stainless
steel. Provide Type 316 stainless steel 1/2-inch nominal size NPT half couplings with
plastic pipe plugs at piping increments of 5 feet or less, to allow the addition of water to
re-wet and lubricate the solids if required and applicable to manufacturer’s design. The
discharge pipe shall be the configuration as shown in the Drawings. Manufacturer to
provide pipe supports if needed.
9. Drive Assembly: The washing press shall have a continuous duty rated motor, coupled to
a gear reducer. The motor shall be rated for a Class 1 Division 2 area. The motor shall be a
maximum of 5 HP and be a constant speed unit rotating at a maximum of 1800 rpms.
It shall be powered by 230/460 VAC, 60 Hz, 3 phase. The motor conduit box will have
one (1) 1/2" NPT and one (1) 3/4" NPT conduit connection. The gear reducer will be
AGMA class II (1.6 service factor) with minimum 94% efficiency, producing an output
speed of 14 rpm and an output torque of 13,900 inch-pounds. Heavy duty tapered roller
bearings in the gear reducer will provide a maximum thrust capacity of 6,740 pounds.

D. A 4 inch (minimum) drain line connection shall be provided to convey water from the washing
system and compaction zone to the plant drain system.

2.7 ELECTRICAL COMPONENTS AND ACCESSORIES

A. General:
   1. Conform with Division 26, ELECTRICAL.
   2. Provide all necessary electrical components and wiring for a complete, functional system.
   3. Where indicated, motor starters shall be provided in a separate motor control center
      specified in Division 26, ELECTRICAL. Provide all necessary control functions to properly
      interface with this motor starter.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment
provided under this section. If additional wiring is required, or if required wiring does not match
what is indicated, the Contractor shall make the necessary modifications to the electrical wiring
and documentation as part of the lump sum price. Wiring shall meet the requirements of
Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-
voltage (24V) signals shall be run in twisted, shielded pair cable.
C. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

D. Spray Solenoid Valve: Each solenoid valve will have a brass body with 1/2" NPT pipe connections. Each solenoid valve requires 120 volt, 60 Hz, single phase power and will be provided with an 18 inch long integral lead. Electrical housing will be rated NEMA type 7 suitable for a Class 1, Division 2 location and provided with a 1/2" NPT conduit connection. Each solenoid valve will be field installed by the contractor in the respective wash water supply line. Proper wiring from the solenoid valve to the control panel will be the responsibility of the contractor.

E. Motors:
   1. Provide squirrel-cage ac induction motors meeting the requirements of Division 26, ELECTRICAL, and as specified herein.

2.8 INSTRUMENTATION AND CONTROLS

A. All instrumentation and control components shall be provided in accordance with the requirements of Division 40, ELECTRICAL.

B. All controls necessary for the fully automatic operation of the screenings washer/compactor shall be provided. The controls shall be designed to ensure sufficient protection against overload in order to prevent equipment damage.

C. Refer to Specification Section 46 21 26 Step Screens for control panel requirements of the complete screening system, including Waster/Compactors.

D. Control Description
   1. In the LOCAL mode:
      a. The washer/compactor will start and run continuously as long as the step screen is running. If the step screen is shut down or stopped, the washer/compactor will run for a predetermined amount of time to allow for the removal and dewatering of the screenings contained in the washer/compactor unit. When either spray wash LOCAL mode is selected, the respective solenoid valve will open or close when operator selects OPEN/CLOSE at the local control panel (LCP) selector switch and the spray wash system will run continuously when the solenoid valve is OPEN.

   2. In the REMOTE mode:
      a. The washing press shall be cycled on and off, based on the run time of the associated screen, by remote control signals from the main control panel. The washing press shall be capable of being cycled by a screen cycle counter. In AUTO the washer/compactor shall employ a cleaning cycle when signaled to stop.

2.9 TOOLS AND SPARE PARTS

A. Tools: The work includes one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:
   1. None
2.10 FABRICATION

A. Shop Assembly: The system shall be test-run, fully assembled, in the factory before shipment. Submit test results to Engineer for review prior to shipment.

B. Shop/Factory Finishing: Shop prime coatings shall conform to the requirements of Section 09 96 00.01, HIGH-PERFORMANCE COATINGS.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs and features required by the manufacturer including safety interlocks.

3.2 ASSEMBLY AND PREPARATION FOR SHIPMENT

A. Each unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.

B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, PRODUCT STORAGE AND HANDLING REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Pumps, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.4 INSTALLATION

A. As shown on the Drawings. All anchors, bolts, and accessories shall be 316 stainless steel. The manufacturer shall provide templates for anchor bolt locations.

B. Contractor will install the equipment according to the Contract Documents, following the instructions detailed in the Installation Operation and Maintenance manual.

C. Lubricants: Include oil and grease for initial operation.
3.5 FIELD QUALITY CONTROL

A. Functional Testing: Prior to plant startup, all equipment described herein shall be inspected for proper alignment, quite operation, proper connection, and satisfactory performance by means of a functional test. Provide certification of test results. Tests and certification shall be as specified in Section 01 79 00, ELECTRICAL DEMONSTRATION AND TRAINING.

3.6 MANUFACTURER’S SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereinunder, travel time excluded:
   1. Installation, Startup, and Testing Services:
      a. 1 person for two, eight-hour days for installation assistance, inspection, and Certificate of Proper Installation.
      b. 1 person for one, eight-hour day for functional and performance testing.
      c. Provide Qualifications of Manufacturer’s employee.
   2. Training Services:
      a. 1 person for one, eight-hour day of prestart classroom or jobsite training of Owner’s personnel.
      b. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 79 00, DEMONSTRATION & TRAINING of Division 01, GENERAL REQUIREMENTS.

3.7 MANUFACTURER’S CERTIFICATES

A. Provide Manufacturer’s certificate(s) in accordance with Section 01 79 00, DEMONSTRATION AND TRAINING, of Division 01, GENERAL REQUIREMENTS.

END OF SECTION
SECTION 44 42 56.29 – WET-PIT SUBMERSIBLE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to complete furnish, install and place into operation the submersible pump(s) required to complete this project. This section includes submersible pump(s) to be supplied with motor, close coupled volute, cast iron discharge elbow, guide bar brackets, power cable and accessories as specified herein, and as further specified in the Submersible Pump Data Sheets hereinafter.

B. Related sections:
   1. Section 01 33 00 – Submittals.
   2. Section 01 66 00 – Product Storage and Handling Requirements.
   3. Section 01 78 23 – Operation and Maintenance Data.
   4. Section 01 79 00 – Electrical Demonstration and Training.
   5. Section 09 97 23 – Concrete or Masonry Coatings.

1.2 COSTS OF PRE-NEGOTIATED ITEMS

A. Owner has entered into a pre-negotiated cost agreement with the specified manufacturer for some items in this section of the specification. Refer to Attachment “A” BID FORM for more details. The pre-negotiated cost agreement and proposal from the specified manufacturer is provided as an attachment to this specification section. The Contractor shall carefully review the pre-negotiated proposal and scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. In addition to the pre-negotiated costs indicated in Attachment “A” BID FORM, the Contractor shall include in the Lump Sum Bid Price the costs for the following:
   1. All items not specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal but required by the Contract Documents and/or necessary to provide a complete and operational system.
   2. All items specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal which are designated to be provided by others, provided by the customer, provided by the Owner, or any similar designation.
   3. All labor, materials, and all other associated costs not included in the pre-negotiated proposal but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Like items of equipment provided hereunder shall be the end products of one Manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and Manufacturer’s service.

B. Unit Responsibility: The Work requires the Submersible Pumps complete with all accessories and appurtenances (including, but not necessarily limited to, pump, motor, base elbow, guidersails, guidersail mount accessories, lift chains or cables, spare parts, start-up, testing, and personnel training) be the end product of one responsible Manufacturer. Unless otherwise indicated, the Contractor shall obtain each system from the Manufacturer of the equipment, which Manufacturer shall provide all components of the system to enhance compatibility, ease of construction, and efficient operation and maintenance, and as necessary to place the equipment in operation and its intended functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for performance of all equipment systems as indicated.
C. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
   1. Shop Drawings: Shop drawings shall include descriptive information as required to fully describe the Pumps, Controls, Motors, and overall performance and shall identify any deviations from the specified requirements.
   2. For pumps equipped with variable frequency drives. Provide a VFD analysis showing single pump operation, and parallel pump operation at increments not greater than 5 Hz between 60 Hz and 35 Hz or the minimum safe operating frequency, whichever is greater. Each increment shall include flow, head, and pump efficiency.
   3. Special handling instructions, in accordance with Section 01 66 00, PRODUCT STORAGE AND HANDLING REQUIREMENTS.
   4. Requirements for storage and protection prior to installation, in accordance with Section 01 66 00, PRODUCT STORAGE AND HANDLING REQUIREMENTS.
   5. Motor information to be submitted in accordance with Division 26, ELECTRICAL.
   6. Motor data information including:
      a. FLA
      b. LRA
      c. Power Factor (at least 3 load points between 0 – 100%)
      d. Efficiency throughout curve
      e. Insulation
      f. NEMA Design Code
      g. Service Factor
      h. VFD compatibility assurance
      i. Number of allowable starts per hour
      j. Conductor cut sheets
      k. Overvoltage/undervoltage recommendation settings of motor
      l. Overload recommendation setting
   7. Quality control submittals as listed in Section 01 33 00, SUBMITTALS of Division 01, GENERAL REQUIREMENTS.

1.5 QUALITY CONTROL

A. The materials covered under these specifications are intended to be standard equipment of proven reliability and as manufactured by a reputable manufacturer having experience in the production of screening equipment. The equipment furnished shall be designed and constructed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the Contract Drawings and operated per the manufacturer’s recommendations.

B. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.

C. Balancing: Rotating elements of equipment, except small, commercially packaged equipment, shall be statically and dynamically balanced at the factory prior to final assembly. The Contractor shall furnish certified copies of all test results.
1.6 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, format, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY

A. Provide warranty for a period of 12 months from start-up and 18 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided and modified as required to conform to the performance, functions, features, and materials of construction as specified herein.

B. Materials, equipment, and accessories specified in this section shall be products of:

1. Sulzer.

2.2 GENERAL REQUIREMENTS

A. Furnish and install submersible non-clog wastewater pump(s). Each pump shall be equipped with a submersible electric motor, connected for operation on 460 volts, 3 phase, 60 hertz, with 65 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards. See supplement data sheets for specific pump information.

B. The use of a Manufacturer’s name and model or catalog number is for the purpose of establishing the standard of quality and general configuration, but modifications shall be made to ensure all requirements specified herein are met. Specific pump models are suggested and other models meeting the service and duty requirements will be considered.

2.3 BEARINGS

A. The integral pump/motor shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper motor bearing shall be a two row angular contact ball bearing. The lower bearing shall be a two row angular contact ball bearing to handle the thrust and radial forces. The minimum L10 bearing life shall be 50,000 hours at any usable portion of the pump curve.

2.4 MECHANICAL SEALS

A. Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The rotating seal ring
shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

B. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication.

C. The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

D. A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float type switch that will signal if the chamber should reach 50% capacity.

2.5 ACCESSORIES

A. Discharge Base and Elbow:

1. Materials: Same as pump casing.
2. Features:
   a. Structurally capable of firmly supporting guide rails, discharge piping and pumping unit under operating conditions.
   b. One or more integral support legs or pads with provisions for bolting to sump floor.
   c. Incorporates 90-degree flanged elbow that receives horizontal flow from pump and discharges flow vertically.
3. Discharge Interface:
   a. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact or with a double set of nitrile rubber or Viton O-rings watertight contact.
   b. Self-aligning without having to enter the wet well.
   c. Discharge elbow to mate to pump discharge and transition to discharge piping.

B. Guide rails, brackets, fasteners, and lifting chain for each pump:

1. Material: Type 316 stainless steel, with the following features:
   a. Dual pipes or dual rails that extend from discharge base to upper bracket unless scheduled otherwise.
   b. Rail wall thickness sufficient to suspend pump unit between brackets plus minimum 50 percent safety factor.
   c. Sized to fit discharge base and sliding bracket of pump.
   d. Integral, self-aligning, guide rail sliding brackets that seal pump to discharge base under operating conditions.
   e. Upper guide rail bracket.
   f. Intermediate guide rail brackets shall be where indicated on the Drawings or the minimum between 10-foot maximum intervals or as recommended by the pump manufacturer.
g. Lifting chain of sufficient strength and length to permit safe removal of pump unit from sump.

h. For setting greater than 15 feet, provide double harness rings in chain or cable every 15 feet and a hook to support pump and chain from concrete wall at ground surface.

2.6 PUMP ACCESSORIES

A. Equipment Identification Plate: A 16-gauge stainless steel identification plate shall be securely mounted on each pump in a readily visible location. The plate shall bear the 1/4" die-stamped equipment identification number name that is assigned to each pump in the Submersible Pump Data Sheets and shown on the Drawings.

B. Lifting Lugs/Handle: Equipment weighing over 100 pounds shall be provided with lifting lugs/handle.

C. Painting: Provide touch-up painting for post-installation.

D. See Submersible Pump Data Sheets following this Section.

E. Spare Parts and Special Tools (if required): See Submersible Pump Data Sheets for spare parts and special tools required for each pump or set of pumps.

2.7 MOTOR REQUIREMENTS

A. Motor shall be selected in accordance with the pump’s non-overloading performance characteristics. Motor horsepower rating shall be chosen in keeping with the pump’s possible peak horsepower requirements.

B. Each pump motor shall be sufficiently cooled by submergence in the pumped media or by an integral motor cooling system. Manufacturer shall determine if the internal cooling system is required for proper operation of the motor and furnish the system accordingly. See Submersible Pump Data Sheet(s). A stainless-steel cooling jacket shall encircle the stator housing, providing for dissipation of motor heat regardless of the type of pump installation. An impeller, integral to the cooling system and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The cooling liquid shall pass about the stator housing in the closed loop system in turbulent flow providing for superior heat transfer. The cooling system shall have one fill port and one drain port integral to the cooling jacket.

C. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer grommets or Buna-N grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered equal.

D. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The
use of multiple step dip and bake-type stator insulation process is not acceptable. The use of pins, bolts, screws, or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 40°C (104°F). The motor shall be capable of operating in dry or partially submerged conditions for extended periods without damage. The motor shall be capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel.

E. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

F. The motor service factor (combined effect of voltage, frequency, and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10%. The motor shall be designed for continuous operation in up to an ambient temperature of 40°C ambient and shall have a NEMA Class B maximum operating temperature rise of 80°C. A motor performance chart shall be provided upon request exhibiting curves for motor torque, current, power factor, input/output kW and efficiency. The chart shall also include data on motor starting and no-load characteristics.

G. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

H. Motor shall also meet requirements specified in the following supplemental data sheet(s).

2.8 PROTECTION

A. Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm. A float switch shall be installed in the seal leakage chamber and will activate if leakage into the chamber reaches 50% chamber capacity, signaling the need to schedule an inspection.

B. The thermal switches and float switch shall be connected to a status monitoring unit. The unit shall be designed to be mounted in the pump control panel.

2.9 ELECTRICAL AND CONTROL SYSTEMS

A. Electrical products and execution required to complete the Work under this section shall conform to the applicable requirements of Division 26, ELECTRICAL.

B. Labeling: All electrical materials, devices, appliances, and equipment used shall be indicated as acceptable by established standards. Indication shall be by a valid label affixed to the item. Panels that consist of multiple components shall be listed and labeled as a unit in addition to any other requirements.

C. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.
D. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

2.10 INSTRUMENTATION AND CONTROLS
A. All instrumentation and control components shall be provided in accordance with the requirements of Division 40, ELECTRICAL.

2.11 FABRICATION
A. Shop prime and field finish paint ferrous metal in accordance with and as specified in Section 09 96 00, PAINTING AND PROTECTIVE COATINGS.

PART 3 - EXECUTION

3.1 GENERAL
A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs, and features required by the manufacturer including safety interlocks.

3.2 ASSEMBLY AND PREPARATION FOR SHIPMENT
A. Each pump unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.

B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING
A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

3.4 FACTORY TESTS
A. Motor Tests and Test Reports: As specified in Division 26, ELECTRICAL.

B. Each pump and motor shall be performance tested at the factory. All pumps shall be tested with motor cables to be supplied with the pumps. Three copies of certified test reports, including actual test records, shall be submitted and approved by Engineer prior to shipment of the equipment.

C. Each pump shall be tested for performance at the factory to determine the head vs. capacity, and motor input power for the full speed at which the pumps are specified and shown on a certified performance test curve as continuous functions throughout the pump’s performance range. Tests of models, prototypes or similar units will not be acceptable. All tests shall be run in accordance with the test code for centrifugal pumps of the Standards of Hydraulic Institute,
latest edition, per Section 1.2.D.3. The motor and cable on each pump shall be tested for moisture content or insulation defects. After the test, the pump cable end shall be fitted with a shrink-fit rubber boot to protect it from moisture or water.

3.5 FIELD TESTS

A. Functional Test: Prior to startup, all equipment described herein and in the Submersible Pump Data Sheets following shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance by means of a functional test. Provide certification of test results. Tests and certification shall be as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Vibration Test: The complete assembly, consisting of the driving unit and pump, connected and in normal operation, shall not develop amplitudes of vibration exceeding limits recommended by the current edition of Hydraulic Institute Standards. If directed by Engineer, vibration tests shall be conducted at Contractor’s sole expense to determine amplitude of vibration, and Contractor shall make any corrections necessary to meet these requirements. If corrections are made, a second vibration test shall be done following corrections.

3.6 MANUFACTURER’S SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereinunder, travel time excluded:
   1. Installation, Startup, and Testing Services:
      a. 2 person-days for installation assistance, inspection, and Certificate of Proper Installation.
      b. 1 person-day for functional and performance testing.
      c. Provide Qualifications of Manufacturer's Representative.
   2. Training Services:
      a. 1 person-day of prestart classroom or jobsite training of Owner’s personnel.
      b. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 79 00, DEMONSTRATION & TRAINING of Division 01, GENERAL REQUIREMENTS.

3.7 MANUFACTURER’S CERTIFICATE(S)

A. Provide Manufacturer’s certificate(s). In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

3.8 SUPPLEMENTS

A. The supplements listed below and following “END OF SECTION” are part of this Specification.
   1. Section 44 42 56.29.1 – Return Activated Sludge Submersible Pump Data Sheet.
   2. Section 44 42 56.29.2 – Waste Activated Sludge Submersible Pump Data Sheet.

END OF SECTION
# Section 44 42 56.29.1 – RAS Wet-Pit Submersible Pumps Data Sheet

**PROJECT:** Western Area WWTP Expansion Phase 1

**OWNER:** Huntsville

**EQUIPMENT NAME(S):** Return Activated Sludge Pumps

**EQUIPMENT TAG NUMBER(S):** 50P102, 50P103, 50P202, 50P203

**CONTROL PANEL(S):** See on Drawings

**TOTAL PUMPS REQUIRED:** (3) Duty + (1) Standby

### MANUFACTURERS

<table>
<thead>
<tr>
<th>SULZER</th>
<th>XFP 305J-CB2 60HZ</th>
</tr>
</thead>
</table>

### SERVICE CONDITIONS

<table>
<thead>
<tr>
<th><strong>Liquid Pumped:</strong></th>
<th>Return Activated Sludge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity (US gpm):</strong></td>
<td>Single Pump Operational Range</td>
</tr>
<tr>
<td><strong>Range (with VFD):</strong></td>
<td>2500-7000</td>
</tr>
<tr>
<td><strong>Specific Gravity at 60 deg F:</strong></td>
<td>0.99 – 1.10</td>
</tr>
<tr>
<td><strong>Largest dia. Solid pump shall be capable of passing:</strong></td>
<td>2 inch</td>
</tr>
<tr>
<td><strong>Min. NPSH available:</strong></td>
<td>33.0 ft</td>
</tr>
<tr>
<td><strong>Explosion Proof (Y/N):</strong></td>
<td>Y</td>
</tr>
<tr>
<td><strong>Pumping Temperature (°F):</strong></td>
<td>40 – 100 °F</td>
</tr>
<tr>
<td><strong>Max pump speed at rated capacity:</strong></td>
<td>1200 rpm</td>
</tr>
</tbody>
</table>

### PERFORMANCE REQUIREMENTS

| **Capacity (US gpm):** | Rated: 4880 |
| **Total Dynamic Head (ft):** | Single Pump Operational Range |
| **Total Dynamic Head (ft):** | Rated: 42 |
| **Min. rated pump hydraulic efficiency at rated capacity (%):** | 75 |
| **Minimum efficiency for operational range (%):** | 60 |
| **Static head range (ft):** | 15-25 |

### EQUIPMENT DESCRIPTION

| **Casing Material:** | Cast Iron, A48 Class 35B |
| **Minimum discharge port:** | 10” (inch) |
| **Casing Wear Ring Material:** | Cast Iron, A48 Class 35B or Hard Iron, A 532 ALLOY III A (25% Chrome) |
| **Guide Rail Material:** | Double, SST |
| **Impeller Type:** | Balanced, semi-open or closed, multi-vane, Non-Clogging |
| **Lifting Chain Material:** | 316 SST |
| **Impeller Material:** | Cast Iron, A48 Class 35B or Hard Iron, A 532 ALLOY III A (25% Chrome) |
| **Pump Removal Hoist (Y/N):** | Y |
| **Shaft Material:** | 420 or 431 Stainless Steel |
| **Impeller Wear Ring (Y/N):** | N |
| **Material:** | N/A |
| **Double Mechanical Seal (Y/N):** | Y |

### MOTOR DATA

| **Type:** | Squirrel-cage induction meeting requirements of NEMA MG1. |
| **Manufacturer:** | For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer. |
| **Hazardous Location:** | ☒ Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking |
| **Motor Horsepower:** | 75 Maximum |
| **Voltage:** | 460 |
| **Phase:** | 3 |
| **Frequency:** | 60 Hz |
| **Synchronous Speed:** | 1200 rpm max |
| **Service Factor:** | ☒ 1.15 |

| **Variable Speed Drive:** | See Division 26, ELECTRIC. Provide Inverter Duty Rated Motors. |
| **Winding:** | One ☒ Two ☒ |
| **Thermal protection embedded in windings:** | ☒ |
| **Motor nameplate horsepower shall not be exceeded at any operational point:** | ☒ |

| **Provide:** | Space Heater ☒ Oversize main terminal (conduit) box for motors ☒ Moisture detection switches. |

### SPECIAL FEATURES / NOTES

See Division 40 for general instrumentation and control requirements.
## Section 44 42 56.29.2 – WAS Wet-Pit Submersible Pumps Data Sheet

### PROJECT: Western Area WWTP Expansion Phase 1

<table>
<thead>
<tr>
<th>MANUFACTURERS</th>
<th>SUGGESTED MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULZER</td>
<td>XFP150G CB1 60HZ</td>
</tr>
</tbody>
</table>

### SERVICE CONDITIONS

<table>
<thead>
<tr>
<th>Liquid Pumped</th>
<th>Capacity (US gpm): Single Pump Operational Range (with VFD):</th>
<th>300-1400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity at 60 deg F:</td>
<td>Capacity (US gpm): Rated:</td>
<td>920</td>
</tr>
<tr>
<td>Largest dia. Solid pump shall be capable of passing:</td>
<td>Operational Range (with VFD):</td>
<td>28-48</td>
</tr>
<tr>
<td>Min. NPSH available:</td>
<td>Total Dynamic Head (ft): Single Pump</td>
<td>48</td>
</tr>
<tr>
<td>Explosion Proof (Y/N)</td>
<td>Maximum Shutoff Pressure (ft):</td>
<td>72</td>
</tr>
<tr>
<td>Pumping Temperature (°F)</td>
<td>Min. rated pump hydraulic efficiency at rated capacity (%):</td>
<td>60</td>
</tr>
<tr>
<td>Max pump speed at rated capacity</td>
<td>Minimum efficiency for operational range (%):</td>
<td>35</td>
</tr>
</tbody>
</table>

### EQUIPMENT DESCRIPTION

| Casing Material: | Cast Iron, A48 Class 35B | Minimum discharge port: | 6” (inch) |
| Casing Wear Ring Material: | Cast Iron, A48 Class 35B or Hard Iron, A 532 ALLOY III A (25% Chrome) |
| Impeller Type: | Balanced, open, semi-open or closed, multi vane or single vane, Non-Clogging |
| Impeller Material: | Cast Iron, A48 Class 35B or Hard Iron, A 532 ALLOY III A (25% Chrome) |
| Impeller Wear Ring (Y/N): | N |
| Material: | N/A |
| Guide Rail Material: | Double, SST |
| Lifting Chain Material: | 316 SST |
| Pump Removal Hoist (Y/N): | Y |
| Shaft Material: | 420 or 431 Stainless Steel |

### MOTOR DATA

| Type: | Squirrel-cage induction meeting requirements of NEMA MG1. |
| Manufacturer: | For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer. |
| Hazardous Location: | Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking |
| Motor Horsepower: | 20 |
| Maximum |
| Voltage: | 460 |
| Phase: | 3 |
| Frequency: | 60 Hz |
| Synchronous Speed: | 1800 rpm max |
| Service Factor: | 1.0, 1.15 |
| Variable Speed Drive: | See Division 26, ELECTRIC. Provide Inverter Duty Rated Motors. |
| Windings: | One, Two |
| Thermal protection embedded in windings. |
| Motor nameplate horsepower shall not be exceeded at any operational point. Provide |
| Space Heater |
| Oversize main terminal (conduit) box for motors |
| Moisture detection switches. |

### SPECIAL FEATURES / NOTES

See Division 26 for general instrumentation and control requirements.
WE ARE PLEASED TO OFFER THE FOLLOWING QUOTATION:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>PRICE EA</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RAS Pumps</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sulzer XFP305J-CB2.360 PE520/6 Non Clog Submersible Pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 70hp 460v 3ph, PE5 frame</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wet pit installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 49' of Cable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Duty Point: 4700 gpm @ 39' tdh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12&quot; GRA w/ Integral Elbow, Dual, HD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hardware Kit, 304SS (Guide Bracket to Pump)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Intermediate Guide Bracket, Dual, 18&quot; Pipe, 304SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Upper Guide Rail Bracket, Dual, 304SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>304 SS Chain, 1/2&quot; (4 ea @ 24')</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>w/ 5/8&quot; Shackles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>2&quot; SS Guide Rails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CA 462 - Seal Leak/Over Temp Relay, 110-230VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Delivery and Start up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Price for RAS Pumps:** $216,910.00

| **WAS Pumps** | | | |
| 2 | Sulzer XFP150G-CB1.8 PE150/4 Non Clog Submersible Pump | | |
| | • 20hp 460v 3ph, PE3 frame | | |
| | • Wet pit installation | | |
| | • 49' of Cable | | |
| | • Duty Point: 900 gpm @ 47' tdh | | |
| 2 | 6" GRA w/integral Elbow, Dual | | |
| 2 | 6" Pump Flange | | |
| 2 | 6" Gromment | | |
| 2 | 6" Bolt Pack SS | | |
| 2 | Intermediate Guide Bracket, Dual, 8" Pipe | | |
| 2 | Upper Guide Rail Bracket, Dual, 304SS | | |
| 48 | 304 SS Chain, 5/16" (2 ea @ 24') | | |
| 4 | w/ Rapid Links | | |
| 160 | 2" SS Guide Rails | | |
| 2 | CA 462 - Seal Leak/Over Temp Relay, 110-230VAC | | |
| 1 | Delivery and Start up | | |

**Total Price for WAS Pumps:** $46,005.00

| **Scum Pumps** | | | |
| 2 | Tsurumi TOS 80C41.5-CR-63 Submersible Chopper Pump | | |
| | • 2hp 460v 3ph, 3’ discharge | | |
• Wet pit installation
• 50' of Cable
• Duty Point: 100 gpm @ 25' tdh

2 JIS 80x 4" Ansi Adaptor
2 Moisture Probe
2 4" GRA w/integral Elbow, Dual
2 4" Pump Flange
2 4" Gromment
2 4" Bolt Pack SS
2 Upper Guide Rail Bracket, Dual, 304SS
40 304 SS Chain, 3/16" (2 ea @ 20')
4 w/ Rapid Links
80 2" SS Guide Rails
2 CA 462 - Seal Leak/Over Temp Relay, 110-230VAC
1 Delivery and Start up

Total Price for Scum Pumps: $20,925.00

Splitter Box Mixers

2 Sulzer XRW 2121 PA18/4 Submersible Mixer
• 2.4hp 460v 3ph
• EC Version
• 49' of Cable
• Based on 4' x 25' x 10' Tank
2 2" Mast Assembly, w/ Intermediate Bracket, Floor Mount, 304SS
40 2" Square Tubing
2 Hoist, Adjustable, 1000#, 24"-36", 42"H, 304SS
w/ Winch Lifting Cable Assembly, 1/4", 30', 316SS
2 Hoist Socket, Platform, 500#, 304 SS
2 Power Cable Support Assembly, 20', 316SS
2 CA 462 - Seal Leak/Over Temp Relay, 110-230VAC
1 Delivery and Start up

Total Price for Splitter Box Mixers: $32,115.00

TOTAL PRICE: $315,955.00

Note: The material quoted is the best interpretation of the items provided for this project, and the customer shall review to ensure no additional items are needed.

The quote is good for 30 days unless otherwise noted. All material is subject to the engineer’s final approval of submittal if required. Price is plus any taxes. Delivery, labor, and start-up are not included unless otherwise noted on the quote. Not included: any applicable taxes, installation costs, wetwell, valves, concrete work, foundation or pole for control panel, electrical connections, offloading, intermediate guide rail brackets, unless otherwise noted. No retainage is allowed.

Trey Doyle
REVIEWED BY HSI REPRESENTATIVE
June 9, 2022
DATE OF REVIEW

PURCHASER SIGNATURE
DATE ACCEPTED
PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to furnish all labor, materials, equipment and incidentals required to provide one (1) recessed impeller grit pump, complete and operational with all appurtenances as specified herein and/or as shown on the plans. The pump shall be specifically designed to pump slurries of grit, debris, and organic solids without clogging.

B. Equipment specified within the following sections shall be coordinated and supplied by a single manufacturer:
   1. Section 44 42 40 – Grit Classifier
   2. Section 44 42 56.60 – Induced Flow (Recessed Impeller) Centrifugal Pump

C. Related Sections:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 01 60 00 – Product Requirements.
   3. Section 01 78 23 – Operation and Maintenance Data.
   4. Section 01 79 00 – Demonstration and Training.
   5. Section 05 50 00 – Metal Fabrications.
   6. Division 26 – Electrical.

1.2 COSTS OF PRE-NEGOTIATED ITEMS

A. Owner has entered into a pre-negotiated cost agreement with the specified manufacturer for some items in this section of the specification. Refer to Attachment “A” BID FORM for more details. The pre-negotiated cost agreement and proposal from the specified manufacturer is provided as an attachment to this specification section. The Contractor shall carefully review the pre-negotiated proposal and scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. In addition to the pre-negotiated costs indicated in Attachment “A” BID FORM, the Contractor shall include in the Lump Sum Bid Price the costs for the following:
   1. All items not specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal but required by the Contract Documents and/or necessary to provide a complete and operational system.
   2. All items specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal which are designated to be provided by others, provided by the customer, provided by the Owner, or any similar designation.
   3. All labor, materials, and all other associated costs not included in the pre-negotiated proposal but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Equipment Numbers: 10P301, 10P302, 10P303

B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts, and manufacturer’s services.

C. Unit Responsibility: The Work requires that the pumps, and components complete with all accessories and appurtenances be the end product of one responsible system manufacturer or...
responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment, which supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.

D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:

1. Shop Drawings:
   a. Make, model, weight, and horsepower of each component.
   b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
   c. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and details of anchorage and of connections to other work, and weights of associated equipment.
   d. Pump curve showing specified performance point.
   e. External utility requirements (quantity and connection details) such as air, water, power, drain etc., for each component.
   f. Motor nameplate data, motor manufacturer, and any motor modifications.
   g. Wiring diagrams for motors, including terminals and numbers.
   h. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
   i. List of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
   j. Instrumentation and Control Submittals: In conformance with Division 26.

2. Quality Control Submittals:
   a. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating systems.
   b. Special shipping, storage and protection, and handling instructions.
   c. Test procedures.
   d. Test results, reports, and certifications.
   e. Manufacturer's Certificate of Proper Installation.
   f. Operation and maintenance manual.


1.5 QUALITY CONTROL

A. Balancing: Rotating elements of equipment, except small, commercially packaged equipment, shall be statically and dynamically balanced at the factory prior to final assembly. The Contractor shall furnish certified copies of all test results.
1.6 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, form, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY

A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a manufacturer’s standard equipment name and/or model number is listed, the equipment system shall be provided and modified as required to conform to the performance, functions, features, and materials of construction as specified herein.

B. Materials, equipment, components, and accessories specified in this section shall be, products of:
   1. Wemco, Model C

2.2 SUPPLEMENTS

A. See supplements to this section for additional equipment system product, component or accessory information.

2.3 SERVICE CONDITIONS

A. The grit pump shall be designed for continuous operation and will be operated continuously under normal service.

2.4 SYSTEM PERFORMANCE AND FUNCTIONAL REQUIREMENTS

A. Since these pumps will be used to pump abrasive grit and other solids, the pumps shall be specifically designed to both optimize wear resistance and then maintain hydraulic performance as wear occurs.

B. The pump(s) shall be of a fully recessed, slurry type design, with the impeller mounted completely out of the flow path between the pump inlet and discharge connection, so that solids are not required to flow through the impeller. All flow path clearances within the pump(s) shall be equal to or greater than the discharge diameter, so that all solids which will pass through the discharge will pass through the pump.

2.5 EQUIPMENT AND/OR MATERIALS

A. Impeller
1. The impeller shall be constructed of 650 Brinell Ni-Hard or Hi-Chrome Iron and specifically designed to maintain hydraulic pumping performance as wear occurs.

2. The impeller shall be of cup design such that the deepest portion of the vane is not located at the vane tips and the tips are surrounded by a thick-sectioned rim of the following thickness:

<table>
<thead>
<tr>
<th>Location</th>
<th>Pump Size (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. Impeller Diameter @ Outside Rim (in.)</td>
<td>14-1/16, 16, 20, 22-1/4</td>
</tr>
<tr>
<td>Minimum Rim Thickness @ Wear Area (in.)</td>
<td>1-1/8, 1-5/8, 1-3/4, 1-3/4</td>
</tr>
<tr>
<td>Minimum Vane Thickness @ Wear Area (in.)</td>
<td>7/8, 7/8, 7/8, 1-1/8</td>
</tr>
<tr>
<td>Impeller Minimum Ni-Hard or Hi-Chrome Iron Weight (lb)</td>
<td>60, 90, 165, 210</td>
</tr>
</tbody>
</table>

3. The hydraulic design shall be such that the length of the impeller vane increases as wear occurs to the rim, allowing as-new or better pumping performance throughout the wear cycle of the impeller.

4. The hydraulic design of the impeller shall preferentially direct flow to a sacrificial, independently replaceable suction piece. The suction piece shall be easily accessible and replaceable, without the need to disassemble any other component of the pump.

5. Pump-out vanes on the rear shroud of the impeller are not acceptable. Impellers of the radial design that incorporate the impeller in a recessed portion of the volute or wearplate are not acceptable.

6. A removable wearplate of Ni-Hard or Hi-Chrome Iron shall be provided behind the impeller designed to direct flow from behind the impeller to the center of the volute for maximum protection to the casing.

7. The packing housing shall be a separate piece bolted to the bearing housing for ease of removal. Designs that incorporate the stuffing box as an integral part of the wear plate and/or backplate assembly are not acceptable.

8. The pump casing shall be of the two-piece radially split type, with a separate and removable suction piece designed so that the impeller can be withdrawn without the need to remove the discharge casing or disturb the discharge piping. The casing shall be constructed so that it can be reversed for opposite rotation and shall be of Ni-Hard or Hi-Chrome Iron. To insure a liberal wear allowance, the casing and suction piece shall be constructed, and the entire wet end weights shall be, as follows:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Discharge Diameter (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Casing Minimum (in.)</td>
<td>9/16</td>
</tr>
<tr>
<td>Suction Piece @ Wear Area (in.)</td>
<td>1</td>
</tr>
<tr>
<td>Weight of Wearing Parts (lbs) (Suction piece, impeller, casing, and wearplate.)</td>
<td>340</td>
</tr>
</tbody>
</table>

9. The pump's head vs. capacity curve shall slope upward toward shutoff in one continuous curve with no points of inflection capable of causing hunting at any pump operational speed.

10. Pump(s) shall be equipped with slotted raised-face flanges to receive 125 lb. standard bolting. Special case slots shall be cast in to retain bolts and to fasten the case to the bearing housing and to the intake for easy case removal.

B. MATERIALS OF CONSTRUCTION

1. The parts exposed to abrasive wear - case, removable suction piece, impeller, and wearplate shall be of all Ni-Hard or Hi-Chrome Iron material conforming to ASTM Designation A532-75 Class I or Class III, Type A, and be a minimum of 650 Brinell hardness for maximum wear resistance. Brinell values below this are not acceptable.

2. Test bars shall be cast integrally with the case and suction piece and shall remain attached to the casting upon final delivery to the owner. Test bars shall be of sufficient thickness to
represent the average thickness of the cast part. After receipt of final delivery, the owner may at any time prior to the final acceptance, remove the test bar and independently verify compliance to the material and hardness specification. Failure of the tested bars to meet the specified requirements shall be cause for rejection.

C. BEARING HOUSING
1. The bearing housing shall be of cast iron, ASTM A48CL-25.
2. The shaft shall be of ASTM A108, Grade 1045 (or equal) steel.
3. Bearings shall be oil bath lubricated. The oil reservoir shall be sealed at both ends to prevent entrance of foreign matter. The thrust bearings shall consist of three angular contact ball bearings for maximum protection from all thrust loads. The bearing housing will be equipped with a pressure venting device and oil fill and drain taps. A built-in sight glass shall be furnished to check proper oil level. The bearings shall be rated for a minimum B10 life of 100,000 hours, without credit for any rear pump-out vanes to balance hydraulic thrust.

D. SHAFT SEALING
1. Mechanical Seal
   a. A single cartridge mechanical seal requiring no external flushing shall be furnished in the pump. The seal shall utilize a rotational sealing ring mounted in an elastomer cup with an o-ring mounted stationary ring loaded by a non-fouling, conical spring encapsulated in Viton. Installation of the seal shall require no measurements or scribe marks on the shaft.
   b. The rotational sealing ring shall be made of tungsten carbide Grade VC 805, the surface of which shall be lapped to a flatness not to exceed three helium light bands. The sealing ring shall be bonded inside a Viton rubber cup, which shall have three (3) integrally molded anti-rotational lugs to prevent the rotary seal face from turning within the rotary body. Additionally, the rotary body shall have three (3) 1/8" solid stainless steel pins to also prevent the rotary seal face from turning within the rotary body.
   c. The stationary sealing ring shall also be constructed of tungsten carbide Grade VC 805. The surface shall be lapped to a flatness not to exceed three helium light bands. The stationary ring shall have a slot milled on the side opposite of the mating side, which engages an anti-rotation pin. Stationary sealing rings of converted carbon or other surface-only treatments are not acceptable.
   d. The spring that loads the rotational sealing ring shall be cone-type, non-fouling design and shall run in the pumped product without fouling or hang-up. The spring metal material shall be SAE1085 Carbon Steel, ASTM A-682 heat-treated to a Rockwell C hardness of 45 to 50 and be totally encapsulated in Viton for protection from the pumped fluid. The product side of the spring shall have a minimum 1/4" thick Viton rubber covering for corrosion/abrasion protection. Seals which use single coil, multiple coil, bellows, and rubber-in-shear designs are not acceptable.
   e. To minimize the number of points where the slurry must be sealed, the mechanical seal assembly shall have no more than three (3) o-rings: one (1) shaft sleeve o-ring, one (1) stationary face o-ring, and one (1) retainer o-ring. O-rings are to be made of Viton. Seals using more than three (3) o-rings are not acceptable.
   f. All metal components not encapsulated in Viton shall be constructed of abrasion resistant CD4MCu ASTM A-743. Surface finish shall be a maximum of 64 RMS.
   g. The seal shall be capable of running with up to ± 0.025" radial shaft deflection and ± 0.040" axial shaft deflection without leakage, damage, or loss of performance.
   h. A seal chamber of Hi-chrome iron, ASTM A-532, minimum 600 Brinell, shall be provided to mount the seal and to provide a reservoir of adequate volume for the pumped product to contact and to lubricate the seal faces. The seal shall be installed into the seal chamber from the impeller side of the pump so that only the casing/suction piece and impeller need to be removed to gain complete access to the seal for inspection and/or maintenance.
E. MOUNTING

1. Belt Drive
   a. The pump manufacturer shall provide a common pump and motor base, constructed of a minimum 3/8 inch thick fabricated steel, suitably reinforced to support the full weight of the pump, motor, belt drive and guards. Pumps shall be standard left hand motor mount as shown on the drawings.
   b. The pump manufacturer shall furnish and install a separate, adjustable motor base with handwheel adjustment so that the motor can be easily moved for V-belt tensioning and adjustment, TB Woods type MC 3B, modified with a welded steel gusset, or equal.
   c. The pump manufacturer shall supply and install belts and sheaves to drive the pump at the speed necessary to meet the rated conditions.
   d. The drive shall be of the stationary control variable speed TB Woods type 'SVS' or equal, which allows a speed change by means of an adjustment to the motor sheave when the drive is not in operation.
   e. An approved fiberglass or thermoplastic belt guard shall be provided to safely enclose the belt drive. If metal guards are furnished, they shall be of all 316 stainless steel construction with suitable lifting eyes and handles to aid in removal.

F. MOTOR

1. All motors shall be of nationally known manufacture and shall conform to NEMA standards and specifications.

2.6 TOOLS AND SPARE PARTS

A. Tools: The work includes one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:
   1. None.

2.7 FABRICATION

A. Shop Assembly: The system shall be test-run, fully assembled, in the factory before shipment. Submit test results to Engineer for review prior to shipment.

B. Shop/Factory Finishing: Shop prime coatings shall conform to the requirements of Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs and features required by the manufacturer including safety interlocks.

3.2 ASSEMBLY AND PREPARATION FOR SHIPMENT

A. Each unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.
B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 66 00, PRODUCT STORAGE AND HANDLING REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Pumps, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.4 INSTALLATION

A. As shown on the Drawings. All anchors, bolts, and accessories shall be 316 stainless steel. The manufacturer shall provide templates for anchor bolt locations.

B. Contractor will install the equipment according to the Contract Documents, following the instructions detailed in the Installation Operation and Maintenance manual.

C. Lubricants: Include oil and grease for initial operation.

3.5 FIELD QUALITY CONTROL

A. Field Test
1. During plant start-up all equipment described herein shall be inspected for proper connections and satisfactory performance by means of a function test.
2. The equipment system and associated accessories shall be field tested to verify adequate performance.
3. Units apparently failing to meet the Specifications must be corrected to provide proper service. Should the problem persist due to a flaw in material and/or in the design of the equipment, new equipment must be provided by the Contractor to meet the specifications.

B. Functional Tests: Conduct on each pump.
1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
2. Vibration Test:
   a. Test with units installed and in normal operation and discharging to the connected piping systems at rates between the low discharge head and high discharge head conditions specified, shall not develop at any frequency or in any plane, peak-to-peak vibration amplitudes in excess of 3 mils.
   b. If units exhibit vibration in excess of the limits specified adjust or modify as necessary. Units that cannot be adjusted or modified to conform as specified shall be replaced.
3. Flow Output: Measured by facility instrumentation and storage volumes.
C. Performance Test: In accordance with Hydraulic Institute Standards and Section 01 79 00, Demonstration and Training.

3.6 MANUFACTURER’S SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereinunder, travel time excluded:
1. Installation, Startup, and Testing Services:
   a. 1 person for two, eight-hour days for installation assistance, inspection, and Certificate of Proper Installation.
   b. 1 person for one, eight-hour day for functional and performance testing.
   c. Provide Qualifications of Manufacturer’s employee.
2. Training Services:
   a. 1 person, eight-hour day of prestart classroom or jobsite training of Owner’s personnel.
   b. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 79 00, DEMONSTRATION & TRAINING of Division 01, GENERAL REQUIREMENTS.

3.7 MANUFACTURER’S CERTIFICATES

A. Provide Manufacturer’s certificate(s) in accordance with Section 01 79 00, DEMONSTRATION AND TRAINING, of Division 01, GENERAL REQUIREMENTS.

3.8 SUPPLEMENTS

A. The supplements listed below following “END OF SECTION” are a part of this Specification.
   1. Section 44 42 56.60 – Induced Flow (Recessed Impeller) Centrifugal Pump Data Sheet

END OF SECTION
**Section 44 42 56.60.1 – Induced Flow (Recessed Impeller) Centrifugal Pump Data Sheet**

**PROJECT:** Western Area WWTP Phase 1 Expansion  
**OWNER:** City of Huntsville  
**EQUIPMENT NAME(S):** Grit Pump 1, 2, 3  
**EQUIPMENT TAG NUMBER(S):** 10P301, 10P302, 10P303  
**CONTROL PANEL(S):** GTCP1  
**TOTAL PUMPS REQUIRED:** 3  

<table>
<thead>
<tr>
<th>MANUFACTURERS</th>
<th>SUGGESTED MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wemco</td>
<td>Model C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SERVICE CONDITIONS</th>
<th>PERFORMANCE REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Pumped:</td>
<td>Grit Slurry</td>
</tr>
<tr>
<td>Specific Gravity at 60 deg F:</td>
<td>0.99 – 1.20</td>
</tr>
<tr>
<td>Largest dia. Solid pump shall be capable of passing:</td>
<td>4 inch</td>
</tr>
<tr>
<td>Min. NPSH available:</td>
<td>-</td>
</tr>
<tr>
<td>Explosion Proof (Y/N):</td>
<td>Y</td>
</tr>
<tr>
<td>Pumping Temperature (°F):</td>
<td>40 – 68 °F</td>
</tr>
<tr>
<td>Max pump speed at rated capacity</td>
<td>1200 rpm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing Material: 650 Brinell Ni-Hard or Hi-Chrome</td>
</tr>
<tr>
<td>Casing Wear Ring Material: 650 Brinell Ni-Hard or Hi-Chrome</td>
</tr>
<tr>
<td>Impeller Type: Cupped Recessed Impeller</td>
</tr>
<tr>
<td>Impeller Material: 650 Brinell Ni-Hard or Hi-Chrome</td>
</tr>
<tr>
<td>Impeller Wear Ring (Y/N): Wear Plate Type, Ni-Hard or Hi-Chrome</td>
</tr>
<tr>
<td>Material: Ni-Hard or Hi-Chrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTOR DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Squirrel-cage induction meeting requirements of NEMA MG1.</td>
</tr>
<tr>
<td>Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.</td>
</tr>
<tr>
<td>Hazardous Location: Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking</td>
</tr>
<tr>
<td>Motor Horsepower: 15 Maximum</td>
</tr>
<tr>
<td>Voltage: 460</td>
</tr>
<tr>
<td>Phase: 3</td>
</tr>
<tr>
<td>Frequency: 60 Hz</td>
</tr>
<tr>
<td>Synchronous Speed: 1200 rpm max</td>
</tr>
<tr>
<td>Service Factor: 1.0 1.15</td>
</tr>
</tbody>
</table>

Variable Speed Drive: See Division 26, ELECTRIC. Provide Inverter Duty Rated Motors.  
Windings: One Two Thermal protection embedded in windings.  
Motor nameplate horsepower shall not be exceeded at any operational point.  
Provide Space Heater Oversize main terminal (conduit) box for motors Moisture detection switches.

**SPECIAL FEATURES / NOTES**  
See Division 40 for general instrumentation and control requirements.  
See Section 28 24 19 MOTOR CONTROL CENTERS for additional requirements.
PROPOSAL

June 20, 2022

SUBJECT: WEMCO GRIT EQUIPMENT
JOB: Huntsville, AL Western WWTP Pumps & Hydrogritters
PROPOSAL NO. 1621535

Thank you for your inquiry for WEMCO equipment. We are pleased to offer our quotation as follows:

**Section 44 42 56.60 Induced Flow (Recessed Impeller) Centrifugal Pumps**

**Grit Pumps: 10P301, 10P302, 10P303**

Qty. (3) 4” X 4” MODEL C WEMCO Torque-Flow Pumps complete with:
- High Chrome case, impeller, and wear-plate
- Cast iron bearing frame with Slurry Dynamics (flushless) single mechanical seal
- 15 HP 284T 1200 RPM TEFC-XP premium efficient severe duty horizontal motor
- Side mount pump & motor arrangement - left hand motor mount
- Variable speed belts & sheaves –stationary control

**Conditions of Service:** 250 GPM against 40’ TDH.

**Spare Parts:** N/A

Please refer to the enclosed Technical Offer 1621535 Item 001 for further details.

**Section 44 42 40 Grit Classifier**

**Hydrogritters: 10GRT101, 10GRT201, 10GRT301**

Qty. (3) 12” Full Flare WEMCO Hydrogritter units with one (1) weir end-mounted 1000C Wemclone cyclones:
- Cyclones designed to handle 250 GPM @ 7.5 PSI
- Classifier tank, tank supports, cyclone supports, feed boxes, and tank cover/guards all 316L stainless steel construction
- Single ribbon spiral design with ARS replaceable wear shoes
- 1 HP 1800 RPM TEFC-XP horizontal motor with thermal protection & space heater
- 0-15 PSI stainless steel pressure gauges
Spare Parts: N/A

Please refer to the enclosed Technical Offer 1621535 Item 002 for further details

TOTAL PRICE: $359,201.00

Following items are included in the scope:
- Factory certified pump performance testing (Pumps Only)
- Start-up services by Principle Environmental
- 316SST Hydrogritter anchor bolts

Following items are NOT included in the scope:
- Controls of any kind.
- Piping, fittings, valves, special tools, flush plans/systems

Technical Comments:

Section 44 42 56.60
- Motor Data: Moisture detection switches do not apply to this type of motor.

Section 44 42 40.1
- Motor Data: Motor mounting type is horizontal. Vertical motor is not applicable.

Documentation and Shipment Schedule:
Document submittal: 6-8 weeks after receipt of order
Shipment: 28-30 weeks after executed PO and submittal approval

Terms and Conditions

Bid Price: Pricing is F.O.B. jobsite, Full Freight Allowed. Detailed receiving inspection is required within 72 hours of delivery and notification of damage claims must occur within 5 working days of delivery. No taxes or duties of any kind are included.

Pricing is firm for the shipment(s) indicated, provided the included schedules are maintained.
Price quoted is for all items purchased at one time. In the event of a partial order, we will review and adjust accordingly. **ESCALATION CLAUSE:** In the event of a delay of two weeks or more or the increase of actual costs of goods and/or services of 5% or more, occurring between the effective date and the date of shipment from causes beyond the reasonable control of the Company, including but not limited to any foreign exchange fluctuation, import or export duties, costs of labor, transportation, materials or other costs of manufacture, any change in delivery dates, quantities or specifications for the goods requested by the Customer, or any delay caused by any instructions or omissions by the Customer, the contract price or contract requirements will be equitably adjusted via written notice to the Customer at any time prior to shipment.

**Payment Terms:**
15% of the Purchase Order value will be invoiced, due Net 30 days, upon completion and approval of submittals. An additional 15% of the Purchase Order value will be invoiced, due Net 30 days, upon the materials purchase order placement by the seller. The remaining 70% of the Purchase Order value will be invoiced, due Net 30 days, upon shipment. Purchase orders must be made out to Trillium Pumps USA INC.

**Bid Validity:**
This proposal is valid for an order for 60 days from the bid date and based on all conditions herein.

**Terms & Conditions:**
This quotation is conditioned on Buyer’s acceptance of the Seller’s Terms and Conditions of Sale Rev. 2 (May 2022) attached hereto. Any modification to these terms and conditions may result in a price and/or delivery impact.

Thank you for the opportunity to submit this proposal on our pumping equipment. If we may be of further service, please contact our representative in your area:

**PRINCIPLE ENVIRONMENTAL**
1770 The Exchange, Suite 210
Atlanta, GA 30339
Tel: 770-952-9444, Fax: 770-952-7933

Or you can contact this office directly.

Sincerely,

Robert Haws
Applications Engineer II
Trillium Pumps USA INC
T: 801-530-7861
E: robert.haws@trilliumflow.com
## Pump

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4&quot; Model C</td>
</tr>
<tr>
<td></td>
<td><strong>General Pump Options</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Pump Options</strong></td>
</tr>
<tr>
<td></td>
<td>Clockwise rotation (CW)</td>
</tr>
<tr>
<td></td>
<td>Steel pump hardware</td>
</tr>
<tr>
<td></td>
<td><strong>Bearing lubrication</strong></td>
</tr>
<tr>
<td></td>
<td>Oil lubricated bearings</td>
</tr>
<tr>
<td></td>
<td>Nitrile elastomers</td>
</tr>
<tr>
<td></td>
<td><strong>Case Assembly</strong></td>
</tr>
<tr>
<td></td>
<td>4x4 Case</td>
</tr>
<tr>
<td></td>
<td>Vertical Top</td>
</tr>
<tr>
<td></td>
<td>High chrome case (650+ BHN hardness)</td>
</tr>
<tr>
<td></td>
<td>No case vent &amp; drain</td>
</tr>
<tr>
<td></td>
<td>Standard suction connection</td>
</tr>
<tr>
<td></td>
<td><strong>Rotating Assembly</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Rotating Assembly</strong></td>
</tr>
<tr>
<td></td>
<td>High chrome impeller (650+ BHN hardness)</td>
</tr>
<tr>
<td></td>
<td>Static balance</td>
</tr>
<tr>
<td></td>
<td>Steel shaft</td>
</tr>
<tr>
<td></td>
<td>Steel impeller bolt</td>
</tr>
<tr>
<td></td>
<td><strong>Pump Sealing</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Pump sealing</strong></td>
</tr>
<tr>
<td></td>
<td>Seal Type: Single Mechanical Seal</td>
</tr>
<tr>
<td></td>
<td>Slurry Dynamics Single Mechanical Seal Slurry Seal</td>
</tr>
<tr>
<td></td>
<td>No shaft sleeve</td>
</tr>
<tr>
<td></td>
<td>Hi-Chrome Gland Housing Material/Backplate</td>
</tr>
<tr>
<td></td>
<td>Stainless steel gland</td>
</tr>
<tr>
<td></td>
<td><strong>Driver</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Motors</strong></td>
</tr>
<tr>
<td></td>
<td>Trillium Supplied Motor: Trillium Supplied Motor</td>
</tr>
<tr>
<td></td>
<td>15HP 284T 1200RPM Premium Efficiency TEFC Horizontal Motor</td>
</tr>
<tr>
<td></td>
<td>All motors are sized and selected in accordance with Hydraulic Institute Grade 2 - 2B performance test acceptance grades and tolerances which adds 8% to the rated horsepower requirement of the pump. This calculation has not changed the rated horsepower or efficiency shown on the Performance Data Sheet. View the link for more information from Hydraulic Institute.</td>
</tr>
<tr>
<td></td>
<td>Motor manufacturer - Trillium Standard</td>
</tr>
<tr>
<td></td>
<td><strong>Motor options</strong></td>
</tr>
<tr>
<td></td>
<td>Motor Thermostats (3 per motor)</td>
</tr>
<tr>
<td></td>
<td>TEFC-XP Frame</td>
</tr>
<tr>
<td></td>
<td><strong>Baseplate and Drive</strong></td>
</tr>
<tr>
<td></td>
<td>Belt Drive Baseplate - Side Mount</td>
</tr>
<tr>
<td></td>
<td>Steel Baseplate</td>
</tr>
<tr>
<td></td>
<td>Trillium Standard Baseplate Design</td>
</tr>
<tr>
<td></td>
<td>Steel Baseplate Hardware</td>
</tr>
<tr>
<td></td>
<td>Fiberglass/Polyethylene Guards</td>
</tr>
<tr>
<td></td>
<td>Left Hand Side Mount Motor</td>
</tr>
<tr>
<td></td>
<td><strong>Belts and Sheaves</strong></td>
</tr>
<tr>
<td></td>
<td>Variable Speed Belts and Sheaves - Stationary Control</td>
</tr>
<tr>
<td></td>
<td><strong>Protective Coatings</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Paint type</strong></td>
</tr>
<tr>
<td></td>
<td>Epoxy 2 Coat Paint - Blue (Prime and Top Coat) - Option #8</td>
</tr>
</tbody>
</table>
### Pump

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unless otherwise noted all motors will be supplied with manufacturer's standard coating only</td>
</tr>
</tbody>
</table>

### Packing & Shipping

**Shipping**
- No Boxing
- Trillium Decision Carrier

**Freight Rates**
- Freight Rates - Alabama: Alabama

### Material Testing

**Material Testing**
- No Hardness Testing
- No Non-Destructive Testing

### Testing

**Testing**
- Testing Required

**Performance Testing**
- 5 Point Performance Test, Single Speed
- Performance Test: Bare Pump Test
- PE Certified

### Spare Parts / Accessories

**Spare Parts and Accessories Group**
- Spare Parts
  - (3) Mechanical seal assemblies
  - (3) Sets of pump bearings
  - (3) Sets of gaskets & O-rings

### Estimated Weights

- Bareshaft Pump: 890.0 lb
- Baseplate: 440.0 lb
- Driver: 380.0 lb
- Misc. Weight: 0.00 lb
- Misc. Weight: 0.00 lb
- Misc. Weight: 0.00 lb
- Total Per Unit Weight: 1,710.0 lb
# Pump Performance Datasheet

<table>
<thead>
<tr>
<th>Operating Conditions</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow, rated</td>
<td>250.0 USgpm</td>
</tr>
<tr>
<td>Differential head / pressure, rated (requested)</td>
<td>40.00 ft</td>
</tr>
<tr>
<td>Differential head / pressure, rated (actual)</td>
<td>40.29 ft</td>
</tr>
<tr>
<td>Suction pressure, rated / max</td>
<td>0.00 / 0.00 psi.g</td>
</tr>
<tr>
<td>NPSH available, rated</td>
<td>Ample</td>
</tr>
<tr>
<td>Site Supply Frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Flow, best eff. point</td>
<td>582.9 USgpm</td>
</tr>
<tr>
<td>Flow ratio, rated / BEP</td>
<td>42.89 %</td>
</tr>
<tr>
<td>Speed ratio (rated / max)</td>
<td>58.00 %</td>
</tr>
<tr>
<td>Head ratio (rated speed / max speed)</td>
<td>31.99 %</td>
</tr>
<tr>
<td>Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]</td>
<td>1.00 / 1.00 / 1.00 / 1.00</td>
</tr>
<tr>
<td>Selection status</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

## Performance

- **Efficiency**: 28.96 %
- **Speed criteria**: Synchronous
- **Speed, rated**: 870 rpm
- **Speed, maximum**: 1500 rpm
- **Speed, minimum**: 600 rpm
- **NPSH required / margin required**: - / 0.00 ft
- **Ns (imp. eye flow) / Nss (imp. eye flow)**: 1.830 / - US Units
- **MCSF**: 20.00 USgpm
- **Head maximum, rated speed**: 44.43 ft
- **Head rise to shutoff**: 10.70 %
- **Driver sizing specification**: Rated power
- **Margin over specification**: 0.08 %
- **Service factor**: 1.00
- **Power, hydraulic**: 2.53 hp
- **Power, rated**: 8.75 hp
- **Power, maximum, rated diameter**: 20.34 hp
- **Minimum recommended motor rating**: 15.00 hp / 11.19 kW

## Material

- **Material selected**: Standard

## Pressure Data

- **Maximum working pressure**: 19.24 psi.g
- **Maximum allowable working pressure**: 85.00 psi.g
- **Maximum allowable suction pressure**: N/A
- **Hydrostatic test pressure**: N/A

---

**Graphs**

- **Power vs. Flow**
- **Efficiency vs. Flow**
- **Head vs. Flow**
### Customer Technical Offer

<table>
<thead>
<tr>
<th>Customer</th>
<th>PRINCIPLE ENVIRONMENTAL</th>
<th>Size / Stages</th>
<th>12-FF-WE / 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item number</td>
<td>002: Section 44 42 40 Grit Classifier</td>
<td>Pump speed</td>
<td>0</td>
</tr>
<tr>
<td>Customer reference</td>
<td></td>
<td>Quote number</td>
<td>1621535</td>
</tr>
</tbody>
</table>

### Pump

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><strong>WEMCO Hydrogritter 12” Full Flare - Weir End</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Tank Options</strong></td>
</tr>
<tr>
<td></td>
<td>Stainless steel tank</td>
</tr>
<tr>
<td></td>
<td>Non air tight design</td>
</tr>
<tr>
<td></td>
<td>Stainless steel hardware</td>
</tr>
<tr>
<td></td>
<td>Standard tank support</td>
</tr>
<tr>
<td></td>
<td>Stainless steel tank support</td>
</tr>
<tr>
<td></td>
<td>No grit chute</td>
</tr>
<tr>
<td></td>
<td><strong>Spiral Options</strong></td>
</tr>
<tr>
<td></td>
<td>Stainless steel spiral guard</td>
</tr>
<tr>
<td></td>
<td>Stainless steel spiral single pitch</td>
</tr>
<tr>
<td></td>
<td>ARS wear shoes</td>
</tr>
<tr>
<td></td>
<td>Stainless steel spiral hardware</td>
</tr>
<tr>
<td></td>
<td>Spiral speed - 12 RPM</td>
</tr>
<tr>
<td></td>
<td><strong>Drive</strong></td>
</tr>
<tr>
<td></td>
<td>Stainless steel driven assembly</td>
</tr>
<tr>
<td></td>
<td>No torque limiter</td>
</tr>
<tr>
<td></td>
<td>No zero speed sensor</td>
</tr>
<tr>
<td></td>
<td>Belt driven</td>
</tr>
<tr>
<td></td>
<td>Stainless steel belt guard</td>
</tr>
<tr>
<td></td>
<td><strong>Sluice water</strong></td>
</tr>
<tr>
<td></td>
<td>Stainless steel sluice water valve</td>
</tr>
<tr>
<td></td>
<td>120V</td>
</tr>
<tr>
<td></td>
<td>NEMA 4 sluice water valve enclosure</td>
</tr>
<tr>
<td></td>
<td><strong>Wemclone</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Wemclone Configuration</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Wemclone quantity</strong></td>
</tr>
<tr>
<td></td>
<td>Single Wemclone</td>
</tr>
<tr>
<td></td>
<td>1000C Wemclone (quantity of 1)</td>
</tr>
<tr>
<td></td>
<td>Aluminum Wemclone</td>
</tr>
<tr>
<td></td>
<td>Rubber Wemclone liner</td>
</tr>
<tr>
<td></td>
<td>Stainless steel Wemclone hardware</td>
</tr>
<tr>
<td></td>
<td>Stainless steel Wemclone support (single wemclone)</td>
</tr>
<tr>
<td></td>
<td>Wemclone overflow piping -02 45 degrees</td>
</tr>
<tr>
<td></td>
<td>Inlet arrangement C</td>
</tr>
<tr>
<td></td>
<td>45 degree Wemclone</td>
</tr>
<tr>
<td></td>
<td>Stainless steel Wemclone pressure gauge</td>
</tr>
<tr>
<td></td>
<td>0-15 PSI Wemclone pressure gauge (single wemclone)</td>
</tr>
<tr>
<td></td>
<td><strong>Feedbox</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Feedbox Options</strong></td>
</tr>
<tr>
<td></td>
<td>Center feedbox</td>
</tr>
<tr>
<td></td>
<td>One steel feedbox</td>
</tr>
<tr>
<td></td>
<td><strong>Motor</strong></td>
</tr>
<tr>
<td></td>
<td>1 HP 1800 RPM TEFC-XP 230V/460V Explosion Proof Severe Duty Motor</td>
</tr>
<tr>
<td></td>
<td>Thermostats</td>
</tr>
<tr>
<td></td>
<td>Space Heater</td>
</tr>
</tbody>
</table>
Pump

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Spare Parts / Accessories</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Spare Parts and Accessories Group</strong></td>
</tr>
<tr>
<td></td>
<td>Spare Parts</td>
</tr>
<tr>
<td></td>
<td>(6) Sets of cyclone liners</td>
</tr>
<tr>
<td></td>
<td>(1) Set of spiral wear shoes</td>
</tr>
<tr>
<td></td>
<td>(1) Lower bearing assembly</td>
</tr>
<tr>
<td></td>
<td>(1) Lower bearing tool</td>
</tr>
<tr>
<td></td>
<td>316 SST Anchor Bold Assemblies</td>
</tr>
<tr>
<td></td>
<td><strong>Protective Coatings</strong></td>
</tr>
<tr>
<td></td>
<td>Paint type</td>
</tr>
<tr>
<td></td>
<td>Paint Preparation: Standard paint preparation (clean and blast)</td>
</tr>
<tr>
<td></td>
<td>Tank Exterior and Cyclone - Epoxy 2 Coat Paint - Blue (Prime and Top Coat) - Option #9</td>
</tr>
<tr>
<td></td>
<td>Tank Interior, Spiral and Wear Shoes - Coal Tar Epoxy Paint - Black - (Stainless is Uncoated) - Option #9</td>
</tr>
<tr>
<td></td>
<td>Stainless steel parts on the Hydrogritter will not be painted</td>
</tr>
<tr>
<td></td>
<td><strong>Packing &amp; Shipping</strong></td>
</tr>
<tr>
<td></td>
<td>Shipping</td>
</tr>
<tr>
<td></td>
<td>No Boxing</td>
</tr>
<tr>
<td></td>
<td>Trillium Decision Carrier</td>
</tr>
<tr>
<td></td>
<td><strong>Freight Rates</strong></td>
</tr>
<tr>
<td></td>
<td>Freight Rates - Alabama: Alabama</td>
</tr>
<tr>
<td></td>
<td><strong>Estimated Weights</strong></td>
</tr>
<tr>
<td></td>
<td>Tank: 745.0 lb</td>
</tr>
<tr>
<td></td>
<td>Wemclone: 650.0 lb</td>
</tr>
<tr>
<td></td>
<td>Driver: 0.00 lb</td>
</tr>
<tr>
<td></td>
<td>Misc. Weight: 0.00 lb</td>
</tr>
<tr>
<td></td>
<td>Total Per Unit Weight: 1,395.0 lb</td>
</tr>
</tbody>
</table>

No Group

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flow Rate/per cyclone 250GPM: 250.0 USgpm</td>
</tr>
<tr>
<td></td>
<td>Inlet Pressure 7.5PSI: 7.50 psi.g</td>
</tr>
</tbody>
</table>
NOZZLE SCHEDULE

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>QTY.</th>
<th>SIZE</th>
<th>RATING</th>
<th>TYPE</th>
<th>SERVICE/NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>1</td>
<td>6&quot;</td>
<td>CLASS 150</td>
<td>FLAT FACE</td>
<td>OVERFLOW CONNECTION</td>
</tr>
<tr>
<td>②</td>
<td>1</td>
<td>4&quot;</td>
<td>CLASS 150</td>
<td>FLAT FACE</td>
<td>INLET CONNECTION</td>
</tr>
<tr>
<td>③</td>
<td>1</td>
<td>8 1/2&quot;</td>
<td>SCH 40</td>
<td>NPTF</td>
<td>TANK OVERFLOW</td>
</tr>
<tr>
<td>④</td>
<td>1</td>
<td>8&quot;</td>
<td>SCH 40</td>
<td>NPTF</td>
<td>TANK DRAIN (PLUGGED)</td>
</tr>
<tr>
<td>⑤</td>
<td>1</td>
<td>3/8&quot;</td>
<td>SCH 40</td>
<td>NPTF</td>
<td>SLUICE WATER WASH, 3/8&quot; NPT</td>
</tr>
<tr>
<td>⑥</td>
<td>1</td>
<td>1&quot;</td>
<td>SCH 40</td>
<td>NPTF</td>
<td>POSSIBLE VENT (PLUGGED)</td>
</tr>
<tr>
<td>⑦</td>
<td>1</td>
<td>3x5 1/2</td>
<td>---</td>
<td>REIN.</td>
<td>GUT DISCHARGE OPENING</td>
</tr>
</tbody>
</table>

NOTE:
1. GUT FREE DISCHARGE FROM CYCLOPE AND TANK MUST BE VENTED BY OTHERS. (SEE DETAIL)
2. SPIRAL COVERS AND BELT GUARD MUST BE IN PLACE BEFORE OPERATING THE MACHINE.

APPROXIMATE WEIGHTS

- 12" FULL FLARE TANK: 510 LB
- WATER: 336 LB
- SPIRAL SINGLE RIBBON: 235 LB
- WEMCOLEONE 1000G WITH WATER: 450 LB
- WEMCOLEONE SUPPORT: 200 LB

TOTAL OPERATING WEIGHTS

- SINGLE RIBBON ASSY: 1731 LB TOTAL
- ADD FOR DOUBLE RIBBON: 138 LB
- DOUBLE RIBBON ASSY: 1869 LB TOTAL

DESCRIPTION

1. VELMENT, TANK - 12" FULL FLARE
2. PLUG, DRAIN - 2" NPT
3. SPIRAL ASSEMBLY - SINGLE OR DOUBLE RIBBON
4. VENT BAR
5. LIFTING DEVICE ASSEMBLY
6. DRIVING ASSEMBLY
7. DRIVER ASSEMBLY
8. TANK SUPPORT ASSEMBLY
9. SLUICE WATER ASSEMBLY
10. VEMCLEONE PIPING ARRANGEMENT
11. VEMCLEONE ASSEMBLY
12. VEMCLEONE PIPING GAUGE ASSEMBLY
13. FEEDER ASSEMBLY
14. SPIRAL GUARD ASSEMBLY
15. VEMCLEONE SUPPORT ASSEMBLY
16. DECAL KIT

VENT DETAIL (N.T.S.)

OVERFLOW PIPING WITH VENT BY OTHERS (SEE OPERATION MANUAL)
1. DEFINITIONS AND INTERPRETATION

1.1 In the Contract the following definitions apply as well as any definitions defined locally within these Terms and Conditions or the applicable Purchase Order:

"Affiliate" means any entity that directly or indirectly controls, is controlled by or is under common control with, another entity;

"Applicable Laws" means all applicable laws, legislation, regulations and governmental guidance having binding force, whether local or national, and having jurisdiction over the parties in relation to the Contract;

"Contract" means these Terms and Conditions and the applicable Purchase Order;

"Customer" means the person specified in the Purchase Order who purchases Goods and/or Services from Trillium, and such person’s successors;

"Customer Plant" means Customer’s plant, machinery, goods and/or equipment which is to be serviced by Trillium as part of the Services;

"Defect" has the meaning given in clause 8.2, and "Defective" shall be construed accordingly;

"Force Majeure" means an event or sequence of events beyond a party’s reasonable control, preventing or delaying that party from performing its obligations under the Contract, including: (a) an act of God, fire, flood, lightning, earthquake or other natural disaster, epidemic or pandemic; (b) any action taken by a governmental or public authority, including imposing an export or import restriction, quota, or other restriction or prohibition or any complete or partial government shutdown; (c) war, riot or civil unrest; (d) interruption or failure of supplies of power, fuel, water, transport, equipment, telecommunications service, or material required for performance of the Contract; or (e) strike, lockout or boycott or any other industrial action including those involving Trillium or its workforce;

"Goods" means all goods, products and ancillary equipment and spare parts specified in the applicable Purchase Order;

"Intellectual Property Rights" means patents, utility models, rights to inventions, copyright and neighbouring rights, designs, trademarks, domain names, trade marks, business names and domain names, rights in computer software, rights in Confidential Information, database rights, and all other intellectual property rights, in each case whether registered or unregistered and including all applications and rights to apply for and be granted, renewals or extensions of and rights to claim priority from, any rights and all similar or equivalent rights or forms of protection that exist in relation to the Goods or in any country or part of the world;

"Price" means the price payable by the Customer to Trillium for the applicable Goods and/or Services (as applicable);

"Purchase Order" means the document agreed by the parties that sets out details of the Goods and/or Services that are to be provided by Trillium to the Customer in accordance with these Terms and Conditions and any terms mutually agreed in the Purchase Order;

"Site" means the address of the place where the Services are to be performed, as specified in the Purchase Order;

"Sub-Supplier" means any agent, sub-contractor or other third party engaged by Trillium in relation to the provision of the Goods and/or Services;

"Sub-Supplier Personnel" means all employees, officers, staff, other workers, agents and consultants of a Sub-Supplier;

"Sub-Suppliers" means all Sub-Suppliers;

"Terms and Conditions" means these terms and conditions of sale in relation to the applicable Contract;

"Trillium" means the Trillium entity specified in the Purchase Order that provides the Goods and/or Services to the Customer, and such Trillium entity’s successors;

"Trillium Indemnitees" means Trillium, its Affiliates and Sub-Suppliers, and its and their respective personnel; and

"Trillium Personnel" means all employees, officers, staff, other workers, agents and consultants of Trillium and its Affiliates who are engaged in the performance of Trillium’s obligations under the Contract from time to time.

1.2 The parties agree that: (a) the headings to the clauses in these Terms and Conditions are inserted for convenience of reference and shall not affect their interpretation; (b) in case of any conflict or inconsistency between these Terms and Conditions and the Purchase Order, the terms of the Purchase Order shall prevail and (c) English shall be the language of the Contract, and all communications, written or oral, and documents under the Contract shall be in the English language unless otherwise stated elsewhere in the Contract.

2. APPLICABILITY, CONTRACT FORMATION AND CHANGES

2.1 Applicability. These Terms and Conditions apply to all orders for Goods and/or Services made by the Customer pursuant to a Purchase Order. Unless expressly agreed in writing by Trillium, any terms or conditions in the Customer’s order or other documents provided by the Customer shall not apply to any Goods or Services provided by Trillium and shall not bind Trillium, and Trillium explicitly rejects any such terms or conditions.

2.2 Contract Formation. Where the Customer wishes to purchase Goods and/or Services from Trillium it will communicate its requirements to Trillium. Upon receipt of such request, Trillium may produce a draft document setting out the details of the Goods and/or Services that Trillium proposes to provide and shall provide this draft document to the Customer. If applicable, the terms of the draft document shall be valid for the time period stated in that draft document and thereafter are subject to change. The Contract between Trillium and the Customer is formed upon the parties formally accepting or otherwise acknowledging in writing a Purchase Order and shall continue until each party’s obligations are completed in accordance with the terms of the Contract, unless terminated earlier in accordance with the terms of the Contract (the “Term”). Trillium has no obligation to agree to any Purchase Order.

2.3 Changes. The Customer may request modifications as to the amount, scope and/or nature of the Goods and/or Services via a written change request. If, in Trillium’s sole opinion, any such modification will affect the agreed Price and/or time of delivery, Trillium will notify the Customer in writing and will not be obligated to perform any modification unless the Customer agrees in writing to such Price and/or time of delivery.

3. PRICE AND PAYMENT

3.1 Price and Payment Terms. The Price and payment terms shall be set as out in the Purchase Order. When no Price is specified in the Purchase Order, it shall be calculated on a time and materials basis in accordance with Trillium’s price schedule then in force. Where no payment terms are set out in the Purchase Order, payment of each invoice shall be due and payable thirty (30) days after the date of the invoice. All invoices shall be paid without any set-off, counterclaim or deduction whatsoever.

3.2 Additional Charges. Any technical documents, inspection reports, evaluation or opinion requested by the Customer or in connection with the Contract shall be chargeable, such charges to be agreed by the parties. Any time that Trillium Personnel or Sub-Supplier Personnel are required at the Site(s) outside of the agreed working hours shall be chargeable as overtime. If Trillium incurs any costs due to the Customer’s failure to comply with any of its obligations under the Contract, the Customer shall be responsible for such costs.

3.3 Excluded Charges and Tax. Unless expressly provided otherwise in the Purchase Order: (a) transportation charges, delivery charges, customs duties, insurance charges, packaging costs, consular fees, and any other similar charges are not included in the Price; and (b) the Customer shall be responsible for all taxes (other than taxes based on the income of Trillium), charges and assessments levied or imposed on the sale(s) made under the Contract. In the event that Trillium is required to pay any such tax, charge, or assessment, the Customer agrees to promptly reimburse Trillium for said amounts.

3.4 Interest on Overdue Amounts. If the Customer fails to pay any invoice by the due date for payment, Trillium shall charge interest at 15% per annum on the overdue amount from the due date for payment until actual payment is made.

3.5 Escalation. In the event of a delay of two weeks or more the increase of actual costs of Goods and/or Services of 5% or more, occurring between the effective date of the Contract and the date of shipment of the Goods or performance of the Services from causes beyond the reasonable control of Trillium, including but not limited to any foreign exchange fluctuation, import or export duties, costs of labor, transportation, materials and other costs of manufacture, any change in duties or specifications of the Goods or Services, or any delay caused by any instructions or omissions by Customer, the Price or Contract requirements will be equitably adjusted via written notice to Customer at any time prior to shipment of the Goods and/or performance of the Services.

4. DELIVERY, TESTING AND ACCEPTANCE OF GOODS

4.1 Delivery. Delivery terms for Goods shall be as per the INCOTERM 2010 stated in the Purchase Order. Where no INCOTERM 2010 is stated in the Purchase Order, delivery shall be EXW INCOTERM 2010's specified premises. The Customer must collect the Goods, or arrange for the Goods to be collected, within seven (7) days of notice from Trillium that the Goods are ready to be collected. If the Goods are not collected within such time period, Trillium may, at its discretion: (a) where title has not passed to the Customer, sell the Goods at the best price readily obtainable and recover from the Customer any shortfall between the Price for the Goods and the price obtained by Trillium; or (b) arrange for the storage of the Goods, which, unless otherwise agreed, shall be at the Customer’s exclusive cost and expense. Where storage is not at Trillium’s premises, risk in the Goods will pass to the Customer upon the Goods leaving Trillium’s premises. The time of delivery shall not be of the essence and if Trillium is unable for any reason to fulfil any delivery of the Goods on the specified date, Trillium shall not be treated as being in breach of the Contract and the Customer shall not be entitled to reject delivery, terminate the Contract, nor to any compensation in respect of such delay.

4.2 Testing. Goods manufactured by Trillium will be subject to Trillium’s standard tests. Any additional testing requested by the Customer will be subject to the payment by the Customer of additional charges.

4.3 Acceptance. Following delivery of the Goods in accordance with the Contract, and unless expressly excluded by the Customer to Trillium in writing, the Customer shall accept the Goods.

4.4 Liquidated Damages. Where the parties have agreed in the Purchase Order that any sum will be payable for late delivery of the Goods, if delivery of the Goods is delayed beyond the agreed delivery date due to an act or omission of Trillium then Trillium shall pay to the Customer a sum calculated at the percentage rate (stated in the Purchase Order) of the price of the delayed Goods for each week between the agreed delivery date and the actual delivery date, up to the maximum amount specified in the Purchase Order. Such sum shall be the Customer’s sole and exclusive remedy and paid in lieu of any claim arising by Trillium. The Customer in full and final settlement and satisfaction of Trillium’s entire liability for any loss, damages, costs or expenses suffered or incurred by the Customer arising from such delay (“Liquidated Damages”). Liquidated Damages are not applicable to the delivery of spare parts or accessories.

4.5 Provision of Documents. Where the Purchase Order requires Trillium to provide documents for approval by the Customer, Trillium shall provide such documents within the time period agreed, or if no time period is agreed, within a reasonable time from receipt of the Purchase Order.

5. TITLE AND RISK

5.1 Title and Risk. Title and property in all Goods shall remain vested in Trillium until receipt by Trillium of payment in full of the Price (including any storage costs and expenses and default interest) for such Goods from the Customer. Risk in the Goods shall pass to the Customer in accordance with the agreed INCOTERM 2010. Customer shall provide access to the Customer’s premises in order for Trillium to recover Goods in respect of which title and property has not passed to the Customer.

5.2 Trillium Property. Any Goods delivered by Trillium to the Customer where title and property remains vested in Trillium: (a) shall be stored by the Customer separately from any other goods or materials; or (b) shall not be included in any mixed consignment nor sold to any third party, by the Customer or any person on the Customer’s behalf, until such time as title and risk passes to the Customer.

5.3 Customer Plant. In respect of Customer Plant: (a) the Customer warrants that it is the owner, or the authorized agent of the owner, of the Customer Plant with express authority to contract with Trillium on the terms and conditions of the Contract; and (b) all Customer Plant delivered to Trillium shall be at the sole risk of the Customer, and Trillium shall be under no obligation to the Customer for any loss or damage to the Customer Plant however caused, except for any damages caused by the negligence of Trillium Personnel or Sub-Supplier Personnel. Accordingly, the Customer should make such arrangements for insurance thereof as it thinks fit.
PERFORMANCE OF THE SERVICES. The Services shall be performed at the Site(s) on the date(s) specified in the Services. Trillium or any Sub-Supplier shall not be liable for any failure to meet any dates where such failure is caused by an act or omission of the Customer, its agents, subcontractors, consultants or employees.

OBLIGATIONS OF THE CUSTOMER

1. Provision of Data. The Customer shall promptly provide to Trillium all applicable data that is relevant to the provision of the applicable Goods and/or Services, including all specifications, instructions, documentation, drawings and/or other information. The Customer will, at its cost, ensure that all applicable drawings and/or other information are adequate for Trillium to perform the Services.

2. Decontamination. Any Defective Goods returned to Trillium and any Customer Plant delivered to Trillium for any purpose (including collection and/or return), or made available to be collected by the Customer, must be decontaminated in accordance with the relevant decontamination standards.

3. Property Rights. The Customer warrants that it has all necessary licenses and permissions to allow the provision of the applicable Goods and/or Services. The Customer also warrants that it has all necessary licenses, permits and authorizations to provide such access.

WARRANTIES

1. Warranty Period. Trillium’s warranty obligations under the Contract shall commence on the date of delivery of the Goods. Unless otherwise agreed in writing by Trillium, the Warranty Period shall be as follows: (a) for new or reconditioned Goods, twelve (12) months from the date of delivery; (b) for repaired or replaced Goods, twelve (12) months from the date of repair or replacement.

2. Exclusions. Subject to clause 10.1 above and notwithstanding anything in the Contract to the contrary, Trillium shall not be responsible or held liable to the Customer or any Third Party for any Special, Punitive, Exemplary, Delay, Incidental, Indirect, or Consequential Damages, Losses, or Costs of Any Kind, including without limitation, Loss of Profit, Savings, or Any Special, Punitive, Exemplary, Delay, Incidental, Indirect, or Consequential Damages, Losses, or Costs of Any Kind, or any expense or liability for any such damages or losses.

3. Limitation of Liability. Subject to clauses 10.1 and 10.2 above and notwithstanding anything in the Contract or otherwise, under or in connection with the Contract, the Customer shall be liable for any total claim for payment received by Trillium from a Third Party for which the Customer is responsible to Trillium under this Contract or otherwise.

4. Warranty Disclaimers. Except for those express warranties set out in the Contract, to the fullest extent permitted by applicable law, the Customer expressly disclaims, and any and all representations or warranties of any kind, whether express or implied, including those of merchantability and fitness for any particular purpose, are hereby disclaimed by the Customer, and the Customer express disclaims, and any and all representations or warranties of any kind, whether express or implied, including those of merchantability and fitness for any particular purpose, are hereby disclaimed by the Customer.

5. Exclusions. Subject to clause 10.1 above and notwithstanding anything in the Contract to the contrary, Trillium shall have no liability for any such damages or losses, nor shall it be liable for any such expenses or liabilities.

6. Customer Warranties. The Customer warrants and represents that: (a) it has provided Trillium with all relevant, full and accurate information as to the Customer’s business and needs, as well as all the information required in order for Trillium to perform its obligations under the Contract; and (b) it is properly financed and organized, and is solvent and has not made a general assignment for the benefit of creditors nor has it been adjudicated bankrupt or insolvent and it is not aware of any fact or event based upon which, in its reasonable opinion, it may face any such situation of financial distress described in this clause before the completion of all its obligations under the Contract.

INDUSTRY AND INSURANCE

1. Indemnity. The Customer shall indemnify and hold the Trillium Indemnitees harmless for all claims, demands, losses, damages, liability, costs and expenses (including legal and other professional fees), fines and penalties incurred by the applicable Trillium Indemnitees arising out of or in connection with the applicable Trillium Indemnitees’ attendance at any Site in order to provide the Services.

2. Limitation of Liability. Under or in connection with the Contract, the Customer shall release and hold harmless the Trillium Indemnitees from all liability, claims, actions and proceedings, including all summary, declaratory, injunctive or permanent relief thereon.

3. Indemnity and Insurance. The Customer shall have in place insurance with reputable insurers incorporated in the country of establishment to cover its obligations under the Contract. On request, the Customer shall supply evidence of the maintenance of the insurance and all of its terms from time to time applicable.

LIMITATION OF LIABILITY

1. UNLIMITEO LIABILITY. NOTHING IN THE CONTRACT LIMITS ANY LIABILITY OF THE PARTIES FOR: (i) ANY INDEMNITY PROVIDED UNDER THESE TERMS AND CONDITIONS; (ii) DEATH OR PERSONAL INJURY CAUSED BY NEGLIGENCE; (iii) FRAUD OR FRAUDULENT MISREPRESENTATION; OR (iv) ANY LIABILITY WHICH CANNOT LEGALLY BE LIED.

2. EXCLUSIONS. SUBJECT TO CLAUSE 10.1 ABOVE AND NOTWITHSTANDING ANYTHING IN THE CONTRACT TO THE CONTRARY, TRILLIUM SHALL NOT BE RESPONSIBLE OR HELD LIABLE TO THE CUSTOMER OR ANY THIRD PARTY FOR ANY SPECIAL, PUNITIVE, EXEMPLARY, DELAY, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSSES, OR COSTS OF ANY KIND, INCLUDING WITHOUT LIMITATION, LOSS OF PROFIT, SAVINGS, OR ANY SPECIAL, PUNITIVE, EXEMPLARY, DELAY, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSSES, OR COSTS OF ANY KIND, OR ANY EXPENSE OR LIABILITY FOR ANY SUCH DAMAGES OR LOSSES.

3. LIMITATION OF LIABILITY. UNDER OR IN CONNECTION WITH THE CONTRACT, THE CUSTOMER SHALL BE LIABLE FOR ANY TOTAL CLAIM FOR PAYMENT RECEIVED BY TRILLIUM FROM THE CUSTOMER IN RESPECT OF THE PARTICULAR GOODS OR SERVICES (OR PART THEREOF) GIVING RISE TO THE CLAIM.

4. WARRANTY DISCLAIMER. EXCEPT FOR THOSE EXPRESS WARRANTIES SET OUT IN THE CONTRACT, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE CUSTOMER EXPRESSLY DISCLAIMS, AND ANY AND ALL REPRESENTATIONS OR WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED BY THE CUSTOMER, AND THE CUSTOMER EXPRESSLY DISCLAIMS, AND ANY AND ALL REPRESENTATIONS OR WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED BY THE CUSTOMER.

5. EXCLUSIONS. SUBJECT TO CLAUSE 10.1 ABOVE AND NOTWITHSTANDING ANYTHING IN THE CONTRACT TO THE CONTRARY, THE MAXIMUM AGGREGATE LIABILITY, IF ANY, OF TRILLIUM (WHETHER ARISING IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY, BREACH OF CONTRACT OR OTHERWISE) UNDER OR IN CONNECTION WITH THE CONTRACT SHALL BE LIMITED TO AN AMOUNT EQUAL TO ONE HUNDRED PERCENT (100%) OF THE TOTAL PAYMENTS RECEIVED BY TRILLIUM FROM THE CUSTOMER IN RESPECT OF THE PARTICULAR GOODS OR SERVICES (OR PART THEREOF) GIVING RISE TO THE CLAIM.

6. LIABILITY CLAIMS. RISOREFERENCE OF TRILLIUM’S FAULT, NEGLIGENCE OR LIABILITY WITHOUT FAULT.

INTELLECTUAL PROPERTY

1. Trademark and Copyright. The Customer acknowledges that, unless otherwise agreed in the Purchase Order, all Intellectual Property Rights in any Goods, Deliverables, designs, drawings and/or software or any items related thereto, or any other items provided to the Customer under the Contract shall be fully owned by Trillium or its licensors (as applicable). Subject to the terms of the Contract, Trillium grants the Customer a revocable, non-exclusive, non-transferable, non-sublicensable license to use the Goods in the course of ordinary business.

2. License Requirements. The Customer undertakes that it will not use, except for the Permitted Purpose, nor make available to any Third Party (i) any Goods or software or any items related thereto, or any other items provided to the Customer during the performance of the Contract (collectively referred to as “Trillium IP”), (ii) any Trillium IP, (iii) any Trillium IP or any equivalent software, or (iv) any Trillium IP, except as expressly required in writing by the Customer, which shall be at its sole discretion, and provided that the Customer shall indemnify and hold harmless Trillium from and against any claims, damages, costs, expenses (including legal and other professional fees), fines and penalties incurred by the applicable Trillium Indemnitees arising out of or in connection with the applicable Trillium Indemnitees’ use of the Customer’s Intellectual Property Rights.

3. Trademark and Copyright. The Customer acknowledges that, unless otherwise agreed in the Purchase Order, all Intellectual Property Rights in any Goods, Deliverables, designs, drawings and/or software or any items related thereto, or any other items provided to the Customer under the Contract shall be fully owned by Trillium or its licensors (as applicable).

4. Trademark and Copyright. The Customer acknowledges that, unless otherwise agreed in the Purchase Order, all Intellectual Property Rights in any Goods, Deliverables, designs, drawings and/or software or any items related thereto, or any other items provided to the Customer under the Contract shall be fully owned by Trillium or its licensors (as applicable).
12. CONFIDENTIALITY

12.1 Any document, data, drawings, plans, designs, images, specifications, technical data and any other material or information supplied or made available by one party (the “Discloser”) to the other party (the “Recipient”) or as part of the Contract or any other documentation or information in whatsoever form provided by the Discloser to the Recipient during the performance of the Contract (“Confidential Information”), shall be treated as strictly confidential and shall not be divulged by the Recipient to any third party except as required by law or to the Recipient’s personnel, subcontractors or professional advisors, who need to know such Confidential Information in order for the Recipient to comply with its obligations under, or receive the benefit of, the Contract and provided that such recipients are subject to obligations of confidentiality in respect of such Confidential Information. As between the Recipient and the Discloser, the Discloser retains title to all of its Confidential Information.

13. PROCESSES OF PERSONAL DATA

Each party, as an autonomous data controller, agrees to process the personal data acquired from the other party during the performance of the Contract (the “Personal Data”) in compliance with the provisions of the General Data Protection Regulation (EU) 2016/679 and the United Kingdom’s adoption of the General Data Protection Regulation and every law and provision concerning personal data protection which may be applicable from time to time (hereinafter, collectively referred to as “Data Protection Laws”). Each party, for the parts they are responsible for, is specifically obliged to comply with, when necessary, obligations concerning information to be sent to the data subjects (including ensuring appropriate legal basis for processing) and to obtain, when necessary, from the same all required consent in relation to the processing of the Personal Data transferred to and processed by the other party and to meet any obligations provided for by Data Protection Laws. Each party may exercise any rights they have under the Data Protection Laws in relation to the other party at any time. The parties declare that their respective representatives processing the Personal Data, directly and/or indirectly concerned with the performance of the Contract, have been informed of the confidential nature of, and legal requirements including those under the Data Protection Laws relating to, such Personal Data and have received suitable training on their responsibilities to protect the Personal Data.

14. COMPLIANCE WITH LAW AND REGULATIONS

14.1 Applicable Law. The Customer represents and warrants that it is, and will remain, fully compliant with all Applicable Law, instructions and policies, including, but not limited to all statutory licenses or permits required for the receipt of the Goods and/or Services and the performance of its obligations under the Contract. Each party shall comply with all Applicable Law in connection with bribery or anti-corruption. If required by Trillium, DP, the Customer shall complete and sign an end user certificate before using the Goods and/or Services. Unless otherwise agreed in writing, Trillium accepts no responsibility or liability for failure to comply with statutory or local regulations or by-laws that affect the siting, construction and operation of the Goods supplied under the Contract. Any relevant consents or approvals required shall be the responsibility of, and obtained by, the Customer.

14.2 Export and Dual Use Law. The Customer acknowledges that Trillium is required to comply with all applicable export laws, controls and regulations relating to the sale, exportation, transfer, assignment, disposal, and usage of Goods to be supplied in accordance with the Contract, as well as any laws or regulation relating to “dual use” goods, including, but not limited to, U.S., United Kingdom and European (Union export rules and any export license requirements collectively, the “Export and Dual Use Law”). The Customer agrees it shall not at any time or in any manner, directly or indirectly, export, sell, transfer, assign or otherwise dispose of the Goods in a manner which will result in non-compliance with applicable Export and Dual Use Law. If any of the Goods fall under the definition of “dual use” item, the Customer represents and warrants that it has obtained all required licenses and approvals and shall provide any and all information and consent required. The Customer may also involve information or items that are subject to military defense or nuclear export controls, and the Customer agrees that it will comply with said controls and shall not export or re-export, directly or indirectly, any hardware, software, defense service, information or technical data provided by, through, or with the cooperation of Trillium, to any party, including persons employed by or associated with, or under contract with, the Customer or the Customer’s lower-tier suppliers without the prior written consent of Trillium and without first obtaining any required export license or other approval.

14.3 Restricted Party Lists. The Customer represents that neither the Customer nor any of its Affiliates are included on any of the restricted, denied, or sanctioned party lists maintained by the government of the country(ies) in which Trillium or its Affiliates are based. The Customer shall promptly notify Trillium in writing if the Customer is, or becomes, listed in any such lists or if the Customer’s export privileges are otherwise denied, suspended, revoked or in whole or in part by any governmental authority.

15. TERMINATION

15.1 Termination. The Customer may terminates the Contract or any part thereof for any reason by written notice to Trillium, provided that (other than where such termination is due to a material breach of the Contract by the Customer) the Customer shall pay to Trillium the total costs which have been incurred by Trillium as of the date of such notice. If, by reason of an event of Force Majeure, either of the parties shall be delayed in, or prevented from, performing any of the provisions of the Contract (other than the Customer’s obligation to make payments in accordance with the Contract) then, provided that the affected party promptly notifies the other in writing of the nature and extent of such event as soon as practicable, such delay or non-performance shall not be deemed to be a breach of that party’s obligations and no loss or damage shall be claimed by either of the parties hereto from the other by reason thereof. If Trillium suffers delay and/or incurs any costs by reason of an event of Force Majeure, Trillium shall be entitled to an extension of time under the Contract for the delays in performance caused by such event of Force Majeure.

16.2 Force Majeure. If, by reason of an event of Force Majeure, either of the parties shall be delayed in, or prevented from, performing any of the provisions of the Contract (other than the Customer’s obligation to make payments in accordance with the Contract) then, provided that the affected party promptly notifies the other in writing of the nature and extent of such event as soon as practicable, such delay or non-performance shall not be deemed to be a breach of that party’s obligations and no loss or damage shall be claimed by either of the parties hereto from the other by reason thereof. If Trillium suffers delay and/or incurs any costs by reason of an event of Force Majeure, Trillium shall be entitled to an extension of time under the Contract for the delays in performance caused by such event of Force Majeure.
SECTION 46 21 26 – STEP SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the Work necessary to completely furnish and install the step screen system including all related equipment, material, and appurtenances as shown on the drawings and specified herein.

B. Equipment specified within the following sections shall be coordinated and supplied by a single manufacturer:
   1. Section 44 42 27.20 – Screenings Washer Compactor
   2. Section 46 21 26 – Step Screen
   3. Section 46 21 60 – Water Sluice System

C. Related sections:
   1. Section 01 33 00 – Submittals
   2. Section 01 60 00 – Product Requirements
   3. Section 01 78 23 – Operation and Maintenance Data
   4. Section 01 79 00 – Demonstration and Training
   5. Section 26 05 33 – Raceways, Boxes, Enclosures, and Fittings

1.2 COSTS OF PRE-NEGOTIATED ITEMS

A. Owner has entered into a pre-negotiated cost agreement with the specified manufacturer for some items in this section of the specification. Refer to Attachment “A” BID FORM for more details. The pre-negotiated cost agreement and proposal from the specified manufacturer is provided as an attachment to this specification section. The Contractor shall carefully review the pre-negotiated proposal and scope of supply to determine those items required by the Contract Documents which are not part of the proposal or specified manufacturer’s scope of supply. In addition to the pre-negotiated costs indicated in Attachment “A” BID FORM, the Contractor shall include in the Lump Sum Bid Price the costs for the following:
   1. All items not specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal but required by the Contract Documents and/or necessary to provide a complete and operational system.
   2. All items specifically itemized in the manufacturer’s scope of supply provided as part of the pre-negotiated proposal which are designated to be provided by others, provided by the customer, provided by the Owner, or any similar designation.
   3. All labor, materials, and all other associated costs not included in the pre-negotiated proposal but required by the Contract Documents and required to provide a complete and operational system.

1.3 GENERAL

A. Equipment Numbers: 10SCR1, 10SCR2, 10SCR3, 10SCR4

B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts, and manufacturer’s services.

C. Unit Responsibility: The Work requires that the step screens, local control panel, instruments, and components complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment. The
supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor’s responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein and in the pre-negotiated agreement which is provided as an attachment to this specification section.

D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.4 SUBMITTALS

A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:

1. Shop Drawings:
   a. Make, model, weight, and horsepower of each component.
   b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
   c. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and details of anchorage and of connections to other work, and weights of associated equipment.
   d. Gear output torque and screen lifting capacity calculations
   e. External utility requirements (quantity and connection details) such as air, water, power, drain etc., for each component.
   f. Motor nameplate data, motor manufacturer, and any motor modifications.
   g. Wiring diagrams for motors, including terminals and numbers.
   h. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
   i. List of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
   j. Instrumentation and Control Submittals: In conformance with Division 40.
   k. Provide complete headloss calculation sheets and outputs, including peak and average flow scenarios, with 10%, 30%, 50%, and 70% blinded conditions.

2. Quality Control Submittals:
   a. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating systems.
   b. Special shipping, storage and protection, and handling instructions.
   c. Test procedures.
   d. Test results, reports, and certifications.
   e. Manufacturer's Certificate of Proper Installation.
   f. Operation and maintenance manual.


1.5 QUALITY CONTROL

A. The materials covered under these specifications are intended to be standard equipment of proven reliability and as manufactured by a reputable manufacturer having experience in the production of screening equipment. The equipment furnished shall be designed and constructed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the Contract Drawings and operated per the manufacturer’s recommendations.
B. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.

1.6 OPERATION AND MAINTENANCE DATA

A. O&M Manuals: Content, format, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY

A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer will promptly repair or replace the defective equipment without additional cost to the Owner.

B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided and modified as required to conform to the performance, functions, features, and materials of construction as specified herein.

B. Materials, equipment, components, and accessories specified in this section shall be, products of:
   1. Huber – SSF-HF 5000x1126/6

2.2 GENERAL REQUIREMENTS

A. Noise Level: When in operation, no piece of equipment shall exceed the noise level requirements for a 1-hour exposure at 80 dBA.

B. Service Factors: Service factors shall be applied in the selection and design of components where so indicated in individual sections. When not indicated there, minimum service factors shall be 1.25, except for gears and gear drives as specified herein.

C. Safety Devices: The completed work shall include all necessary permanent safety devices, such as machinery guards, emergency stops and similar items required by OSHA, and other federal, state, and local health and safety regulations.

D. Flanges and Pipe Threads: Comply with ANSI B 16.1, Class 125; or B 16.5, Class 150, unless otherwise indicated. Threaded flanges and fittings shall have standard taper pipe threads complying with ANSI/ASME B 1.20.1.

E. Bearings:
   1. Conform to the standards of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA).
   2. Except where otherwise indicated, bearings of process equipment shall have a minimum L-10 life expectancy of 100,000 hours.
F. Gears and Gear Drives:
   1. Except as otherwise indicated, gears shall be of the helical or spiral-bevel type, designed and manufactured in accordance with AGMA Standards, with a minimum service factor of 1.7, a minimum L-10 bearing life of 60,000 hours, and a minimum efficiency of 94 percent.
   2. Gear speed reducers or increasers shall be of the enclosed type, oil- or grease-lubricated and fully sealed, with a breather to allow air to escape but keep dust and dirt out. The casing shall be of cast iron or heavy-duty steel construction with lifting lugs and an inspection cover for each gear train. A bullseye style sight glass and an oil flow indicator shall be provided and installed for easy reading.
   3. Gears and gear drives as part of an equipment assembly shall be shipped fully assembled for field installation.
   4. Material selections shall comply with AGMA values and the manufacturer's recommendations. Input and output shafts shall be properly designed for the service and load requirements. Gears shall be computer-matched for minimum tolerance variation. The output shall have two positive seals to prevent oil leakage.
   5. Oil level and drain location shall be readily accessible.
   6. Where gear drive input to output shafts connect to couplings or sprockets, the gear drive manufacturer shall supply matching key.

G. Anchor bolts shall be stainless steel straight threaded rods complying with ASTM F593, AISI Type 316, Condition A, with ASTM F594, AISI Type 316, stainless steel nuts. Provide ASTM A194/A194M, Grade 8S (Nitronic 60) stainless steel nuts where required. Other AISI types may be used when approved by Engineer. Threaded rods shall comply with ductility requirements of ACI 350 or ACI 318 Appendix D, Section D.3.3. Hooked Bolts are unacceptable. Anchorage number, size and design shall be by the screen manufacturer.

H. Stainless Steel: Stainless steel components shall be 316-304 stainless steel, or higher, as specified.

I. Nameplates: Equipment nameplates of 316 stainless steel shall be engraved or stamped and fastened to the equipment in accessible locations with 316 stainless steel screws or drive pins. Nameplates shall contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.3 SERVICE CONDITIONS

A. Each screen will be located in the Headworks Screen Facility in a channel that is 4.5-feet wide and 6.0-feet deep, as shown in the drawings.

B. The step screens will be required to remove material from raw sewage. This material includes rocks, grit, rags, hair, paper products, plastic products, and any and all material up to 9 inches in diameter.

C. There will be a high level of hydrogen sulfide present.

2.4 SYSTEM PERFORMANCE AND FUNCTIONAL REQUIREMENTS

A. System Definition
   1. The system will consist of four (4) step screens and four (4) local control stations for each screen.
   2. The entire headworks system shall be designed to handle 87.5 MGD with four screens in service.
3. The screenings will be discharged into a sluiceway, and then travel to a washer/compactor. The downstream equipment (sluiceway and washer/compactor) are not included in this specification.

4. The configuration and location of the systems and their components shall be as shown on the Drawings.

5. Each system shall include components and accessories which are required for a fully functioning system.

B. Downstream Hydraulics
   1. The bottom floor elevation of the screen channels is: 591.50 feet ELE. The operating floor elevation is: 597.50 feet ELE.
   2. The hydraulics of the system are as follows: The downstream water elevation is controlled by the effluent weir gate at the headworks distribution structure. The water level downstream of the screens fluctuates as a function of the flow rate, number of grit basin units online, and number of screens online. There are three total grit basins and four total screens that could be online.
   3. Table 1 indicates the downstream water level at the various conditions.

<table>
<thead>
<tr>
<th>Number of Grit Basins Online</th>
<th>Number of Screens Online</th>
<th>Average Flow</th>
<th>Peak Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three</td>
<td>Four</td>
<td>2.15 ft</td>
<td>2.95 ft</td>
</tr>
</tbody>
</table>

C. Step Screen
   1. Remove, collect, elevate, and discharge screenings through a discharge chute into the sluiceway that is at floor level.
   2. Hydraulic flows to screen facility:
      a. Peak Flow: 87.5 MGD
      b. Average Flow: 35 MGD
   3. Screen Hydraulics:
      a. Maximum flow to one screen: 17.5 MGD
      b. Set point for maximum screenings capture: 8.0 inches differential
      c. Maximum head loss at peak flow: 11.05 inches at 35% blinding
      d. Provide all hydraulic calculations.
      e. Velocity through the screen shall always be less than 4.0 feet per second (fps).
      f. Channel velocity upstream of the screen shall be between 2.4 fps and 3.53 fps.
      g. A face plate should be provided that covers the entire bottom step. This face plate height should be included in the headloss calculations and shown in the headloss calculations under a separate line item.
      h. Maximum downstream water depth in channel is 3.0 feet. There shall be no components that need lubrication below 6.0 feet.
   4. The steps should be capable of conveying a 9-inch diameter material up the face of the screen.
   5. Furnish a screen with discharge chute/hopper such that the screenings discharge is fully compatible with the screenings sluiceway system.

2.5 EQUIPMENT AND/OR MATERIALS

A. Materials:
   1. All structural steel components shall conform to the requirements of “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings” published by the American Institute of Steel Construction.
   2. All components of the entire screen shall be 304 stainless steel or higher, including the drive shaft.
3. 304 stainless steel structural components and enclosure panels shall be passivated (either full dip passivation or electropolish) to remove embedded iron, surface rust, and weld burn.
4. All fasteners and hardware shall be 316 stainless steel.
5. All welding in the factory will use shielded arc, inert gas, MIG or TIG method. Add filler wire 316 to all welds to provide for a cross section equal to or greater than the parent metal. Fully penetrate butt welds to the interior surface and provide gas shielding to interior and exterior of the joint. All welds will be finished to include the following as a minimum: Remove all pointed protrusions from underside and face of welds and remove all weld spatter.
6. Field welding of stainless steel will not be permitted.
7. Bearings shall be greased ball bearing type, non-self-aligning, sealed and lubricated.

B. Step Screen
1. Design Features:
   a. The step screens shall be a 304 stainless steel step type screen.
   b. Screen Covers and Discharge Chute: Removable 304 stainless steel protective covers shall be installed to cover the front sections of the step screens/frame that are above the channel opening. 304 stainless steel protective covers shall cover the back sections of the screens/frame that are above the channel opening. Front access covers shall be provided for any mechanical components. Covers should be removable by one person. The connection mechanism of the covers onto the screen must be quick disconnect and not require any tools. Covers should seal against the frame and mitigate air passage along sealing area.
   c. A sealing system shall be installed between the support frame and channel walls to prevent screenings from bypassing the step screen system. This sealing system shall be of a non-degradable material and shall be able to be removed and replaced with a guide frame and bolts.
   d. Side seal angles and baffles mounted to the channel are required, to provide a surface for the sealing system to rest against. These components should be stainless steel and be anchored into the concrete. The side seals should allow the screen to pivot out of the channel without the removal of the seal plates. This system is the responsibility of the screen manufacturer. This detail must be provided as part of the submittal.
   e. Any required maintenance shall be capable of being performed at the operating floor or grade level (not the channel floor).
   f. No parts of the drive system shall be in direct contact with, or exposed to, screened debris.
   g. Screened debris shall be routed to the screenings sluice flume via a covered discharge chute. The discharge chute is the responsibility of the screen manufacturer and should be coordinated and provided under this scope of work.
   h. The discharge chute shall be designed to be used with the screen when pivoted. This can be done by either:
      1) The screen being capable of pivoting while the discharge chute is installed
      2) The discharge chute being easily removable, without the use of tools, and by no more than one person, to allow a pivot.
   i. This discharge chute must be of stainless-steel construction. The chute should have a hinged door for visual access to the back of the screen; this door should be able to be opened and closed without the use of any hand tools.
   j. A directing plate will be installed at the base of the machine to prevent grit deposits from accumulating in front of the screen. This plate should either fully cover the bottom step or so designed so that deposits are directed onto the top of the bottom step. Per the manufacturer, the plate should be removable or self-relieving.
   k. The fixed lamella plates are constructed from type 304 stainless steel. The fixed lamella shall have a step profile on the upstream side and locking tabs and serrations on the downstream side. Each fixed plate shall have a UHMW or stainless steel cap.
at the top and bottom of the plate in order to properly maintain the lamella spacing and alignment with adjacent movable plates. On the downstream side of the unit, the locking tab of each fixed lamella plate shall fit into slotted step cradles that are bolted to the unit frame on each side. The step cradles are slotted to maintain the spacing of the fixed lamella plates and connect them into a single fixed pack. The plates are then clamped to the step cradles to positively lock the plates in place. With the clamping plates loosened, an individual fixed plate may be removed from the pack. Lamellas should have no change in material across the length of the lamella.

l. Fixed Lamella plates thickness should be 2 mm.
m. The movable lamella plates are constructed from type 304 stainless steel. The movable lamella shall have a step profile on the upstream side and locking tabs and either serrations on the downstream side. Each movable plate shall have intermittent UHMW spacers along its length in order to properly maintain the lamella spacing and alignment with adjacent movable plates. On the downstream side of the unit, the locking tab of each movable lamella plate shall fit into slotted step cradles that are bolted to the end plates of the movable lamella pack on each side. The end plates are constructed from type 304 stainless steel. The step cradles are slotted to maintain the spacing of the movable lamella plates and connect them into a single rotating pack. The plates are then clamped to the step cradles to positively lock the plates in place. With the clamping plates loosened, an individual fixed plate may be removed from the pack.

n. Movable Lamella plates should be spaced at 6 mm.
o. Screen Inclination Angle: 50 degrees from horizontal. No other angle shall be acceptable.
p. Screens shall have the capability to pivot out of the channels as necessary without disconnecting any line, pipe, or device, except the discharge chute if necessary.
q. Do not permanently locate grease lubricated bearings within the possible wetted area of the channel.
r. Screens that do not provide the pronounced step profile over their entire length shall not be acceptable.

2. Components:
a. Structural Frame: The frame shall be manufactured of 304 stainless steel or higher quality with a minimum thickness of 5 mm. The screen frame shall not be fixed within the channel; the machine shall be allowed to pivot out of the channel for maintenance. The screen shall be supported by a pivot stand which is to be provided within this scope of work.
b. Screen: The screens will consist of 304 stainless steel elements connected in parallel with 6 mm (1/8”) spacing between the bars. The steps will operate with rotating step-shaped lamellas conveying the particles upward onto fixed lamellas, which will have the screenings removed by the next rotation of the lamellas. Both the fixed and rotating lamellas will have a thickness of 2 mm and 3 mm (1/8”), respectively. All wetted parts will be of 304 stainless steel and high-density composites for maximum corrosion resistance. To reduce maintenance, no grease lubricated bearings, seals or other mechanisms are subject to operation in the flow stream. Removable front and rear covers will completely enclose the screens above the operating floor.
c. Directing Plate: The step screens shall be provided with a directing plate at the base of the machine perpendicular to flow to prevent grit and gravel deposits from accumulating below the step blades. The plate should be installed at a maximum angle of 40 degrees from horizontal.
d. Linkage Driving System: The screen shall be designed with a linkage system on each side of the unit that transfers the rotation of the drive to the moveable lamella pack without the use of chains or sprockets. Each linkage system shall consist of an eccentrically rotated excenter bearing and upper and lower rocker arm assemblies.
connected by solid drive plates or rods that connect to the movable pack cross members and step cradles.

e. A cable linkage drive is NOT acceptable.

f. Chain and Sprocket Driving System is NOT acceptable.

g. Gear Motor Drive Assembly: The drive unit shall be a gear motor rated for continuous duty and shall be selected to match the requirements of the particular screen. The motor shall be a maximum of 3 hp, 480 VAC, 60 Hz, 3 phase power, and a service factor of 1.15. The drive unit shall be direct coupled to the screen drive shaft through the gear box. Gear reducers shall meet the standards of the American Gear Manufacturers association. The drive assembly shall be capable of elevating the weight of the movable lamellas plus the maximum debris load. The screen shall be equipped with electronic overload protection to stop the screen and initiate an alarm in the event of an overload.

h. Covers: The step screens shall include 304 stainless steel covers for odor control and general plant safety. The covers shall extend from the deck level to the top of the screen. The covers on the front and back of the screen shall be easily removable and shall include a keyed locking mechanism. The covers on the sides of the screen shall be fastened in place by screws.

i. Grit Spray Wash: The screen should be provided with a grit spray wash system. This system should consist of a stainless-steel spray bar mounted integral to the toe of the screen. The spray bar should have openings that stream a jet of water in the direction of the flow of the wastewater through the screen. The water should be directed at the base of the lamellas, to flush any grit away from the base of the lamellas. The spray wash hose and supply should run inside the frame of the screen to a flexible connection at the pivot point of the screen. This flexible connection should be 10 feet long and made of braided stainless-steel hose or another flexible corrosion-resistant hose material, and provided with quick disconnects on both ends. The grit spray wash system should be provided with a NEMA 4X or C1D1 stainless steel solenoid valve to control the spray wash. A maximum of two solenoid valves will be provided for each screen if two grit spray bars are required for the size of the screens. The solenoid valve(s) will be controlled on a timer.

j. Screen Pivot Stand: The manufacturer should provide three custom pivot stands. The purpose of the stand is to hold the screen up in the horizontal position when pivoted at a 90 degree angle out of the channel. The pivot stand should have a base that allows it to rest on both sides of the channel and spans the width of the channel to rest the screen on. The stand shall be manufactured out of aluminum to decrease the weight of the stand.

k. Screen Spreader Bar: The manufacturer shall provide a spreader bar for each screen. The spreader bar shall provide a center load connection point for the screen to be lifted and pivoted by an overhead crane. This shall be manufactured out of aluminum or another corrosion-resistant, lightweight material so that the total weight of the spreader bar is less than 75 pounds.

l. All required connections for the screen (electrical, wash water, etc.) shall terminate at or near the pivot point with stainless steel whips of not less than 3 feet and should not need to be disconnected to pivot the screen out of channel.

m. Lamella spacers must be UHMW.

2.6 ELECTRICAL COMPONENTS AND ACCESSORIES

A. General:
1. Conform with Division 26, ELECTRICAL, and Division 40, Instrumentation.
2. Provide all necessary electrical components and wiring for a complete, functional system.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Manufacturer shall make the necessary modifications to the electrical wiring
and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, Division 40, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.

C. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Specification 26 05 33, RACEWAYS, BOXES, ENCLOSURES, AND FITTINGS, and NFPA 70.

D. Motors:
1. Provide squirrel-cage AC induction motors meeting the requirements of Division 26, and as specified herein.
2. For additional specific requirements on motors, refer to the Motor Data table above.

2.7 INSTRUMENTATION AND CONTROLS

A. All instrumentation and control components shall be provided in accordance with the requirements of Division 26 and Division 40.

B. Master Control Panel
1. The complete screening system (screening/conveying/washing/compacting) shall be provided with a master PLC control panel with HMI for overall automatic control of the system. All control components required for the operation, monitoring, and control of each screen, washer/compactor, and sluiceway shall be supplied by the mechanical stair screen manufacturer. The control panel shall be configured for future connection to a plant SCADA system over fiber media via Ethernet/IP communication. The control panel will be located outdoors, beneath a canopy as indicated in the drawings.
2. General Requirements:
   a. Enclosure: Corrosion Resistant NEMA 4X, suitable for installation outdoors
   b. Materials: 304 Stainless Steel
   c. Power: 120 volts, single-phase, 60-Hz.
   d. Main Disconnect: Circuit breaker interlocked with door handle.
   e. Panel space heater with thermostat.
   f. Panel air conditioner.
   g. Operator Interface Terminal (OIT) touchscreen for operator interface for complete screening system.
   h. System Control Power selector switch and indicator light.
   i. Alarm horn, alarm indicator light, and reset pushbutton.
   j. Emergency Stop Mushroom Head pushbutton.
   k. Provide 120VAC circuits for powering the channel level transmitters.
   l. Receive analog signals from channel level transmitters.
   m. Provide control signals to/from sluiceway water solenoid valve.
   n. Refer to Specification 40 67 23 Control Panels for additional requirements.

C. Motor Starting Panels
1. Each set of two (2) screens and each washer/compactor, for a total of four (4) panels, shall be provided with a dedicated motor starting panel containing the power components associated with the equipment. These panels should interface with the master control panel through hard-wired inputs and outputs as required for control and monitoring of the equipment.
2. General Requirements:
   a. Enclosure: Corrosion Resistant NEMA 4X, suitable for installation outdoors
   b. Materials: 304 Stainless Steel
   c. Power: 480 volts, three-phase, 60-Hz.
   d. Main Disconnect: Circuit breaker interlocked with door handle.
   e. Provide control switches and indicating lights as indicated on P&ID diagram.
   f. Refer to Specification 40 67 23, CONTROL PANELS, for additional requirements.
D. Local Control Stations
1. Provide a local control station for each screen and washer/compactor. Local control stations shall be:
   a. NEMA 7/4X boxes: Class 1, Division 1, Groups A, B, C, and D
   b. Copper free cast aluminum body and cover
   c. Stainless steel hinges
   d. Copper free cast aluminum body and cover
   e. Stainless steel hinges
2. Step Screen Local Control Station
   a. Screen HAND/OFF/AUTO Selector Switch
   b. Emergency Stop Mushroom Head Pushbutton
   c. Wash 1 HAND/OFF/AUTO Selector Switch
   d. Wash 2 HAND/OFF/AUTO Selector Switch
   e. FAULT Light
3. Washer/Compactor Local Control Station
   a. W/C HAND/OFF/AUTO Selector Switch
   b. W/C FORWARD/OFF/REVERSE Selector Switch
   c. Emergency Stop Mushroom Head Pushbutton
   d. Wash 1 HAND/OFF/AUTO Selector Switch
   e. Wash 2 HAND/OFF/AUTO Selector Switch
   f. FAULT Light
4. Upstream and Downstream Level Transmitters to be provided for each channel. Refer to Specification 40 72 13 for requirements.

E. Control Panels External Interfaces: Provide for all required signal interfaces between the master control panel, motor starting panels, local control stations, and field devices. Manufacturer to be responsible for accommodating required interfaces between all items.

F. Control Description
1. In the AUTO mode, each component shall be operated based on the channel water level differential and/or run time.
   a. When the channel water level differential rises to an adjustable preset level the step screens shall begin operating and shall continue to operate until the differential is reduced to the preset normal level. When the channel level drops below the adjustable set point, the screen drive shall stop after an adjustable time delay.
   b. When the screen is operating based on run time, a timer will cycle the screen on and off. The timer range shall be 0 to 60 minutes. The screen shall operate when the timer set point has been reached. The timer shall automatically reset whenever the screen operates.
2. In the ON mode, each component will operate continuously.
3. The spray wash will be operated on an adjustable timer.

G. Alarm Control
1. The following conditions shall shut down the screen system in ON or AUTO mode, sound horn, and illuminate respective pilot light. Alarm silence pushbutton will acknowledge and silence horn; alarm reset will extinguish alarm indicator after condition has been cleared. Any time the alarm reset pushbutton is activated more than twice within 5 minutes of each other, the reset function will be disabled until the alarm is cleared by an operator with supervisor authority.
   a. Screen drive motor overload
2. The following conditions shall not shutdown the Screen System in ON or AUTO mode, sound horn, and illuminate respective signal. Alarm silence pushbutton will acknowledge and silence horn; alarm reset will extinguish alarm indicator after condition has been cleared.
   a. Channel High-High Level
H. Other Instrumentation and Controls: Provide all items not specifically called out which are required to implement the functions described herein.

2.8 TOOLS AND SPARE PARTS

A. Tools: The work includes one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:
   1. None.

2.9 FABRICATION

A. Shop Assembly: The system shall be factory assembled and tested.

B. Shop/Factory Finishing: Shop prime coatings shall conform to the requirements of Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination shall include space and structural requirements, clearances, utility connections, signals, outputs and features required by the manufacturer including safety interlocks.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.

B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

E. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal. The equipment shall also be plastic shrink-wrapped for dust protection.

3.3 INSTALLATION

A. As shown on the Drawings. All anchors, bolts, and accessories shall be 316 stainless steel. The manufacturer shall provide templates for anchor bolt locations.

B. Lubricants: Include oil and grease for initial operation.
3.4 FIELD QUALITY CONTROL

A. Functional Testing: Prior to equipment startup, all equipment described herein shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance by means of a functional test. Provide certification of test results. Tests and certification shall be as specified in Section 01 79 00, DEMONSTRATION AND TRAINING.

3.5 MANUFACTURER’S SERVICES

A. A manufacturer’s representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services hereunder, travel time excluded:
   1. Installation, Startup, and Testing Services:
      a. 1 person for two, eight-hour days for installation assistance, inspection, and Certificate of Proper Installation.
      b. 1 person for one, eight-hour day for functional and performance testing.
      c. Provide Qualifications of Manufacturer’s employee.
   2. Training Services:
      a. 1 person for one, eight-hour day of prestart classroom or jobsite training of Owner’s personnel.
      b. Training of Owner’s personnel shall be at such times and at such locations as required and approved by the Owner.

B. See Section 01 79 00, DEMONSTRATION AND TRAINING of Division 01, GENERAL REQUIREMENTS.

3.6 MANUFACTURER’S CERTIFICATES

A. Provide Manufacturer’s certificate(s). In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

3.7 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.
   1. Section 46 21 26.1 – Step Screen Drive Data Sheet.
   2. Huber Scope of Supply – Project Number 482482, Addenda 0, Revision 0. Dated 6/23/2022.

END OF SECTION
### Section 44 42 27.19: STEP SCREEN SYSTEM

<table>
<thead>
<tr>
<th>PROJECT:</th>
<th>Western Area WWTP Phase 1 Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWNER:</td>
<td>City of Huntsville</td>
</tr>
<tr>
<td>EQUIPMENT NAME(S):</td>
<td>Screen Drive Motor #1, #2, #3, #4</td>
</tr>
<tr>
<td>EQUIPMENT TAG NUMBER(S):</td>
<td>10SCR1, 10SCR2, 10SCR3, 10SCR4</td>
</tr>
<tr>
<td>CONTROL PANEL(S):</td>
<td>See on Drawings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTOR DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Squirrel-cage induction meeting requirements of NEMA MG1.</td>
</tr>
<tr>
<td>Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.</td>
</tr>
<tr>
<td>Hazardous Location: Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking.</td>
</tr>
<tr>
<td>Motor Horsepower: 3.0 (max)</td>
</tr>
<tr>
<td>Voltage: 230/460</td>
</tr>
<tr>
<td>Phase: 3</td>
</tr>
<tr>
<td>Frequency: 60</td>
</tr>
<tr>
<td>Synchronous Speed: 1,800 rpm</td>
</tr>
<tr>
<td>Enclosure Type: TEFC</td>
</tr>
<tr>
<td>Material: Cast Iron; A48 Class 35B</td>
</tr>
<tr>
<td>Mounting Type:</td>
</tr>
<tr>
<td>Load Class: Constant Torque</td>
</tr>
<tr>
<td>Multispeed, Two Speed:</td>
</tr>
<tr>
<td>Adjustable Speed Drive: Provide Inverter Duty Rated Motors.</td>
</tr>
<tr>
<td>Winding: One Two</td>
</tr>
<tr>
<td>Service Factor: 1.0</td>
</tr>
<tr>
<td>Motor nameplate horsepower shall not be exceeded at any operational point.</td>
</tr>
<tr>
<td>Additional Motor Requirements: See Section 26 05 15, ELECTRIC MOTORS</td>
</tr>
<tr>
<td>Provide: Space Heater</td>
</tr>
</tbody>
</table>

### SPECIAL FEATURES / NOTES
Huntsville, AL- Western Area WWTP

Equipment:
HUBER Fine Screen: STEP SCREEN® SSF

Represented by:
Morrow Water Technologies, Inc.
Carney Holland
(205) 408-6680
cholland@morrowwater.com

Regional Sales Director:
Steve Frank
(704) 330-9378
Steve.Frank@hhusa.net

Project Number: 482462
Spec. Section(s): 46 21 26; 46 21 60; 44 42 27
Addenda: 0
Revision: 0
Bid Date: 6/23/2022
### Design Information

<table>
<thead>
<tr>
<th>Screen Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screen Model</strong></td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
</tr>
<tr>
<td><strong>Clear Bar Spacing</strong></td>
</tr>
<tr>
<td><strong>Inclination from Horizontal</strong></td>
</tr>
<tr>
<td><strong>Discharge Height Above Invert</strong></td>
</tr>
<tr>
<td><strong>Approximate Weight</strong></td>
</tr>
<tr>
<td><strong>Wash Water Demand</strong></td>
</tr>
<tr>
<td><strong>Material</strong></td>
</tr>
<tr>
<td><strong>Covers</strong></td>
</tr>
<tr>
<td><strong>Stationary Lamella</strong></td>
</tr>
<tr>
<td><strong>Moving Lamella</strong></td>
</tr>
<tr>
<td><strong>Discharge Spacers</strong></td>
</tr>
<tr>
<td><strong>Bottom Step Flushing</strong></td>
</tr>
<tr>
<td><strong>Supports</strong></td>
</tr>
<tr>
<td><strong>Anchor Bolts</strong></td>
</tr>
<tr>
<td><strong>Local Control Station</strong></td>
</tr>
<tr>
<td><strong>Level Control Device(s)</strong></td>
</tr>
<tr>
<td><strong>Optional Adder(s)</strong></td>
</tr>
</tbody>
</table>

### Screen Details

<table>
<thead>
<tr>
<th>Screen Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screen Model</strong></td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
</tr>
<tr>
<td><strong>Clear Bar Spacing</strong></td>
</tr>
<tr>
<td><strong>Inclination from Horizontal</strong></td>
</tr>
<tr>
<td><strong>Discharge Height Above Invert</strong></td>
</tr>
<tr>
<td><strong>Approximate Weight</strong></td>
</tr>
<tr>
<td><strong>Wash Water Demand</strong></td>
</tr>
<tr>
<td><strong>Material</strong></td>
</tr>
<tr>
<td><strong>Covers</strong></td>
</tr>
<tr>
<td><strong>Stationary Lamella</strong></td>
</tr>
<tr>
<td><strong>Moving Lamella</strong></td>
</tr>
<tr>
<td><strong>Discharge Spacers</strong></td>
</tr>
<tr>
<td><strong>Bottom Step Flushing</strong></td>
</tr>
<tr>
<td><strong>Supports</strong></td>
</tr>
<tr>
<td><strong>Anchor Bolts</strong></td>
</tr>
<tr>
<td><strong>Local Control Station</strong></td>
</tr>
<tr>
<td><strong>Level Control Device(s)</strong></td>
</tr>
<tr>
<td><strong>Optional Adder(s)</strong></td>
</tr>
</tbody>
</table>

### Screenings Treatment Details

<table>
<thead>
<tr>
<th>Wash/Compactor Model</th>
<th>WAP-L® 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantity</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Max. Screenings Capacity</strong></td>
<td>284 ft³/hr</td>
</tr>
<tr>
<td><strong>Wash water demand</strong></td>
<td>24 gpm</td>
</tr>
<tr>
<td><strong>Wash water pressure</strong></td>
<td>30-60 psi</td>
</tr>
<tr>
<td><strong>Approximate weight (empty)</strong></td>
<td>1890 lbs</td>
</tr>
<tr>
<td><strong>Body Material</strong></td>
<td>304L stainless steel construction; pickled and passivated in acid bath</td>
</tr>
<tr>
<td><strong>Screw Auger</strong></td>
<td>Shafted; 304L stainless steel construction with stainless-backed nylon brush in wash &amp; compaction zones</td>
</tr>
<tr>
<td><strong>Drain</strong></td>
<td>5mm perforations; latched and sealed with 6.0in NPT drain connection</td>
</tr>
<tr>
<td><strong>Inlet Hopper</strong></td>
<td>304L stainless steel construction; inspection hatch included</td>
</tr>
<tr>
<td><strong>Discharge Pipe</strong></td>
<td>Tapered, conical pipe flanged connection</td>
</tr>
<tr>
<td><strong>Motor Data</strong></td>
<td>7.5HP, C1D1, 480VAC, 3 phase, 60Hz, SF 1.15 (auger)</td>
</tr>
<tr>
<td><strong>Water Manifold</strong></td>
<td>Mounted to body; 304L stainless steel construction with two (2) solenoid valves, brass-bodied, C1D1, 120VAC</td>
</tr>
<tr>
<td><strong>Anchor Bolts</strong></td>
<td>M12, 316L stainless steel</td>
</tr>
<tr>
<td><strong>Local Control Station</strong></td>
<td>Included, 4-hole NEMA7</td>
</tr>
<tr>
<td><strong>Hopper Level Device</strong></td>
<td>Not included</td>
</tr>
<tr>
<td><strong>Optional Adder(s)</strong></td>
<td>No optional adders included</td>
</tr>
</tbody>
</table>
Screenings Conveyance Details

<table>
<thead>
<tr>
<th>Sluice Model</th>
<th>HLC 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1</td>
</tr>
<tr>
<td>Length [ft]</td>
<td>72</td>
</tr>
<tr>
<td>Slope [']</td>
<td>1.3</td>
</tr>
<tr>
<td>Max. Water Demand</td>
<td>270 gpm</td>
</tr>
<tr>
<td>Trough Material</td>
<td>304L stainless steel construction; pickled and passivated in acid bath</td>
</tr>
<tr>
<td>Covers</td>
<td>Included; 304L stainless steel construction</td>
</tr>
<tr>
<td>Inlet Hopper(s)</td>
<td>Four (4); 304L stainless steel construction; inspection hatch included</td>
</tr>
<tr>
<td>Discharge Type</td>
<td>Into top of WAP</td>
</tr>
<tr>
<td>Flush Water Valve</td>
<td>One (1) Electrically actuated ball valve</td>
</tr>
<tr>
<td>Supports</td>
<td>Floor-mounted, as required</td>
</tr>
<tr>
<td>Anchor Bolts</td>
<td>M12, 316L stainless steel</td>
</tr>
<tr>
<td>Local Control Station</td>
<td>Not included</td>
</tr>
<tr>
<td>Additional Equipment</td>
<td>Knife Gates on Inlet Hopper</td>
</tr>
</tbody>
</table>

Control Details

Controls

- Power Supply: 120VAC-1PH-60HZ
- Panel Classification: NONE
- Panel Location: Outdoors, Shade
- 1 - Enclosure, NEMA 4X, 304 Stainless Steel, Free Standing w/3-Point Latch
- 1 - Air Conditioner, NEMA 4X
- 1 - Programmable Logic Controller, AB CompactLogix L30ER w/ Ethernet, Required IO
- 1 - Operator Interface Unit, AB PanelView Plus, Series 7, Standard, 10“ Color Touchscreen
- 1 - Ethernet Switch, Unmanaged Phoenix or Equal
- 1 - 24VDC Power Supply, Redundant, Delta or Equal
- 1 - UPS Battery Backup, Phoenix or Equal
- 1 - Panel Light, w/ ON/OFF Switch
- 1 - Alarm Horn w/ Silence Pushbutton
- 1 - GFCI, 120VAC
- 1 - Lot, Circuit Breakers, 120VAC: [As Required]
- 1 - Lot, Pilot Lights, PTT, LED Type: [As Required]
- 1 - Lot, Push Buttons: [As Required]
- 1 - Lot, Selector Switches: [As Required]
- 1 - Lot, Control Relays, Socket Type: [As Required]
- 1 - Lot, Terminal Blocks: [As Required]
- 1 - Lot, Intrinsically Safe Barrier: [As Required]
- 1 - Lot, Dry Contacts: [As Required]
- 1 - UL Label
- 1 - 12/18 Month Warranty

Dual SSF Motor Control Panel:

Per specification:
- None

- Power Supply: 480VAC-3PH-60HZ
- Panel Classification: NONE
- Panel Location: Outdoors, Shade
- 1 - Enclosure, NEMA 4X, 304 Stainless Steel, Wall Mount Control Panel w/ 3-Point Latch
- 1 - Main Disconnect, Non-Fused Type, w/Through Door Disconnect Handle
- 2 - Motor Starter, Non-Reversing, IEC, w/Overload Relay and CB Branch Circuit Protection [2HP - 480VAC Max, Screen]
- 2 - Power Monitor - Screen
- 1 - Phase Failure Monitor
- 1 - Control Power Transformer, 480-120VAC w/ Primary / Secondary CB Protection
- 1 - Lot, Circuit Breakers, 120VAC: [As Required]
<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Lights, PTT, LED Type</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Push Buttons</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Selector Switches</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Control Relays, Socket Type</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Terminal Blocks</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Intrinsically Safe Barrier</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Dry Contacts</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>UL Label</td>
<td>1 - 12/18 Month Warranty</td>
<td></td>
</tr>
</tbody>
</table>

**WAP-L Motor Control Panel**

Per specification:
- None

Power Supply: 480VAC-3PH-60HZ
Panel Classification: NONE
Panel Location: Outdoors, Shade

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure, NEMA 4X, 304 Stainless Steel, Wall Mount Control Panel w/ 3-Point Latch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Main Disconnect, Non-Fused Type, w/Through Door Disconnect Handle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Motor Starter, Reversing, IEC, w/Overload Relay and CB Branch Circuit Protection</td>
<td>2</td>
<td>7.5HP - 480VAC Max, Press</td>
</tr>
<tr>
<td>Current Monitor - Screen</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Phase Failure Monitor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Control Power Transformer, 480-120VAC w/ Primary / Secondary CB Protection</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Circuit Breakers, 120VAC</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Pilot Lights, PTT, LED Type</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Push Buttons</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Selector Switches</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Control Relays, Socket Type</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Terminal Blocks</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>Dry Contacts</td>
<td>1 Lot</td>
<td>As Required</td>
</tr>
<tr>
<td>UL Label</td>
<td>1 - 12/18 Month Warranty</td>
<td></td>
</tr>
<tr>
<td>System Auto Status</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Screen Control Station**

Panel Classification: C1D1
Enclosure, NEMA 7, Cast Aluminum
Selector Switches: As Required
Screen HOA
Solenoid HOA
Emergency Stop

**WAP-L Control Station**

Panel Classification: C1D1
Enclosure, NEMA 7, Cast Aluminum
Selector Switches: As Required
Press HOA
Press FOR
Solenoid HOA
Emergency Stop

**Sluice Control Station**

Panel Classification: C1D1
Enclosure, NEMA 7, Cast Aluminum
Selector Switches: As Required
Sluice MOV OCA
Knife Gates Press No.1-None-Press No.2
Emergency Stop
### Notes and Technical Clarifications

1. HUBER Scope of Supply is based on section 46 21 26, 46 21 60, 44 42 27.
2. HUBER is in receipt of the following addenda:
   - No addenda.
3. All electrical interconnections, wirings, junction boxes, and terminations between the equipment and electrical components are to be provided by installing contractor.
4. Any item not specifically listed is not considered part of this scope of supply. Please contact the HUBER Technology representative listed for further clarification.
5. A fully functioning and programmed HMI/PLC will be delivered to site. Software licenses for the PLC/HMI program will not be included in this scope of supply unless stated otherwise. These items are available for additional price adder upon request.
6. Huber Technology, Inc. is offering the equipment and associated performance guarantees based on information available at the time of the issuance date. Information not made available to Huber, whether Huber is asking for specific information or not, which could affect the performance of the equipment might void warranty and performance guarantees.
7. Enclosures will be NEMA 4X, 304 Stainless Steel. It is understood that ALL panels will be mounted in shade, or under contractor supplied sun shade.
8. The Main Headworks PLC Panel will include Air Conditioning. All other panels will NOT be provided with climate control.
9. Each Screen will have Differential Level Control provided by VEGAPULS C21 radar sensor.
Terms and Conditions
The Proposal is dependent and expressly conditioned upon Purchaser’s acceptance of the attached HUBER Technology, Inc. (hereinafter “HUBER”) Standard Terms and Conditions of Sale dated June 23, 2022.

Special Information and Exceptions
- Price does not include any unloading or any applicable fees or taxes (Local, Federal, or Final Destination)
- Prices are in U.S. Dollars unless noted otherwise
- Freight is delivered with duty paid (D.D.P.) to Job site
- Price does not include installation or building modifications
- Price Quotation is valid for fourteen (14) days from the date of this Proposal or until withdrawn by HUBER. After expiration HUBER reserves the right to adjust pricing to take into account any significant increases in material costs such as steel, stainless steel finished products, stainless steel coil, etc.

Terms of Payment
- 10% upon delivery of submittals (net 30 days)
- 80% upon delivery of equipment (net 30 days)
- 10% upon start-up of equipment (net 30 days)
- No retainage will be withheld on this Project.

Submittals
HUBER will provide documentation to the Purchaser per the following schedule:
- Five (5) copies or the quantity stipulated in the equipment specification of submittal shop drawings 4-6 weeks after acceptance of a written purchase order.
- Three (3) copies or the quantity stipulated in the equipment specification of HUBER O&M manuals prior to equipment start-up.

Shipment
HUBER will make all reasonable efforts to maintain the following schedule:
- Submittals 4-6 weeks after acceptance of a written purchase order.
- Equipment delivery 22-24 weeks after approved submittals or notice to proceed.
- O&M manuals prior to equipment start-up.
- For any delays in delivery which are beyond HUBER’s responsibility, a finance charge of 1.5% of the contract value per month and all direct Costs incurred as a result of the delay will be due and payable to HUBER upon request/invoice.

Accessories
This Proposal includes only those items specifically mentioned in the equipment descriptions. Any items which may be necessary for the operation of the equipment, but are not specifically mentioned, such as motors, drives, controls, or supports, are to be supplied via additional quotation separate from this offering.

Abrasion or Corrosive Materials
All of HUBER’s machines and systems are manufactured from 304 grade stainless steel. The environment or materials the equipment may be exposed to may be abrasive or corrosive. This Proposal makes no representation or warranties concerning the service life of the equipment against such abrasion or corrosion. The concentration of chloride and hydrogen sulfide (H2S) in the equipment operating environment shall be kept below the following values:
- Chloride < 200 mg/l
- Hydrogen sulfide H2S < 6 ppm

Machines made from 316 grade stainless steel are available at an additional price for extremely harsh operating environments upon request.

Purchase Orders
All Purchase Orders are to be faxed or mailed to:
HUBER Technology, Inc.
1009 Airlie Parkway
Denver, NC 28037
Phone: (704) 949-1010
Fax: (704) 949-1020

All Purchase Orders are subject to acceptance by HUBER and acceptance of HUBER’s Standard Terms and Conditions.
LIMITED WARRANTY: HUBER warrants that the equipment and components furnished will be free from defects in workmanship and materials and perform the general process function intended, solely under the conditions defined by HUBER for a period of (a) twelve (12) months from completion of installation, start-up or owner acceptance of the equipment assuming the equipment is accepted by the owner within 6 months of delivery or (b) eighteen (18) months from the date of delivery to Purchaser, whichever date comes first. HUBER will replace, modify or repair, at its sole option, any such defective component or equipment at no charge provided that HUBER is notified promptly in writing of any claimed defect. If requested by HUBER, any such defective part or component shall be returned to HUBER, freight prepaid. HUBER will provide on-site Field Service when reasonably assured of payment therefore if this warranty does not apply or when such service is required in its judgments. This warranty does not apply to any defect or malfunction arising out of failure to store, install, operate or maintain the equipment in accordance with instructions by HUBER. Warranty shall be voided for any misuse of equipment; operation under conditions other than those defined by HUBER in its operation and maintenance (O&M) manuals for said equipment, or gross operator negligence. Any unauthorized modification or alteration of the equipment or repair or replacement of components may void this warranty, at the sole option of HUBER. For any billable repairs completed outside of the initial warranty period, a sixty (60) day guarantee on work performed and parts supplied will apply.

HUBER MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, WITH REGARD TO THE DESIGN, SALE, MERCHANTABILITY OR FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE OR USE EXCEPT AS EXPRESSLY SET FORTH IN HUBER’S TERMS AND CONDITIONS. HUBER IS NOT SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT CLAIMS INCLUDING NEGLIGENCE, GROSS NEGLIGENCE AND STRICT LIABILITY, OR ANY OTHER THEORIES OF LAW. HUBER IS UNDER NO EVENT LIABLE FOR ANY SPECIFIC, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGES, EXPENSE, INJURY, DISEMEMBERMENT, OR DEATH OF ANY KIND WHATSOEVER.

Exclusions
- Financing
- Cranes and/or lifting devices
- Unloading and/or storage of equipment on job site
- Local, State or Federal taxes or fees
- Foundation design and engineering (HUBER will only furnish equipment drawings and data)
- Utilities for erection, installation and operation
- Gauges and instrumentation not specifically described in HUBER scope of supply
- Interconnecting wiring, conduit, piping, tubing, valves, fittings, etc. between the equipment and other equipment and/or control devices and control panel.
- Tools, oil, grease, grease gun, dumpster(s), or bin(s).

Project Management
HUBER will appoint a Project Manager for the duration of the contract. Project Management services are included in this package and are as follows:
- Provision of a complete critical path project schedule for HUBER equipment
- Coordination with HUBER manufacturing on materials procurement and fabrication to and with HUBER shipping/logistics to ensure HUBER commitments are maintained.

Erection, Training and Start-up Assistance
A certified HUBER Service Technician will make every reasonable effort to be at the job site within two (2) weeks after Purchaser’s request to HUBER for equipment start-up and commissioning assistance. HUBER will provide additional erection and start-up supervision, which is not specifically included in the scope of our supply at the Purchaser’s written request. For such additional services Purchaser shall pay $1,000.00 per day plus expenses, for eight (8) hours per day.
- At the request of the Purchaser, overtime service will be provided at a rate of 1.5 times the regular rate for weekdays, and 2.0 times the regular rate for weekends.
- “Expenses” are defined as the costs of travel from HUBER’s location to the point of installation and return; together with accommodation and living expenses during the start-up period of field service. HUBER will make all reasonable efforts to provide a HUBER Rep located within North America. However, some circumstances will require travel from Europe.
- Charges for all time involved will be invoiced, including delays which are beyond HUBER’s control. The full net invoice is payable within thirty (30) days of receipt by Purchaser.

Equipment Standard
Any deviations from the HUBER standard mechanical and electrical specifications must be discussed with the Purchaser and agreed upon. HUBER reserves the right to charge additional costs to the equipment price for any non-standard mechanical and electrical components required by the Purchaser and not explicitly stated in HUBER’s scope of supply.

Shop Painting
Gears and motors will receive three (3) layers of painting, two (2) layers of primer and a finishing layer with synthetic resin varnish.
1. ENTIRE AGREEMENT/ORDERS.

This agreement (the “Agreement”) is between HUBER Technology, Inc., its subsidiaries and its affiliates (collectively “HUBER”) and Purchaser. No order for HUBER’s goods or services shall be binding upon HUBER until acknowledged in writing by HUBER. Such written acknowledgement and these Standard Terms and Conditions of Sale (the “Terms and Conditions”) constitute the entire agreement between HUBER and Purchaser. Any purchase order, offer or counter-offer made by Purchaser before or after HUBER’s written acknowledgement is rejected and all documents exchanged prior to HUBER’s written acknowledgement are merely preliminary negotiations and not part of any agreement between the parties. For example, orders submitted on Purchaser’s own purchase order forms modifying, adding to, contrary to, or inconsistent with these Terms and Conditions are expressly rejected and of no force or effect and acceptance is expressly made conditional upon assent to these terms. In no event will HUBER be deemed to have in any way changed, enlarged or modified its liabilities or obligations as fixed by these Terms and Conditions including, without limitation, situations in which HUBER satisfies an order submitted on Purchaser’s own purchase order form. No other terms or conditions or modification of these terms shall be binding upon HUBER unless specifically accepted in writing by an Officer of HUBER. Merely signing a purchase order or other document as a condition of payment shall not be deemed a specific acceptance of terms therein by HUBER.

Purchaser shall have been deemed to agree to these Terms and Conditions upon the earlier of acceptance of HUBER’s quotation, acceptance of delivery of the goods or services or the issuance of a purchase order to HUBER.

2. PRICES.

Until acceptance of a purchase order is acknowledged in writing by HUBER, all prices are subject to change. Written quotations expire fourteen (14) calendar days from the date of quotation unless specified otherwise. Verbal quotations are non-binding on HUBER. Quoted prices do not include sales, excise, municipal, state or any other government taxes. All taxes and other governmental charges upon the production, manufacture, distribution, sale or use of goods or services to the extent required or not forbidden by law to be collected by HUBER from Purchaser, shall be paid by Purchaser to HUBER unless Purchaser furnishes HUBER with exemption certificates acceptable to the relevant taxing authorities. HUBER reserves the right to revise final quoted prices of work in process due to any change in the order on the part of Purchaser or any factor beyond the control of HUBER. Typographical and/or clerical errors made by HUBER are subject to correction.

If Purchaser causes or requests delays in manufacture or shipment beyond six (6) months from acceptance of Purchase Order, HUBER shall have the right to increase price based on any actual escalation in labor, material, overhead, and component costs. HUBER also reserves the right to charge Purchaser for any direct costs, reasonable storage costs caused by such delays and a finance charge of 1.5% of the Contract value per month.

3. TERMS OF PAYMENT.

Invoices are net thirty (30) days from the date of invoice, unless specified otherwise and approved in writing by HUBER. In the event that the purchase order between Purchaser and HUBER requires partial payments to be made by Purchaser, Purchaser shall pay those required amounts in a timely manner or HUBER will be permitted to suspend, without penalty or liability of any kind, delivery of future goods and services to the Purchaser even though partial payment for such undelivered goods or services may have already been received by HUBER. Past due accounts will bear interest at the rate of 1.5% per month of the invoiced amount. All invoices are payable in U.S. dollars, unless specified otherwise and approved by HUBER in writing. Acceptance of bank drafts, checks or other form of payment shall be subject to immediate collection of the full face amount thereof. HUBER may, at its discretion, impose a transaction fee on payments processed via wire transfer or by Letter of Credit.

HUBER reserves the right at any time to suspend credit or to change credit terms provided herein when in its sole opinion the financial condition of Purchaser so warrants. In such case, in addition to any other remedies provided herein or by law, HUBER may request cash payment or satisfactory security from Purchaser prior to shipment of goods.

In the event of nonpayment of an invoice when due, and without prejudice to other lawful remedies, HUBER shall have the right, without penalty or liability of any kind, to suspend further work or the delivery of future goods under this Agreement or any other agreement with Purchaser until such invoice is paid in full; provided, however, that if such invoice remains unpaid for more than five (5) days after written demand by HUBER, HUBER may terminate this Agreement without penalty and recover all damages as a result of Purchaser’s Breach.

4. RETAINAGE.

There shall be no retainage under this Agreement.
5. Taxes and Other Charges.

The prices for Goods and/or Services do not include any sales, use or other taxes or charges payable to state or local authorities. In addition to HUBER’s invoice price or quote price, Purchaser is also responsible for payment of any use-tax, sales tax, excise tax, VAT tax, duty, custom, inspection or testing fee, and/or any other fee, tax, or charge imposed by governmental or non-governmental authority arising from the Goods and/or Services provided by HUBER. Purchaser is responsible for and bears the risk of establishment of a valid exemption from any fee, tax, or charge. In the event HUBER is required to pay any of the fees, taxes, or charges listed in this paragraph, Purchaser hereby agrees to immediately reimburse HUBER for this cost, or in lieu of such payment by HUBER, Purchaser agrees to timely provide an exemption certificate or other comparable document to the entity or authority imposing said fee, tax and/or charge. Purchaser further agrees to waive any and all claims regarding the reasonableness of such payment and will be liable to HUBER for reasonable attorneys’ fees and/or court costs incurred by HUBER as a result of Purchaser’s failure to pay the charges listed in this paragraph.

6. Delivery.

HUBER shall not be liable for any damage as a result of any non-delivery or delay, including, without limitation, an act of God; act of Purchaser; act of HUBER embargo; other government act, regulation or request; fire; accident; strike; war; boycott; slowdown; riot; or delay in transportation or inability to obtain necessary labor, materials, or manufacturing facilities. HUBER will use its best efforts to meet promised delivery dates, but under no circumstances shall HUBER be liable for any direct, or indirect, consequential, incidental, liquidated or other damages for delay in delivery.

Purchaser will notify HUBER within thirty (30) days after order acceptance of the scheduled delivery date. If Purchaser does not notify, a delivery date of six (6) months, unless otherwise specified by HUBER, after notice to proceed and/or approval of submittals is agreed. For any delays by Purchaser after commencement of manufacturing, a finance charge of 1.5 % per month of the contract value will be assessed to Purchaser.

HUBER reserves the right to substitute suitable alternative materials and components where necessary.

Where the services are to be performed on Purchaser’s premises, Purchaser agrees to provide HUBER on a timely basis with such access, machine downtime, utilities and equipment as HUBER shall reasonably require in order to perform the services in accordance with the Agreement. If Purchaser fails to perform its obligations or shall fail to perform them in a timely manner, Purchaser acknowledges and agrees that HUBER shall be entitled to delay performance of the services, without penalty or liability of any kind, until such time as Purchaser has complied in all respects with its obligations and to increase the price for the services to reflect any increased cost to HUBER caused by Purchaser’s failure to perform or late performance.

If delivery is delayed or deferred by Purchaser beyond the scheduled date, payment shall be due in full when HUBER is prepared to ship the goods or perform the services. The goods may thereafter, at HUBER’s option, be stored at the risk and expense of Purchaser.

HUBER may at certain times provide goods or services to Purchaser prior to the issuance, delivery and acceptance of a corresponding purchase order. In such cases, these Terms and Conditions shall apply to such transactions and Purchaser shall be deemed to have accepted such Terms and Conditions upon HUBER’s delivery of goods or performance of services.


It is HUBER’s intent to deliver complete orders in good condition to the final destination dictated by the Purchaser. All equipment and components delivered to the receiving location must be duly inspected upon receipt. Any visible damages must be noted on way-bill and followed up with a full inspection within a period of seven (7) days from delivery date. If a written report is not submitted to HUBER within this period it is assumed that the equipment was received in good condition, meets the specifications of the purchase order, constitutes unqualified acceptance by the Purchaser, and Purchaser waives any rights to rejection or remediation of delivered equipment.

8. Field Service.

“Field Service” refers to the services of a Huber factory-trained representative at the site of end-use for initial installation, inspection, start-up observation and operator training. “Field Service” refers also to any subsequent investigations of warranty issues, operational difficulties, Purchaser complaints, or requests for post-warranty service. Purchaser acknowledges that HUBER Field Service representatives shall make all arrangements necessary with labor unions for their presence on the site. No contractual warranty or indemnity relating to Field Service is extended by HUBER, nor are its Field Service representatives authorized to bind HUBER with any oral representations or statements in conflict with or addition to the governing contract terms or any manual or instructions provided by HUBER. This paragraph shall apply to any and all initial and subsequent Field Service provided by HUBER relating to the Goods sold to the Purchaser. Any field service work performed at site after expiration of the initial warranty period is warranted for sixty (60) days after the work has been completed.
9. SHIPMENT/RISK OF LOSS.

HUBER will use commercially reasonable efforts to meet delivery dates stated in advance of actual shipment of goods or performance of services, but in no event shall such quoted delivery dates be deemed to represent fixed or guaranteed delivery dates. Under no circumstances will HUBER be liable for any direct, or indirect, consequential, incidental, liquidated or other damages for delay in delivery. Method and route of shipment will be at the discretion of HUBER unless specified otherwise by Purchaser and agreed by HUBER, and any additional expense of the method or route of shipment specified by Purchaser shall be borne by Purchaser. Claims for shortage or other quantity errors must be made in writing to HUBER within seven (7) days after receipt of shipment. Failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Purchaser.

HUBER, in its sole discretion, may accommodate Purchaser requests for delivery of goods in installments if such requests are confirmed in writing by HUBER. Such installment deliveries, when separately invoiced, shall be paid for when due per invoice without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Purchaser of its obligations to accept remaining deliveries.

10. GOVERNMENT STANDARDS.

HUBER applies quality standards in our manufactured equipment that are designed to meet and comply with federal government occupational safety, noise, sanitation and health standards. The Purchaser is solely responsible for compliance of the equipment and its operation with any state or local laws, codes, ordinances, or regulations, unless otherwise specified by HUBER in its proposal.

11. LIMITED WARRANTY.

HUBER warrants that the equipment and components furnished will be free from defects in workmanship and materials and perform the general process function intended, solely under the conditions defined by HUBER for a period of (a) twelve (12) months from completion of installation, start-up or owner acceptance of the equipment assuming the equipment is accepted by the owner within 6 months of delivery or (b) eighteen (18) months from the date of delivery to Purchaser, whichever date comes first. HUBER will replace, modify or repair, at its sole option, any such defective component or equipment at no charge provided that HUBER is notified promptly in writing of any claimed defect. If requested by HUBER, any such defective part or component shall be returned to HUBER, freight prepaid. HUBER will provide on-site Field Service when reasonably assured of payment therefore if this warranty does not apply or when such service is required in its judgments. This warranty does not apply to any defect or malfunction arising out of failure to store, install, operate or maintain the equipment in accordance with instructions by HUBER. Warranty shall be voided for any misuse of equipment; operation under conditions other than those defined by HUBER in its operation and maintenance (O&M) manuals for said equipment, or gross operator negligence. Any unauthorized modification or alteration of the equipment or repair or replacement of components may void this warranty, at the sole option of HUBER. For any billable repairs completed outside of the initial warranty period, a sixty (60) day guarantee on work performed and parts supplied will apply.

HUBER MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, WITH REGARD TO THE DESIGN, SALE, MERCHANTABILITY OR FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE OR USE EXCEPT AS EXPRESSLY SET FORTH IN HUBER'S TERMS AND CONDITIONS. HUBER IS NOT SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT CLAIMS INCLUDING NEGLIGENCE, GROSS NEGLIGENCE AND STRICT LIABILITY, OR ANY OTHER THEORIES OF LAW. HUBER IS UNDER NO EVENT LIABLE FOR ANY SPECIFIC, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGES, EXPENSE, INJURY, DISMEMBERMENT, OR DEATH OF ANY KIND WHATSOEVER.

12. EXCLUSIVE REMEDIES.

Purchaser acknowledges that its sole and exclusive remedies for breach of the Limited Warranty shall be replacement or repair by HUBER of any defective part or component, and payment of the reasonable out of pocket costs incurred in connection with replacement or repair if such costs are approved in advance by HUBER, or refund of 80% of the purchase price if HUBER in its sole discretion concludes the equipment cannot be repaired or replaced. This remedy excludes any other direct, indirect, consequential, incidental, special or other form of damages. It also excludes any extraordinary costs for removal or re-installation of HUBER equipment, such as crane rental, structural alteration, or demolition, necessitated by building design or configuration.
13. LIMITATION OF LIABILITY/INDEMNITY.

HUBER’s liability on any claim for loss or damage arising out of any transactions under this Agreement or from the performance or breach thereof or connected with any goods or services supplied hereunder, or the sale, resale, operation or use of goods, whether based on agreement, warranty, tort (including negligence) or other grounds, and shall not exceed the price allocable to such goods or services or part thereof involved in the claim, regardless of cause or fault. Purchaser’s remedies are limited to the return of non-conforming goods and repayment of the price or to the repair and replacement of non-conforming. This limitation of liability and remedies reflects a deliberate and bargained-for allocation of risks between HUBER and Purchaser and constitutes the basis of the parties’ bargain, without which HUBER would not have agreed to the price or terms of this transaction.

HUBER SHALL NOT IN ANY EVENT BE LIABLE WHETHER AS A RESULT OF BREACH OF AGREEMENT, WARRANTY, TORT (INCLUDING NEGLIGENCE) OR OTHER GROUNDS FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE, LOSS OF USE OF GOODS OR ASSOCIATED PRODUCTS, BUSINESS INTERRUPTION, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES OR SERVICES, DOWNTIME COSTS, OR CLAIMS OF PURCHASERS OF PURCHASER FOR SUCH DAMAGE. In addition, if HUBER furnishes Purchaser with advice or other assistance regarding any goods or services supplied hereunder, or any system or equipment in which any such goods may be installed, and which is not required pursuant to this transaction, the furnishing of the advice or assistance will not subject HUBER to any liability, whether based on agreement, warranty, tort (including negligence) or other grounds.

In the event Purchaser modifies HUBER goods or incorporates HUBER goods into another product or component part, Purchaser agrees to hold harmless and indemnify Huber from any and all claims, liabilities, losses, costs and expenses (including reasonable attorneys’ fees) involving personal injury or property damage. Purchaser also agrees to hold harmless and indemnify HUBER from any patent or other intellectual property claims related to (i) any HUBER goods made in accordance with Purchaser’s designs or specifications; or (ii) the use of any drawings provided to HUBER by Purchaser for use in the manufacture, production or assembly of such goods.

14. TITLE.

Notwithstanding delivery, installation or start-up, title to all equipment furnished shall remain solely with HUBER until the full purchase price is paid by Purchaser. Until such time, HUBER may enter the premises where such equipment is then located and repossess and remove such equipment by any lawful means as this is the property of HUBER Technology. Purchaser agrees to do all acts deemed necessary or desirable or requested by HUBER to maintain HUBER’s rights in, and title to such equipment.

15. WAIVER.

The failure of Huber to insist in any one or more instances, upon the performance of any of the Terms and Conditions as set forth herein or the failure of HUBER to exercise any of its rights hereunder shall not be construed as a waiver or relinquishment of any such terms, conditions or rights and shall not effect HUBER’s right to insist on strict performance and compliance with regard to any future performance of these Terms and Conditions.

16. CHOICE OF LAW.

This Contract shall be exclusively governed by the laws of the State of North Carolina, without regard to its conflict of law provisions. HUBER and Purchaser further consent to the exclusive personal jurisdiction of any applicable court, in the county of Lincoln, North Carolina for any legal action or proceeding brought to enforce, construe or interpret these Terms and Conditions. Venue is proper only in the North Carolina Superior Court of Lincoln County. Each party hereto irrevocably submits to the jurisdiction of each court in each such action or proceeding.

17. DISPUTE RESOLUTION/ATTORNEYS’ FEES.

Any controversy or claim arising out of or relating to this Contract or its breach shall be settled by arbitration conducted in Denver, North Carolina in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association and North Carolina law and judgment on the award rendered by the arbitrator(s) may be entered in any court of competent jurisdiction. The arbitrator shall award attorneys’ fees, costs, witness costs, expert witness fees, arbitrator compensation, arbitrator fees, exhibit fees, travel costs and other amounts deemed reasonable to the prevailing party as defined by North Carolina General Statute §44A et al.

18. ASSIGNMENT, WAIVER, ENTIRE AGREEMENT, SEVERABILITY.

Neither party shall assign or delegate any of its rights or obligations under this Agreement without the prior written consent of the other party, which such consent shall not be unreasonably withheld, except that either party may assign or delegate its rights or obligations hereunder to an Affiliate without the other party’s consent. As used herein, the term “Affiliate” shall mean any entity that directly or indirectly through one or more intermediaries, controls or is controlled by, or is under common control with the entity specified. Huber may terminate this Agreement upon written notice to Purchaser without any further liability to Purchaser if there is a change of control of Purchaser. The Agreement constitutes the entire agreement between the parties with respect to its subject matter, and supersedes all prior oral or written representations or agreements by the parties with respect to the subject matter of this Agreement. Neither the Agreement nor any of its provisions may be modified, amended or waived, whether orally, through the parties’ course of performance, course of dealing or course of conduct, or manifested in any other way, unless in writing and signed by an authorized officer of Huber. It is the express intention of the parties that such requirement for written modifications, amendments or waivers be strictly enforced notwithstanding judicial precedent or statutory provisions to the contrary. Any provision found invalid or unenforceable will not affect the validity or enforceability of any other provision and the invalid provision may be judicially modified to the extent enforceable.
NOTES:

1. SOIL BENEATH CONCRETE PADS SHALL BE WELL COMPACTED (MIN 96%-100% STANDARD PROCTOR). NO SETTLEMENT ALLOWED.

2. RISER SECTION AND ELBOW SAME SIZE AS LINE, UNLESS OTHERWISE SPECIFIED.

3. CONC PAD, ROUND OR SQ PIPE ID + 2'-0" FINISHED GRADE

2-#4 BARS CONCENTRIC CENTER IN SLAB

DI PIPE

LONG RADIUS DI FLANGED 90 DEGREE BEND

THRUST BLOCK

DI BLIND FLANGE

HAND TAMP BACKFILL AROUND RISER SECTION

ALL MECH JOINT DI PROCESS LINE, TEE OR WYE ORIENTATION AS SHOWN ON PLANS

DATE: JOB NO.:

WESTERN AREA WWTP HUNTSVILLE, AL

PHASE 1 EXPANSION

PROCESS LINE CLEAN OUT SETTING

21W10220 6/14/2022

DIVISION D40

SECTION - DETAIL NO. 2339-005

DATE: 6/14/2022
NOTES:
1. DO NOT USE WHERE SUBJECT TO HYDROSTATIC PRESSURE.
2. PAINT ENTIRE SLEEVE AND SEEP RING AS SPECIFIED.
NOTE:
COAT FLOOR SLEEVE WITH SPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

SEEP RING 1/4" MIN THICKNESS

TOP OF FLOOR

FILL WITH WATERPROOF, EXPANDABLE SEALANT. JOINT SHALL BE WATER TIGHT

PIPE OD + 2" AND LARGER

D+2" THRU 12" D+4" 14"

STANDARD WEIGHT STL PIPE SLEEVE HOT DIP GALVANIZE AFTER FABRICATION

PASSING PIPE

4" UNLESS OTHERWISE SHOWN ON PLANS

DATE: 6/14/2022
JOE NO.: 21W10220
PHASE 1 EXPANSION

WESTERN AREA WWTP
HUNTSVILLE, AL

FLOOR SLEEVE

DIVISION
D40

SECTION - DETAIL NO. 2400-003

DATE: 6/14/2022

ADDENDUM 2

RWC

REV

DATE

DESCRIPTION

BY
NOTE:
COAT FLOOR PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

ENDS AS SHOWN ON PLANS

THRUST COLLAR CENTERED IN SLAB

DUCTILE IRON WALL PIPE UNLESS OTHERWISE SHOWN

AS RECD FOR PIPE & INSTALLATION

AS RECD FOR PIPE 6" MIN

TOP OF FLOOR

WESTERN AREA WWTP
HUNTSVILLE, AL

PHASE 1 EXPANSION

FLOOR PIPE

DIVISION
D40

JOB NO.: 21W10220

DATE: 6/14/2022
1. **MATCHLINE - SEE SHEET 05-C206**

2. **KEYNOTES:**
   - A. DIMINISH CURB FROM 6" TO 0" OVER 2 FEET.

3. **NORTHINGS/EASTINGS DESCRIPTION**

4. **NOTES:**
   1. ALL DIMENSIONS ARE BACK OF CURB TO BACK OF CURB UNLESS OTHERWISE NOTED.
   2. ALL SPOT ELEVATIONS AT CURBS ARE TOP OF CURB, BACK OF CURB UNLESS OTHERWISE NOTED.
   3. GRADING SHALL BE AT 4:1 MAXIMUM SLOPES UNLESS OTHERWISE SHOWN OR SPECIFIED.
   4. FOR ELEVATIONS NOT SPECIFICALLY CALLED OUT, REFER TO ROADWAY PROFILES AND TYPICAL SECTIONS.
   5. REFERENCE SHEET 01-G006 FOR PAVEMENT KEY.
   6. FINAL GRADING WEST AND SOUTH OF NEW PROCESS TANKS ARE RECOMMENDATIONS. FINAL GRADING SHALL BE COORDINATED WITH OWNER. INTENT IS TO FLATTEN AREA WITHSpoil AND Regrade TO Drain. ALL ADDITIONAL Spoil MATERIAL SHALL BE PLACED ELSEWHERE ON SITE IN COORDINATION WITH OWNER.
   7. RELOCATE EXISTING RIPRAP WITHIN GRADED AREA TO LOCATE ORIGINALLY SHOWN LOCATION ON SITE DETERMINED BY OWNER. ANY ADJUSTMENTS TO GRADE SHALL BE COORDINATED WITH OWNER.
   8. CONTRACTOR SHALL ENSURE positive DRAINAGE TO MEET INTENT OF DESIGN.

9. **MATCHLINE - SEE SHEET 05-C206**

10. **KEYNOTES:**
    - A. DIMINISH CURB FROM 6" TO 0" OVER 2 FEET.
1. Existing piping is shown based on available record drawings and information provided to the engineer. Contractor shall review existing record drawings and field verify locations and depths of all pertinent lines prior to construction.

2. Piping elevations are for contractors' benefit. Contractor shall verify elevations in field.

3. For electrical duct bank information, see electrical drawings.
KEYED NOTES:
1. FLOW METERS TO BE ULTRASONIC TYPE.
EXISTING SCREENINGS INTERMEDIATE PLAN

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

0" Cored Hole in Existing Walls, TYP

STAIR LANDING, SEE DETAIL

0" @ 12' Intersect Reinforcement, TYP, SEE DETAIL

STAIR LANDING, SEE DETAIL

PROJECT NORTH
EXISTING SCREENING TOP OF WALL PLAN

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

PROJECT NORTH

1

2

3

4

10'-0"

DETAILED DRAWINGS

AL SHADE STRUCTURE

ADJASANT SHEET DRAWINGS

TO E 

TO F

TO G

TO D

TO A

TO B

G

NEW GRIT PROCESSING FOUNDATION PLAN

PROJECT NORTH

SCALE: 1/4" = 1'

CONSTRUCTION JOINT, SEE DETAIL

6" WATERSTOP, TYP

EQUIPMENT PAD, SEE DETAIL

CONSTRUCTION JOINT, SEE DETAIL

SLOPED

AL CS10 x 44, TYP

AL RT 6 x 4 6.05 COL.

6" WATERSTOP, TYP

INTERSECTION REINFORCEMENT, TYP, SEE DETAIL

#6 @ 12"

6" WATERSTOP, TYP

UP

CONSTRUCTION JOINT, SEE DETAIL

EQUIPMENT PAD, SEE DETAIL

584.08

UP EL.

TOS

5' - 5"

14' - 7 1/2"

17' - 0"

11' - 3"

3' - 5 1/2"

11' - 3"

14' - 10"

11' - 3"

20' - 6"

1' - 0"

3" / 12"

SOURCE: DIGITAL SIGNATURE 06/24/2022

AL COA# CA-500-E
EXPIRES 12/31/2023
5125A RESEARCH DRIVE NW
HUNTSVILLE, AL 35805
(256) 534-5512
NEW GRIT PROCESSING TOP OF WALL PLAN

SCALE: 1" = 1'-0"

PROJECT NORTH
NEW SCREENINGS FOUNDATION PLAN

SCALE: 3" = 1'-0"

PROJECT NORTH

DRAWN BY: RWC
JUNE 2022

CITY OF HUNTSVILLE
WESTERN AREA WWTP PHASE 1 EXPANSION
HUNTSVILLE, AL
21W10220
JDS
JJG

HEADWORKS
EXPANSION
ENLARGED NEW
SCREENINGS
FOUNDATION PLAN

DRAWING NUMBER
SHEET NUMBER
10-S110
071

BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

Digitally Signed 06/24/2022

AL COA# CA-500-E
EXPIRES 12/31/2023
5125A RESEARCH DRIVE NW
HUNTSVILLE, AL 35805
(256) 534-5512

© 2022 GARVER, LLC
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

DRAWN BY:
DATE:
JOB NO.:

DESIGNED BY:

CHECKED BY: RWC
NOTCH TOP OF WALL AS REQUIRED FOR SLUICEWAY. SEE PROCESS DRAWINGS.

AT EXISTING WALLS, CUT NOTCH IN TOP OF WALL AS REQUIRED FOR SLUICEWAY. COAT CUT AREA WITH SYSTEM 19 PER SPECIFICATION 09 90 00. SEE PROCESS DRAWINGS FOR ADDITIONAL INFORMATION.
NEW SCREENINGS TOP OF WALL PLAN

AL GUARDRAIL, TYP. SEE DETAIL

5-1/2" AL GRATING, TYP

GRATING CUT FOR CLARITY

ALUM CSS X 4.03, TYP

DIGITALLY SIGNED 06/24/2022

CITY OF HUNTSVILLE
WESTERN AREA WWTP PHASE 1 EXPANSION
HUNTSVILLE, AL

HEADWORKS
EXPANSION
ENLARGED NEW SCREENINGS TOP OF WALL PLAN

DRAWN BY: JDD
CHECKED BY: RWC
JUNE 2022

SHEET NUMBER 073
DRAWING NUMBER 10-8112
PROJECT NORTH
SCALE: 1" = 1'-0"

© 2022 GARVER, LLC
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.
AL RAILING TYP, SEE DETAIL
D05
5213 - 600

6" WATERSTOP, TYP

#6 X 3' - 3" EPOXY GROUTED DOWELS TOP AND BOTT WITH 12" EMBED

#6 @ 6" EF HORIZ
#6 @ 6" EW TOP AND BOTT
#6 @ 6" EW TOP AND BOTT

6" GRANULAR FILL, COMPACT TO 95% MAX DENSITY PER ASTM D698, METHOD C. SCARIFY TOP 6" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY PER ASTM D698, METHOD C. NOTE: UNSUITABLE MATERIAL MAY BE ENCLOSED. REQUIRED EXCAVATION AND SUBGRADE PREP. ADDITIONAL UNDERCUT AND GRANULAR FILL MAY BE REQUIRED AS DETERMINED BY SITE GEOTECHNICAL ENGINEER AND OWNER. ANY ADDITIONAL EXCAVATION OR FILL WILL BE PAID PER UNIT AS UNCLASSIFIED EXCAVATION OR UNCLASSIFIED FILL PER CONTRACT.

6" GRANULAR FILL, COMPACT TO 95% MAX DENSITY PER ASTM D698, METHOD C. SCARIFY TOP 6" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY PER ASTM D698, METHOD C. NOTE: UNSUITABLE MATERIAL MAY BE ENCLOSED. REQUIRED EXCAVATION AND SUBGRADE PREP. ADDITIONAL UNDERCUT AND GRANULAR FILL MAY BE REQUIRED AS DETERMINED BY SITE GEOTECHNICAL ENGINEER AND OWNER. ANY ADDITIONAL EXCAVATION OR FILL WILL BE PAID PER UNIT AS UNCLASSIFIED EXCAVATION OR UNCLASSIFIED FILL PER CONTRACT.
AL RAILING TYP, SEE DETAIL
D05 5213-600
ALUM CS6 X 4.03, TYP

#6 @ 12" EW EF, TYP
#6 @ 12" EW EF, TYP
#6 @ 12" EW EF, TYP
#6 @ 12" EW EF, TYP
#6 @ 12" EW EF, TYP

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY PER ASTM D698, METHOD C. NOTE UNSUITABLE MATERIAL MAY BE ENCOUNTERED DURING EXCAVATION AND SUBGRADE PREP. ADDITIONAL UNDERCUT AND GRANULAR FILL MAY BE REQUIRED AS DETERMINED BY ON SITE GEOTECHNICAL ENGINEER AND OWNER. ANY ADDITIONAL EXCAVATION OR FILL WILL BE PAID FOR UNIT AS UNCLASSIFIED. EXCAVATION OR UNCLASSIFIED FILL PER CONTRACT.
SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE, RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.

EXCAVATION SHORING DESIGN BY CONTRACTOR. SHORING MAY BE LEFT IN PLACE AT CONTRACTORS OPTION.

SCARIFY TOP 8" OF EXPOSED APPROVED SUBGRADE. RECOMPACT TO 95% MAX DENSITY.
Scarcify top 8" of exposed approved subgrade. Recompact to 95% max density per ASTM D698, Method C. Acute unstable areas shall be excavated and backfilled with granular fill. Additional undercut and granular fill may be required as determined by on-site geotechnical engineer and owner. Any additional excavation or fill will be paid per unit as unclassified excavation or unclassified fill per contract.

Excavation shoring design by contractor; shoring may be left in place at contractor's option.

Backfill below screen channels with CLSM.

AL floor hatch, see details D05.

AL guardrail, TYP, see detail D03.

2' CLR.

#6 @ 12" EW
Top and Bott

#6 @ 6" EW
Top and Bott

#6 @ 6" EF
With matching dowels

Sump.

AL floor hatch, see detail D03.

Screen channels with CLSM.

Excavation shoring design by contractor; shoring may be left in place at contractor's option.

Backfill below screen channels with CLSM.

Scarcify top 8" of exposed approved subgrade. Recompact to 95% max density per ASTM D698, Method C. Acute unstable areas shall be excavated and backfilled with granular fill. Additional undercut and granular fill may be required as determined by on-site geotechnical engineer and owner. Any additional excavation or fill will be paid per unit as unclassified excavation or unclassified fill per contract.

Excavation shoring design by contractor; shoring may be left in place at contractor's option.

Backfill below screen channels with CLSM.

AL floor hatch, see detail D03.

AL guardrail, TYP, see detail D03.

2' CLR.

#6 @ 12" EW
Top and Bott

#6 @ 6" EW
Top and Bott

#6 @ 6" EF
With matching dowels

Sump.
INSTALL NEW GRATING WHERE GATES WERE DEMO'D

PIPE SLEEVE SEE DETAIL TYD

KEYNOTES:

01 1" BALL VALVE V330 (SOC x SOC)
02 1" THERMO VALVE
03 1.25" BALL VALVE V330 - HAND ACCUATED
04 2" BALL VALVE V330 (SOC x SOC)
05 3" BALL VALVE V330 (SOC x SOC)
06 4" X 6" X 6" TEE (FLG x FLG x FLG)
07 4" PLUG VALVE V405 (FLG x FLG)
08 4" PIPE SADDLE
09 4" FLANGED COUPLING ADAPTER
10 4" ELBOW SQUARE BASE (FLG x FLG)
11 4" TEE (FLG x FLG x FLG)
12 4" TEE (MJ x MJ x MJ)
13 4" DISMANTLING JOINT
14 4" BUTTERFLY VALVE V500 - HANDWHEEL
15 4" 45° BEND (FLG x FLG)
16 4" 90° BEND (MJ x MJ)
17 4" 90° BEND (FLG x FLG)
18 4" 90° BEND LONG RADIUS (FLG x FLG)
19 4" X LENGTH AS REQ'D SPOOL (FLG x FLG)
20 4" X LENGTH AS REQ'D SPOOL (PE X PE)
21 6" X 4' - 0" (FLG x PE)
22 6" X 4" REDUCER (FLG x FLG)
23 6" YEE (FLG x FLG x FLG)
24 6" X 6" X 4" REDUCING TEE (FLG x FLG x FLG)
25 6" X 6" X 6" TEE (FLG x FLG x FLG)
26 6" PLUG VALVE V405 (FLG x FLG)
27 6" X 12" X 12" TEE (MJ x MJ x MJ)
28 6" DISMANTLING JOINT (FLG x FLG)
29 6" 90° BEND (MJ x MJ)
30 6" X LENGTH AS REQ'D SPOOL (PE X PE)
31 6" X LENGTH AS REQ'D SPOOL (PE X PE)
32 6" FLOOR / WALL PIPE (FLG X PE)
33 6" TAPPED BLIND FLANGE WITH 3" TAP
34 12" 45° BEND (MJ x MJ)
35 12" 90° BEND (MJ x MJ)
36 12" BLIND FLANGE
37 12" X 8" X 12" REDUCING TEE (MJ x MJ x MJ)
38 12" X 12" X 12" TEE (MJ x MJ)
39 12" FLOOR / WALL PIPE (FLG X PE)
40 12" X LENGTH AS REQ'D SPOOL (PE X PE)
KEYNOTES: DENOTED BY SYMBOL

01 1" BALL VALVE V330 (SOC x SOC)
02 1" THERMO VALVE
03 1.25" BALL VALVE V330 - HAND ACUATED
04 2" BALL VALVE V330 (SOC x SOC)
05 3" BALL VALVE V330 (SOC x SOC)
06 4" X 6" X 6" TEE (FLG x FLG x FLG)
07 4" PLUG VALVE V405 (FLG x FLG)
08 4" PIPE SADDLE
09 4" FLANGED COUPLING ADAPTER
10 4" ELBOW SQUARE BASE (FLG x FLG)
11 4" TEE (FLG x FLG x FLG)
12 4" TEE (MJ x MJ x MJ)
13 4" DISMANTLING JOINT
14 4" BUTTERFLY VALVE V500 - HANDWHEEL
15 4" 45° BEND (FLG x FLG)
16 4" 90° BEND (MJ x MJ)
17 4" 90° BEND (FLG x FLG)
18 4" 90° BEND LONG RADIUS (FLG x FLG)
19 4" X LENGTH AS REQ'D SPOOL (FLG x FLG)
20 4" X LENGTH AS REQ'D SPOOL (PE X PE)
21 6" X 6" X 4" REDUCING TEE (FLG x FLG x FLG)
22 6" X 6" X 6" TEE (FLG x FLG x FLG)
23 6" PLUG VALVE V405 (FLG x FLG) HANDWHEEL
24 6" X 12" X 12" TEE (MJ x MJ x MJ)
25 6" DISMANTLING JOINT (FLG x FLG)
26 6" 90° BEND (MJ x MJ)
27 6" x LENGTH AS REQ'D SPOOL (FLG x FLG)
28 6" x LENGTH AS REQ'D SPOOL (PE X PE)
29 6" FLOOR / WALL PIPE (FLG X PE)
30 6" TAPPED BLIND FLANGE WITH 3" TAP
31 12" 45° BEND (MJ x MJ)
32 12" 90° BEND (MJ x MJ)
33 12" BLIND FLANGE
34 12" X 8" X 12" REDUCING TEE (MJ x MJ x MJ)
35 12" X 12" X 12" TEE (MJ x MJ)
36 12" FLOOR / WALL PIPE (FLG X PE)
37 12" x LENGTH AS REQ'D SPOOL (PE X PE)
### Fan Schedule

<table>
<thead>
<tr>
<th>MARK</th>
<th>AREA SERVED</th>
<th>MANUFACTURER</th>
<th>TYPE</th>
<th>MODEL</th>
<th>AIRFLOW (CFM)</th>
<th>D.B.B. (°W.C.)</th>
<th>DRIVE</th>
<th>RPM</th>
<th>MOTOR (HP)</th>
<th>V</th>
<th>PH</th>
<th>CONTROLS</th>
<th>MOUNTING HEIGHT AFF (IN)</th>
<th>SOUND LEVEL (SONES)</th>
<th>WEIGHT (LBS)</th>
<th>ACCESSORIES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10EF01</td>
<td>GRIT PUMP STATION</td>
<td>GREENHECK</td>
<td>UPBLAST CENTRIFUGAL WALL FAN</td>
<td>CUE-080-VG</td>
<td>300</td>
<td>0.2</td>
<td>DIRECT</td>
<td>1230</td>
<td>1/10</td>
<td>100</td>
<td>1</td>
<td>CONTINUOUS</td>
<td>10' - 0&quot;</td>
<td>0.5</td>
<td>46</td>
<td>ALL</td>
<td>ALL</td>
</tr>
</tbody>
</table>

**Accessories:**
1. Control dial for balancing
2. Coated with high impact polyester
3. Hood hasps
4. Bird screen
5. Stainless-steel hardware

**Notes:**
- Fan runs continuously

### Louver Schedule

<table>
<thead>
<tr>
<th>MARK</th>
<th>AREA SERVED</th>
<th>MANUFACTURER</th>
<th>DESCRIPTION</th>
<th>MODEL</th>
<th>SIZE (IN)</th>
<th>MOUNTING HEIGHT AFF (IN)</th>
<th>ACCESSORIES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10LV01</td>
<td>GRIT PUMP STATION</td>
<td>GREENHECK</td>
<td>6&quot; STATIONARY EXTRUDED LOUVER</td>
<td>ESD-603</td>
<td>16&quot;</td>
<td>4'-9&quot;</td>
<td>ALL</td>
<td>ALL</td>
</tr>
</tbody>
</table>

**Accessories:**
1. Internal bird screen

**Notes:**
- Mounting height is indicated from top of room slab to bottom of louver opening

### Unit Heater - Electric Schedule

<table>
<thead>
<tr>
<th>MARK</th>
<th>AREA SERVED</th>
<th>MANUFACTURER</th>
<th>MODEL</th>
<th>TYPE</th>
<th>HEATING DATA INPUT (KW)</th>
<th>CFM</th>
<th>TEMPERATURE RISE (°F)</th>
<th>ELECTRICAL DATA</th>
<th>MOUNTING HEIGHT AFF (IN)</th>
<th>ACCESSORIES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10UH01</td>
<td>GRIT PUMP STATION</td>
<td>CHROMALOX</td>
<td>HD3D-500</td>
<td>WASHDOWN/COISSION RESISTANT</td>
<td>5</td>
<td>405</td>
<td>40</td>
<td>480</td>
<td>3</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

**Accessories:**
1. Wall mounting kit
2. Disconnect switch
3. Remote mounted thermostat

**Notes:**
- Fan runs continuously

---

**Grit Pump Station**

**Airflow Diagram**

---

**CITY OF HUNTSVILLE**

**WESTERN AREA WWTP PHASE 1 EXPANSION**

**6/24/22 12:36:37 PM**
GENERAL NOTES:

1. All locations within a 10' envelope of the screening equipment and headwork channels shall be considered a Class 1, Division 2 location in accordance with NFPA 820.

2. All locations within the interior of the grit removal chamber, from minimum operating water surface to the top of the chamber wall; 18" above the top of the chamber and 18" beyond the exterior chamber walls shall be considered a Class 1, Division 2 location in accordance with NFPA 820.

3. The contractor shall strictly adhere to the requirements in NFPA 70, Article 500, Hazardous (Classified) Locations for all areas referenced in the notes above. This includes providing appropriate seal fittings on conduits and cables and providing equipment, rated for the classification referenced above if installed within the classified envelope.

4. Existing lighting fixtures and respective conduits not shown. Contractor shall re-use existing lighting conductors and wiring if possible for existing lighting fixtures.

5. Detailed conduit routing not shown for most equipment. Contractor to field-route conduit in manner to avoid creating tripping hazards. Conduit placement must not prevent grate removal for channel maintenance.
GENERAL NOTES:

1. SEE DRAWING 10-E133 FOR HAZARDOUS AREA INFORMATION.

2. DETAILED CONDUIT ROUTING NOT SHOWN FOR MOST EQUIPMENT. CONTRACTOR TO FIELD-ROUTE CONDUIT IN MANNER TO AVOID CREATING TRIPPING HAZARDS. CONDUIT PLACEMENT MUST NOT PREVENT GRATE REMOVAL FOR CHANNEL MAINTENANCE. FLEXIBLE METAL CONDUIT TO BE USED FOR SCREEN CONNECTIONS SO SCREENS MAY PIVOT IN PLACE.

3. SEE DRAWING 10-SK01 FOR SUGGESTED CONDUIT ROUTING TO SCREENS AND DOWNSTREAM GATES.

4. CONTRACTOR SHALL SUBMIT CONDUIT ROUTING PLAN TO OWNER AND ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

5. SEE DRAWING 10-P502 FOR HEAT TRACING AND INSULATION INSTALLATION LOCATIONS ON SCREEN AND WASHER COMPACTORS.

SCREENS

SCREEN CONTROL PANELS

WASHER COMPACTORS

HUNTSVILLE, AL 35805

5125 A RESEARCH DRIVE NW

GARVER, LLC

© 2022 GARVER, LLC

PROFESSIONAL SERVICES

ALLOWED IN THE GOVERNING AGREEMENT FOR THIS WORK.

GARVER, LLC OR EXPLICITLY AUTHORIZED IN WRITING BY THE IDEAS AND DESIGN CONTAINED HEREIN, SHALL BE CONSIDERED IDEAS AND DESIGNS CONVEYED INSTRUMENTS OF PROFESSIONAL SERVICES AND ARE PROPERTY OF GARVER, LLC EXPIRES 12/31/2023

STAND FOR EACH LOCAL CONTROL PANEL.

CONTRACTOR SHALL SUBMIT CONDUIT ROUTING PLAN TO OWNER AND ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

CONNECTIONS SO SCREENS MAY PIVOT IN PLACE.

FLEXIBLE CONDUIT TO BE USED FOR SCREEN CONNECTIONS.

CONDUIT ROUTING NOT SHOWN FOR MOST EQUIPMENT.

CONTACTOR TO FIELD-ROUTE CONDUIT IN MANNER TO AVOID CREATING TRIPPING HAZARDS.

STAND FOR EACH LOCAL CONTROL PANEL.

FURNISH AND INSTALL NEW UNDERRUT ELECTRICAL RACK TOP NEW CONCRETE PAD INCLUDE LEAF-TO STYLE ROOF. SEE Dwg 90-E233

SCREENS MAY PIVOT IN PLACE.

CONDUIT PLACEMENT MUST NOT PREVENT GRATE REMOVAL FOR CHANNEL MAINTENANCE.

FLEXIBLE METAL CONDUIT TO BE USED FOR SCREEN CONNECTIONS.

CONTRACTOR TO FIELD-ROUTE CONDUIT IN MANNER TO AVOID CREATING TRIPPING HAZARDS.

DETAINED CONDUIT ROUTING NOT SHOWN FOR MOST EQUIPMENT.

CONTRACTOR TO FIELD-ROUTE CONDUIT IN MANNER TO AVOID CREATING TRIPPING HAZARDS.

CONDUIT PLACEMENT MUST NOT PREVENT GRATE REMOVAL FOR CHANNEL MAINTENANCE.

FLEXIBLE METAL CONDUIT TO BE USED FOR SCREEN CONNECTIONS.
CONTRACTOR TO LOCATE AND AVOID DISTURBING EXISTING DUCT BANK(S).

FURNISH AND INSTALL NEW UNISTRUT ELECTRICAL RACK ATOP CONCRETE PAD.

NEW GRIT PUMP FACILITY LIGHTING

CONTRACTOR TO LOCATE AND AVOID DISTURBING EXISTING DUCT BANK(S).

FURNISH AND INSTALL NEW GRIT MIXER NO. 3 UNISTRUT ELECTRICAL RACK ATOP CONCRETE PAD.

NEW GRIT CLASSIFIERS & EXISTING GRIT PUMP FACILITY

INSTALL NEW GRIT MCC AND NEW TRANSFORMER ON EXISTING HOUSEKEEPING PAD. CONTRACTOR SHALL EXTEND PAD IF NECESSARY.

PENETRATE EAST SIDE OF EXISTING GRIT PUMP BUILDING TO REACH NEW GRIT MCC. USING EXISTING CONCRETE PENETRATION(S) WHERE POSSIBLE.

RE-USE EXISTING DISCONNECT SWITCHES FOR GRIT PUMPS. MOUNT NEW LOCAL CONTROL STATIONS IN ACCESSIBLE LOCATION. FURNISH AND INSTALL NEW CONTROL CONDUIT AND WIRE BACK TO GRIT MCC, USING EXISTING CONCRETE PENETRATION(S) WHERE POSSIBLE.

LIGHTING FIXTURE "W1".

LIGHTING FIXTURE "X".

LIGHTING FIXTURE "F4" (TYP. FOR GRIT PUMP ROOM).

LIGHTING FIXTURE "W1".
GENERAL NOTES:

1. SEE DRAWING 10-E131 FOR HAZARDOUS AREA INFORMATION.

2. DETAILED CONDUIT ROUTING NOT SHOWN FOR MOST EQUIPMENT. CONTRACTOR TO FIELD-ROUTE CONDUIT IN MANNER TO AVOID CREATING TRIPPING HAZARDS. CONDUIT PLACEMENT MUST NOT PREVENT GRATE REMOVAL FOR CHANNEL MAINTENANCE.

3. CONTRACTOR SHALL SUBMIT CONDUIT ROUTING PLAN TO OWNER AND ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

4. EXISTING GATES WITH ACTUATORS TO REQUIRE NEW CONDUIT AND WIRING. NEW 480V SOURCE TO BE LOCATED ON ELECTRICAL RACK WITH SCREEN CONTROL PANELS, NOT IN EXISTING GRIT PUMP BUILDING LIKE PREVIOUS INSTALLATION.

LIGHTING FIXTURE "P2" (TYP. FOR HEADWORKS AREA LIGHTING).

ADDITIONAL AREA LIGHTING

DISTRIBUTION STRUCTURE GATES

MOUNT NEW METER PANEL TO HANDRAIL. ROUTE NEW CONDUITS FOR HEADWORKS DISTRIBUTION GATES NORTH ALONG HANDRAIL TO NEW GRIT PUMP ROOM.

ROUTE NEW CONDUITS FOR HEADWORKS DISTRIBUTION GATES EAST ALONG HANDRAIL TO EXISTING GRIT PUMP ROOM.

ROUTE NEW CONDUITS FOR CHAMBER MIXERS EAST ALONG HANDRAIL TO EXISTING GRIT PUMP ROOM.

MOUNT NEW LOCAL CONTROL PANEL TO HANDRAIL.
### Headworks & Conduit Schedule

<table>
<thead>
<tr>
<th>Conduit #</th>
<th>Description</th>
<th>Conductor Size</th>
<th>Conductor ID</th>
<th>Type</th>
<th>From Equipment Panel</th>
<th>To Equipment Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>10CP001-1C</td>
<td>Sluiceway Water</td>
<td>3/4&quot;</td>
<td>9#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10CP001-1L</td>
</tr>
<tr>
<td>10LE101</td>
<td>Level Transmitter 1 Supply</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LE101-1S</td>
</tr>
<tr>
<td>10LE102</td>
<td>Level Transmitter 2 Supply</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LE102-1S</td>
</tr>
<tr>
<td>10LE103</td>
<td>Level Transmitter 3 Supply</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LE103-1S</td>
</tr>
<tr>
<td>10LE104</td>
<td>Level Transmitter 4 Supply</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LE104-1S</td>
</tr>
<tr>
<td>10LIT101-1S</td>
<td>Screen 1 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT101-1S</td>
</tr>
<tr>
<td>10LIT102-1S</td>
<td>Screen 1 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT102-1S</td>
</tr>
<tr>
<td>10LIT103-1S</td>
<td>Screen 2 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT103-1S</td>
</tr>
<tr>
<td>10LIT104-1S</td>
<td>Screen 2 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT104-1S</td>
</tr>
<tr>
<td>10LIT105-1S</td>
<td>Screen 3 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT105-1S</td>
</tr>
<tr>
<td>10LIT106-1S</td>
<td>Screen 3 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT106-1S</td>
</tr>
<tr>
<td>10LIT107-1S</td>
<td>Screen 4 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT107-1S</td>
</tr>
<tr>
<td>10LIT108-1S</td>
<td>Screen 4 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT108-1S</td>
</tr>
<tr>
<td>10LIT109-1S</td>
<td>Screen 5 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT109-1S</td>
</tr>
<tr>
<td>10LIT110-1S</td>
<td>Screen 5 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT110-1S</td>
</tr>
<tr>
<td>10LIT111-1S</td>
<td>Screen 6 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT111-1S</td>
</tr>
<tr>
<td>10LIT112-1S</td>
<td>Screen 6 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT112-1S</td>
</tr>
<tr>
<td>10LIT113-1S</td>
<td>Screen 7 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT113-1S</td>
</tr>
<tr>
<td>10LIT114-1S</td>
<td>Screen 7 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT114-1S</td>
</tr>
<tr>
<td>10LIT115-1S</td>
<td>Screen 8 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT115-1S</td>
</tr>
<tr>
<td>10LIT116-1S</td>
<td>Screen 8 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT116-1S</td>
</tr>
<tr>
<td>10LIT117-1S</td>
<td>Screen 9 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT117-1S</td>
</tr>
<tr>
<td>10LIT118-1S</td>
<td>Screen 9 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT118-1S</td>
</tr>
<tr>
<td>10LIT119-1S</td>
<td>Screen 10 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT119-1S</td>
</tr>
<tr>
<td>10LIT120-1S</td>
<td>Screen 10 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT120-1S</td>
</tr>
<tr>
<td>10LIT121-1S</td>
<td>Screen 11 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT121-1S</td>
</tr>
<tr>
<td>10LIT122-1S</td>
<td>Screen 11 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT122-1S</td>
</tr>
<tr>
<td>10LIT123-1S</td>
<td>Screen 12 Upper Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT123-1S</td>
</tr>
<tr>
<td>10LIT124-1S</td>
<td>Screen 12 Lower Water</td>
<td>3/4&quot;</td>
<td>2#-14</td>
<td>CG</td>
<td>CONTROL</td>
<td>10LIT124-1S</td>
</tr>
</tbody>
</table>

**Conduit Descriptions:**

- **SCREEN 1 UPPER WATER**
- **SCREEN 1 LOWER WATER**
- **SCREEN 2 UPPER WATER**
- **SCREEN 2 LOWER WATER**
- **SCREEN 3 UPPER WATER**
- **SCREEN 3 LOWER WATER**
- **SCREEN 4 UPPER WATER**
- **SCREEN 4 LOWER WATER**
- **SCREEN 5 UPPER WATER**
- **SCREEN 5 LOWER WATER**
- **SCREEN 6 UPPER WATER**
- **SCREEN 6 LOWER WATER**
- **SCREEN 7 UPPER WATER**
- **SCREEN 7 LOWER WATER**
- **SCREEN 8 UPPER WATER**
- **SCREEN 8 LOWER WATER**
- **SCREEN 9 UPPER WATER**
- **SCREEN 9 LOWER WATER**
- **SCREEN 10 UPPER WATER**
- **SCREEN 10 LOWER WATER**
- **SCREEN 11 UPPER WATER**
- **SCREEN 11 LOWER WATER**
- **SCREEN 12 UPPER WATER**
- **SCREEN 12 LOWER WATER**

**Conductors:**

- **9#-14**
- **2#-14**

**Types:**

- **CG**
- **CG**

**Panel Schedule:**

1. **FLOW TO NEW SPLITTER BOX**
2. **FLOW TO TRAIN A CLASSIFIERS**
3. **FLOW TO NEW SPLITTER BOX**
4. **FLOW TO TRAIN A CLASSIFIERS**

**Manufacturer Cable:**

- **10CP001-1L**
- **10CP001-2L**
- **10CP001-4L**
- **10CP002**
- **5125A Research Drive NW**

**Conductor Counts:**

- **1-PAIR STP**
- **MANUFACTURER CABLE**
- **MANUFACTURER CABLE**
- **MANUFACTURER CABLE**
- **MANUFACTURER CABLE**

**Additional Notes:**

- **Digital Signature:** 06/24/2022
- **Addendum 2**
## GTLP1 PANEL SCHEDULE

<table>
<thead>
<tr>
<th>LOAD AMPS</th>
<th>DESCRIPTION</th>
<th>BREAKER CIRCUIT NO.</th>
<th>POLE</th>
<th>AMP</th>
<th>CKT NO.</th>
<th>POLE</th>
<th>AMP</th>
<th>COND</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>0.3</strong> NEW GRIT PUMP BLOCK EXTERIOR RECIP</td>
<td><strong>GTP1-1L</strong></td>
<td><strong>1</strong></td>
<td><strong>20</strong></td>
<td><strong>1</strong></td>
<td><strong>A</strong></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>0.3</strong> NEW GRIT PUMP BLOCK EXTERIOR RECIP</td>
<td><strong>GTP1-1L</strong></td>
<td><strong>1</strong></td>
<td><strong>20</strong></td>
<td><strong>1</strong></td>
<td><strong>B</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>0.3</strong> NEW GRIT PUMP BLOCK EXTERIOR RECIP</td>
<td><strong>GTP1-1L</strong></td>
<td><strong>1</strong></td>
<td><strong>20</strong></td>
<td><strong>1</strong></td>
<td><strong>C</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>0.3</strong> NEW GRIT PUMP BLOCK EXTERIOR RECIP</td>
<td><strong>GTP1-1L</strong></td>
<td><strong>1</strong></td>
<td><strong>20</strong></td>
<td><strong>1</strong></td>
<td><strong>D</strong></td>
<td><strong>5</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>0.3</strong> NEW GRIT PUMP BLOCK EXTERIOR RECIP</td>
<td><strong>GTP1-1L</strong></td>
<td><strong>1</strong></td>
<td><strong>20</strong></td>
<td><strong>1</strong></td>
<td><strong>E</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

**Heat Trace Supply Breaker to be 30kW Type.**

---

**Key Notes:**
1. Circuits previously powered from panel LP in existing grit pump facility. Use conduct numbers and wire sizes shown if new conduit or wiring is required. Contractor may need to modify field-end of existing wiring if affected by other construction at headworks facility.
2. Heat trace amps are estimated and for reference only. Contractor shall ensure final installation meets national electric code requirements and does not exceed equipment ratings.
3. Heat trace supply breaker to be 30kW type.

---

**General Panel Notes:**
1. Provide ground bus.
2. Provide full size neutral bus unless noted otherwise.
3. Circuits to be provided by contractor.

---

**Drawing Information:**
- **Drawing Date:** June 2022
- **Drawing No.:** GTP001
- **Scale:** Not Specified
- **Last Saved By:** HGW
- **Plot Date:** June 23, 2022
KEYED NOTES:

1. REMOTE PUSHBUTTON STATION TO BE PROVIDED BY ACTUATOR MANUFACTURER AND INCLUDED AS PART OF EQUIPMENT PACKAGE FOR 10CG801. OTHER GATES DO NOT REQUIRE REMOTE PUSHBUTTON STATION.
2. ALL POWER PANELS SOURCE DEPENDENT ON INDIVIDUAL GATE ACTUATOR. SEE ONE-LINE DRAWINGS FOR DETAILED INFORMATION.
3. PROVIDE NUMBER OF RELAYS AS REQUIRED FOR NUMBER OF REQUIRED CONTACTS.

GENERAL NOTES:

1. THE SCHEMATIC IS GENERIC IN NATURE AND ILLUSTRATES THE MINIMUM MONITORING AND CONTROL FEATURES REQUIRED. THE SCHEMATIC IS NOT INTENDED TO BE A COMPLETE SCHEMATIC SHOWING ALL CONNECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A DETAILED SCHEMATIC OF THE STARTER AND ALL CONNECTED EQUIPMENT INCLUDING ANY MOTOR THERMAL SWITCHES OR SPACE HEATERS AS REQUIRED BY THE SPECIFICATIONS.
2. MAKE ALL FINAL CONNECTIONS PER MANUFACTURER'S INSTRUCTIONS.
3. ALL POWER CONNECTIONS TO EXTERNAL DEVICES SHALL BE THROUGH THE USE OF CIRCUIT BREAKERS OR FUSED TERMINAL BLOCKS.
4. PROVIDE NUMBER OF RELAYS AS REQUIRED FOR NUMBER OF REQUIRED CONTACTS.
GENERAL NOTES:

1. THIS SCHEMATIC IS GENERIC IN NATURE AND ILLUSTRATES THE MINIMUM MONITORING AND CONTROL FEATURES REQUIRED. THE SCHEMATIC IS NOT INTENDED TO BE A COMPLETE SCHEMATIC SHOWING ALL CONNECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A DETAILED SCHEMATIC OF THE STARTER AND ALL CONNECTED EQUIPMENT INCLUDING ANY MOTOR THERMAL SWITCHES OR SPACE HEATERS AS REQUIRED BY THE SPECIFICATIONS.

2. MAKE ALL FINAL CONNECTIONS PER MANUFACTURER'S INSTRUCTIONS.

3. ALL POWER CONNECTIONS TO EXTERNAL DEVICES SHALL BE THROUGH THE USE OF CIRCUIT BREAKERS OR FUSED TERMINAL BLOCKS.

4. PROVIDE NUMBER OF RELAYS AS REQUIRED FOR NUMBER OF REQUIRED CONTACTS.

---

GRIT PUMP CONTROL SCHEMATIC (TYP. OF 3)

GRIT CLASSIFIER CONTROL SCHEMATIC (TYP. OF 3)
1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

GENERAL NOTES:

- Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.
- Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.
- Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)
- Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.

KEYED NOTES:

1. Transmitters located at flow meter vaults. Transmitter supplied 120VAC from local lighting panel due to location.

2. Output contacts shown to be located in respective MCC buckets. See individual equipment control schematics.

3. Additional auxiliary relay required for each piece of equipment (mixer #1, mixer #2, mixer #3, classifier #1, etc.)

4. Precision digital photo-digital panel meter shown. 4-20mA output required for future PLC connection.