Dos Rios WRC Primary Clarifier Rehabilitation Project

Solicitation No.: CO-00156

Job No.: 16-6502

Addendum 1 | January 31, 2018

To Bidder of Record:

This addendum, applicable to work referenced above, is an amendment to the proposal, plans and specifications and as such will be part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the Addendum number and issue date on the space provided in submitted copies of the bid proposal.

MODIFICATIONS TO THE SPECIFICATIONS

1. Section 01454 Testing Laboratory Services is deleted in its entirety and replaced with the attached revised Section 01454 Testing Laboratory Services.

2. Section 09900 Painting and Protective Coating (Piping Only) is deleted in its entirety and replaced with the attached revised Section 09900 Painting and Protective Coating (Piping Only).

3. Section 11125 Sludge Collection: Primary Clarifier is deleted in its entirety and replaced with the attached revised Section 11125 Sludge Collection: Primary Clarifier.

RESPONSES TO QUESTIONS RECEIVED

1. Arias is a Geotechnical Engineering/Construction Materials Testing (CMT) Firm. Should we respond with proposals directly to SAWS for these Invitations for Bid or is SAWS going to have the awarded contractor pay for the CMT on these projects?

Answer: Contact Prospective Bidders directly. The Contractor will be required to pay for the CMT as part of this project.

2. Is there any chance we can submit Envirodyne for consideration to be pre-approved? We have a bolt in clarifier replacement. One of the very few who can compete on this project against the OEM.

Answer: Additional manufacturers will not be considered at this time.

3. Is there a build drawing of the bridge (Walkway)? On the Plans (drawings) it shows the bridge on S1 and M1, but there is no detailed build drawing for fabrication. The proposal form, Alternate A-1 requests a price for fabricating and installing a new bridge / walkway.

Answer: No, design and fabrication of the bridge/walkway is part of the clarifier manufacturer's responsibility.

4. At the pre-bid meeting, it was discussed the plant would dewater each of the clarifiers, prior to work starting. Is there a volume amount that will be left, after the plant decants the clarifier? We would like to know approximately how much material we are requested to remove from each clarifier.

Answer: Yes, there is some wastewater/materials remaining in the clarifier after draining. Refer to Sheet D3, Key Note D and Sheet D4, Key Note A. The picture indicates approximately 6 to 12-inches of standing wastewater/materials plus the influent column is full to inlet ports.

END ADDENDUM 1

This Addendum, including these two (2) pages, is twenty-two (22) pages with attachments in its entirety.

Attachments:
Section 01454 Testing Laboratory Services
Section 09900 Painting and Protective Coating (Piping Only)
Section 11125 Sludge Collection: Primary Clarifier

1/31/2018

SECTION 01454
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
1. ~~OWNER will employ and pay, through the ENGINEER, an independent testing laboratory to perform specified services. Testing laboratory will be subcontractor to the ENGINEER.~~ CONTRACTOR will employ and pay an independent testing laboratory to perform specified services.
2. Inspection, sampling, and testing shall be as specified in the Specifications including but not limited to:
   a. Section 03310, Structural Concrete.
   b. Section 03600, Structural Grout.
3. CONTRACTOR shall pay for:
   a. Tests not specifically indicated in the Contract Documents as being OWNER's responsibility.
   b. Tests made for CONTRACTOR's convenience.
   c. Repeat tests required because of CONTRACTOR's negligence or defective Work
   d. Tests required after failure of one test for the same item to comply with the Contract Documents, for tests initially paid for by OWNER.
4. Testing laboratory is not authorized to approve or accept any portion of the Work or defective Work; rescind, alter, or augment requirements of Contract Documents; and perform duties of CONTRACTOR.

1.2 REFERENCES

A. Standards referenced in this Section are:
1. ASTM E329, Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
2. ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories.
3. NIST SRM, Standard Reference Materials

1.3 QUALITY ASSURANCE

A. Qualifications:
1. Testing Laboratory:
   a. Testing laboratory will comply with applicable requirements of ASTM E329.
   b. Testing laboratory will be authorized to operate in the same jurisdiction as the Site. Where applicable, laboratory will be certified by the authority having jurisdiction for the types of testing required.
   c. Testing equipment used by laboratory will be calibrated at intervals of not more than twelve months by devices of accuracy traceable to one of the following: NIST SRM, ISO/IEC 17025, certified by state or local bureau of weights and measures, or values of natural physical constants generally accepted in the engineering and scientific community.

1.4 SUBMITTALS

A. Informational Submittals: Testing laboratory will submit the following:
1. Quality Control Submittals and Test Reports: Promptly submit to ENGINEER and CONTRACTOR results of testing and inspections, in accordance with Section 01 33 00, Submittal Procedures, including:

a. Date issued.
b. Project title, number, and name of the Site.
c. Testing laboratory name and address.
d. Name and signature of inspector or person obtaining samples.
e. Date of inspection or sampling.
f. Record of temperature and weather.
g. Date of test.
h. Identification of material or item tested, and associated Specifications Section.
i. Location in the Project.
j. Type of inspection or test.
k. Results of tests and observations regarding compliance with the Contract Documents.

2. Qualifications Statements: Upon CONTRACTOR's request, testing laboratory will submit the following:
   a. Testing Laboratory:
      1) Qualifications statement indicating experience and facilities for tests required under the Contract Documents.
      2) Copy of report of inspection of facilities during most recent NIST inspection tour. Include memorandum of remedies of deficiencies reported during inspection.
      3) Copy of certificate of calibration for each instrument or measuring device proposed for use, by accredited calibration agency.

1.5 TESTING LABORATORY DUTIES

A. ~~OWNER/ENGINEER~~ CONTRACTOR-hired testing laboratory will:
1. Cooperate with CONTRACTOR and ENGINEER and provide qualified personnel promptly when notified.
2. Perform required inspections, sampling, and testing of materials and methods of construction; comply with applicable reference standards and the Contract Documents; and ascertain compliance with requirements of the Contract Documents.
3. Promptly advise ENGINEER and CONTRACTOR in writing of irregularities and deficiencies in the Work observed during performance of services.
4. Submit to ENGINEER and CONTRACTOR written reports of inspections and tests required by the Contract Documents.
5. ~~Perform additional tests and services as required by OWNER or ENGINEER to verify compliance with the Contract Documents.~~

1.6 CONTRACTOR'S COORDINATION WITH TESTING LABORATORY

A. CONTRACTOR shall perform and provide the following relative to ~~OWNER~~ CONTRACTOR-hired testing laboratory:
1. Provide to testing laboratory representative samples of materials to be tested, in required quantities.
2. Provide labor and facilities:
   a. For access to the Work to be tested, and where required, to Suppliers' operations.
   b. For obtaining and handling samples at the Site.
   c. For facilitating inspections and tests.
   d. For laboratory's exclusive use for storing and curing of test samples.
   e. Forms for preparing concrete test beams and cylinders.
3. Notify testing laboratory and ENGINEER sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
4. Arrange with testing laboratory and pay for additional services, sampling, and testing required for CONTRACTOR's convenience.

PART 2 - PART 2 – PRODUCTS (NOT USED)

PART 3 - PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 09900
PAINTING AND PROTECTIVE COATING (PIPING ONLY)

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Section Includes:

B. Surface preparation and surface finish per schedule for items provided/constructed in this Project.

C. Related Sections:
   1. Section 01330 – Submittal Procedures.

1.2 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. ANSI/NSF Standard 61.

D. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

E. Where the terms "exposed" surfaces are used to define painting locations and requirements it shall include all visible interior or exterior surfaces, top of walls, ceilings, and inside surfaces to 1'-0" below grade or the weir level or to floor level, whichever applies.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data
      a. Submit product data under provisions of Section 01340.
      b. Provide product data on all coatings.
      c. Technical and performance information that demonstrates compliance with specification.
      d. Submit required information on a system by system basis.
      e. Indiscriminate submittal of manufacturer’s literature only is not acceptable.
   2. Samples: Submit samples or color charts illustrating range of colors and textures available for each surface finishing product scheduled, for selection by OWNER.
   3. Submit manufacturer's application instructions under provisions of Section 01340.

B. Informational submittals:
   1. Applicator’s Qualification: List of references substantiating experience.
   2. Coating manufacturer’s Certificate of Compliance, in accordance with Section 01640 – Manufacturers’ Services.
   3. Factory Applied Coatings: Manufacturer’s certification stating factory applied coating system meets or exceeds requirements specified.
   4. If the manufacturer of finish coating differs from that of shop primer, provide finish coating manufacturer’s written confirmation that materials are compatible.
   5. Manufacturer’s written instructions and special details for applying each type of paint.
   6. Manufacturer’s written verification that submitted material is suitable for the intended use.

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Product Manufacturer: Company specializing in manufacturing quality paint and finish products.

2. Applicator: Company specializing in industrial painting and finishing, approved by product manufacturer.

B. Certifications: All coatings in contact with potable water and water being treated for use as potable water shall conform to ANSI/NSF Standard 61 and shall be certified by an organization accredited by ANSI. All process, service water, potable, and chemical piping, fittings, tanks, valves, equipment, and structures in contact with the water being treated are included in this requirement.

C. CONTRACTOR shall coordinate materials to be painted, shop primers, field primers, and finish coating systems to ensure compatibility for all materials and coatings in this project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Shipping:
1. Where pre-coated items are to be shipped to the site, protect coating from damage. Batten coated items to prevent abrasion.
2. Shop painted surfaces shall be protected during shipment and handling, suitable provisions including, padding, blocking, and use of canvas or nylon slings.

B. Acceptance at Site:
1. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
2. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

C. Storage and Protection
1. Store paint materials at minimum ambient temperature of 45ºF (7ºC) and a maximum of 90ºF (32ºC), in well ventilated area, unless required otherwise by manufacturer's instructions.
2. Primed surfaces shall not be exposed to weather for more than 2 months before being top coated, or less time if recommended by coating manufacturer.
3. Take precautionary measures to prevent fire hazards and spontaneous combustion.

D. Deliver, store, and protect products in accordance with coating manufacturer's instructions.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:
1. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45ºF (7ºC) for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
2. No exterior coatings shall be applied during rain or snow, when the air temperature is below 50ºF (10ºC) or above 120ºF (49ºC) or when the temperature of the surface to be coated is below 50ºF (10ºF) except as allowed by the coating manufacturer. No coating shall be applied if a predicted temperature of 35ºF (1.67ºC) or lower is forecast within 24 hours of application unless the coating is enclosed and heated. No painting is to be done when the relative humidity meets or exceed 50 percent or when the substrate temperature is within 5ºF (2.78ºC) of the dew point, as allowed by the manufacturer.
3. Minimum Application Temperatures for Latex Paints: 45ºF (7ºC) for interiors; 50ºF (10ºC) for exterior; unless required otherwise by manufacturer's instructions.
4. Minimum Application Temperature for Varnish and Finishes: 65ºF (18ºC) for interior or exterior, unless required otherwise by manufacturer's instructions.
5. Provide lighting level of 80-foot candles measured mid-height at substrate surface.
6. CONTRACTOR shall be fully responsible for personnel safety during painting operations.

1.7 WARRANTY

A. The coatings shall be warranted for five years or manufacturer’s standard warranty, whichever is longer, after acceptance of the facility by the OWNER.

1.8 EXPERIENCE REQUIREMENTS

A. Product Manufacturer: 10 years experience.

B. Applicator: 5 years documented experience.

1.9 MAINTENANCE

A. Extra Materials
   1. Provide an unopened 1-gallon 4L container of each color and surface texture to OWNER.
   2. Label each container with color, texture, room locations, and in addition to the manufacturer's label.

1.10 REGULATORY REQUIREMENTS

A. Meet federal, state, and local requirements limiting the emission of volatile organic compounds.

B. Perform surface preparation and painting in accordance with recommendations of the following:
   1. Paint manufacturer’s instructions.
   2. SSPC PA 3, Guide to Safety in Paint Applications.
   3. Federal, state, and local agencies having jurisdiction.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Environmental Requirements:
   1. Do not apply paint in temperatures or moisture conditions outside of manufacturer’s recommended maximum or minimum allowable.
   2. Do not perform final abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees F above dew point of ambient air.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - ALL COATINGS

A. Ameron.

B. Carboline.

C. Tnemec.

D. Sherwin-Williams

2.2 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

B. CONTRACTOR shall have complete responsibility for ensuring that each coating applied is compatible with its substitute and/or its intended finish coat, and that the completed coating system is suitable for its intended service.

C. Accessory Materials: Thinning of paint and all accessory type materials used shall be strictly in accordance with the manufacturer's recommendations covering material types, solvents, mix ratios, and methods.

2.3 FINISHES

A. Refer to schedule at end of Section for surface finish schedule. Colors shall be selected by OWNER from manufacturer's standard color charts.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums, unless more stringent limitations are recommended by the coating manufacturer:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Located Wood: 15 percent, measured in accordance with ASTM D2016.

3.2 PREPARATION

A. Surface preparation shall be as indicated in Part 3.7.

3.3 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site and dispose of all excess materials and empty containers in full accordance with all applicable state, federal, and local laws.

3.4 APPLICATION

A. Apply products in accordance with manufacturer's instructions, specifically with regard to the window for application of the second coat.

B. Do not apply finishes to surfaces that are not dry to touch.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry to touch before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

J. Paint all items throughout the project except for surfaces listed below unless shown otherwise in the plans or specifications:
   1. Concrete pavement and sidewalks.
   2. Interior fiberglass items unless specified otherwise. Exterior fiberglass shall be painted.
   3. Metal surfaces of anodized aluminum, stainless steel, or chromium plate.
   4. Operating parts, unless otherwise specified.
   5. Existing structures or equipment, unless otherwise specified.

K. Repair any damage or overspray to paint on existing structures caused by construction work. Match existing colors with touch-up paint.

L. New concrete and rubbed finish and mortar joints shall age a minimum of 30 days before application of coatings. Concrete surfaces to be painted shall be coated prior to installation of equipment, piping, conduit and supports and touched up following installation of these items. Components which cannot be adequately painted due to space limitations following installation shall be coated prior to installation and touched up after installation as well.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to the Division 16 Electrical specifications for schedule of color-coding and identification banding of ductwork, piping, and conduit. Colors for equipment shall be selected by OWNER during submittal process.

B. Paint shop primed equipment. Touchup paint equipment furnished with finish coatings of correct colors.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports. For insulated pipe, provide shop and field primer coats on pipe and surface preparation and final coat on insulation jacket.

E. Replace identification markings on mechanical or electrical equipment when painted accidentally.

F. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

G. Paint exposed conduit and electrical equipment occurring in finished areas.

H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

I. Color code signs, piping, conduit, and exposed ductwork in accordance with the requirements of Section 10952. Color band and identify with flow arrows and names.

J. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.6 CLEANING

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PROTECTIVE COATING SCHEDULE

A. Ferrous Metals (Exterior, Non-Submerged):
   1. Shop Surface Preparation: SSPC-SP6 Commercial Blast Cleaning.
   2. Field Surface Preparation:
      a. Clean all surfaces as per NAPF 500-03-01 Solvent Cleaning to remove all oil, grease, factory-applied tars and/or bitumastic coatings and all other soluble contaminants.
      b. Prepare ductile iron pipe as per NAPF 500-03-04 Abrasive Blast Cleaning for Ductile Iron Pipe providing a minimum 1.5 mil regular anchor profile.
      c. Prepare ductile iron valves and fittings as per NAPF 500-03-05 Abrasive Blast Cleaning for Cast Ductile from fittings.
      d. All other ferrous metals shall be sandblasted at welds and imperfections.
   3. Products and Manufacturer: Provide one of the following:
      a. Tnemec:
         1) Shop Primer: Series N69 Hi-Build Epoxoline II - 1 coat, 6.0 to 8.0 dry mils.
         2) Field Primer: Series N69 Hi-Build Epoxoline II - 2 coats, 6.0 to 8.0 dry mils.
         3) Finish: Series 740 UVX - 1 coat, 3.0 to 5.0 dry mils per coat.
      b. Carboline:
         1) Shop Primer: Carboline 893 - 1 coat, 6.0 mils dft.
         2) Field Primer: Carboline 893 - 2 coats, 6.0 mils dft.
         3) Finish: Carboline 134 - 2 coats, 1.5 mils dft per coat.

c. Ameron:
   1) Shop/Field primer: Amercoat 385 Polyamide Epoxy 3 coats, 6.0 dry mils, 175 square feet per gallon theoretical to be applied in the shop or in the field.
   2) Finish: Amercoat 450H High Solids Aliphatic Polyurethane - 2 coats, 1.5 dry mils per coat, 705 square feet per gallon theoretical.

d. Sherwin-Williams
   1) Shop Primer: Sherwin-Williams Macropoxy 5500, 1 coat, 6.0-8.0 mils DFT.
   2) Field Primer: Sherwin-Williams Macropoxy 5500, 1 coat, 6.0-8.0 mils DFT.
   3) Finish: Sherwin-Williams Acrolon Ultra, 1 coat, 2.0-3.0 mils DFT.

END OF SECTION

SECTION 11125
SLUDGE COLLECTION: PRIMARY CLARIFIER

PART 1 - GENERAL

1.1 SCOPE SUMMARY

A. Section includes the work necessary to design, furnish, and install circular type primary clarifier components and appurtenances as shown on the plans. The system includes but is not limited to the following: ~~rake blades (plate & squeegee),~~ bolted squeegee plate, scum skimming system, scum box, scum discharge piping, and spray system.

B. This project includes the complete removal and replacement of the clarifier bridge/walkway as an additive alternate (Alternative No. 1). The existing clarifier bridge/walkway paint tested positive for lead. Contractor is responsible for the proper disposal as well abatement of any paint removed from the existing clarifier bridge/walkway. Refer to Paragraph 2.9.

C. This project consists of retrofitting portions of the primary clarifier in an existing basin. Any structural, mechanical, and/or electrical modifications as result of the new clarifier equipment components shall be made by the CONTRACTOR at no additional cost to the OWNER. This also includes any engineering expenses that may be required to retrofit the new clarifier in the existing basin.

D. In order to assure uniform quality, ease of maintenance and minimal parts storage, it is the intent of these Specifications that a single manufacturer shall supply all equipment called for under this Section. The equipment manufacturer shall assume the responsibility for proper installation and functioning of the equipment.

E. Provide single source coordination responsibility through the equipment manufacturer for the complete sludge collection system.

F. Naming a manufacturer in PART 2- PRODUCTS does not relieve the manufacture from fully complying with all the requirements of the Contract Documents. The Contract Documents represent the minimum acceptable standards. Equipment must fully comply with all the requirements of the specifications and construction plans.

1.2 EQUIPMENT TAGS

A. DR-0001-Primary Clarifier No. 1

B. DR-0002-Primary Clarifier No. 2

C. DR-0003-Primary Clarifier No. 3

D. DR-0004-Primary Clarifier No. 4

E. DR-0005-Primary Clarifier No. 5

F. DR-0006-Primary Clarifier No. 6

G. DR-0007-Primary Clarifier No. 7

H. DR-0008-Primary Clarifier No. 8

1.3 RELATED WORK

A. Related Sections include, but are not necessarily limited, to:
   1. Division 1 – General Requirements
      a. Section 01010 – Summary of Work
      b. Section 01025 - Measurement and Payment
      c. Section 01330 - Submittal Procedures
      d. Section 01340 – Shop Drawings, Product Data, and Samples

e. Section 01610 – Basic Product Requirements
f. Section 01640 – Manufacturer's Services – Manufacturer's Certificate of Compliance
g. Section 01740 – Warranties
h. Section 01755 - Equipment Testing and Facility Start-up
i. Section 01782 – Operation and Maintenance Data

2. Section 03600 – Structural Grout
3. Section 09800 – General Specification for Coating Systems
4. Division 16 – Electrical

1.4 REFERENCES

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

1. American Gear Manufacturers Association (AGMA): 902-B89, Geometry Factors for Determining the Pitting Resistance and Bending Strength of Spur, Helical and Herringbone Gear Teeth.
2. American Institute of Steel Construction (AJSC): Specifications for the Design, Fabrication, and Execution of Structural Steel for Buildings.
3. American National Standards Institute/American Bearing Manufacturers Association (ANSI/ABMA): Load Ratings and Fatigue Life for Ball Bearings and Roller Bearings.
4. American National Standards Institute/American Gear Manufacturers Association (ANSI/AGMA):
   a. 2000-A88, Gear Classification and Inspection Handbook Tolerances and Measuring Methods for Unassembled Spur and Helical Gears.
   b. 2001-D04, Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth.
   c. 2002-B88, Tooth Thickness Specification and Measurement.
   d. 2003-B97, Rating the Pitting Resistance and Bending Strength of Generated Straight Bevel, Zerol Bevel, and Spiral Bevel Gear Teeth.
   e. 2004-B 89, Gear Materials and Heat Treatment Manual.
   f. 2009-A98, Bevel Gear Classification, Tolerances, and Measuring Methods.
   g. 6001-D97, Design and Selection of Components for Enclosed Gear Drives.
   h. 6010-F97, Standard for Spur, Helical, Herringbone and Bevel Enclosed Drives.
   i. 6022-C93, Design Manual for Cylindrical Wormgearing.
   j. 6034-B92, Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors.
   k. 9005-D94, Industrial Gear Lubrication.
5. American Society of Mechanical Engineers (ASM1E): B29.1M, Precision Power Transmission Roller Chains, Attachments, and Sprockets.
6. American Water Works Association (AWWA): C200, Steel Water Pipe - 6 Inches and Larger.
7. American Welding Society (AWS):
   a. B2.1, Standard for Welding Procedure and Performance Qualification.
   b. D1.1, Structural Welding Code — Steel.
   c. QC 01, Standard for AWS Certification of Welding Inspectors.
8. ASTM International (ASTM):
   a. A36/A36M, Standard Specification for Carbon Structural Steel.
   b. A48, Standard Specification for Gray Iron Castings.
   c. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   d. A148/A148M, Standard Specification for Steel Castings, High Strength, for Structural Purposes.
   e. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   f. A276, Standard Specification for Stainless Steel Bars and Shapes.
   g. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

h. A285/A285M, Standard Specification for Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength.
i. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105-ksi Minimum Tensile Strength.
j. A384, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
k. A385, Standard Specification for Providing High-Quality Zinc Coatings (Hot-Dip).
l. A536, Standard Specification for Ductile Iron Castings.
m. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
n. D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

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

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: Torque used to select size, strength, and type of materials and components for mechanism and drive system and at which or below will provide continuous 24 hour per day clarifier operation for period of not less than 20 years at design torque condition and rotational speed specified herein, without damage, permanent deformation or overload, and equal to 50 percent on overload device scale.

D. Ultimate Torque: 200 percent of Design Running Torque and below which no portion of mechanism will be damaged if operated for only short period of time (a few seconds) and equal to 100 percent on overload device scale.

E. Slenderness Ratio: Ratio of unbraced length to least radius of gyration.

F. Submerged Metal: Metal below gear head drive and plane 18 inches above weir elevation indicated.

G. Certified Welding Inspector (CWI): As defined in AWS QC 01.

1.6 QUALIFICATIONS

A. Equipment specified in this Section shall be furnished by a single supplier.

B. Comply with AWS D1.1 procedures and practices

C. Manufacturer experience
1. Minimum of ten (10) years clarifier mechanism installation with a diameter greater than or equal to 90 percent of the specified clarifier.
2. Supplied similar equipment for the past 10-years.
3. The mechanism shall be a standard production product of the manufacturer.

D. Designer: Registered professional engineer registered in State of Texas.

E. Welder/Welding Operator: In accordance with AWS D1.1.

F. Welding Inspector: Certified in accordance with AWS QC 01, and having prior experience with welding codes specified.

G. If equipment is offered that differs from the manufacturer listed as “A.1” in Paragraph 2.2, equipment will be acceptable only under the following conditions. Any layout revisions, piping, appurtenance equipment, electrical work, etc required to accommodate equipment shall be made at no additional cost to the OWNER.

1.7 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Equipment Assemblies: Make, model, weight, and horsepower of each.
      b. Manufacturer's Catalog: Product information, descriptive literature, specifications, dimensional layout, identification of materials of construction, and specialized equipment assembly cuts.
      c. Detailed Drawings:
         1) Structural, mechanical, and electrical showing 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 influent column, center torque cage, center pier, walkway bridge, influent well, sludge removal header and supports, trusswork, scum skimmer, and scum trough.
      d. 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, and sludge removal header and supports, and trusswork.
      e. Hydraulic Calculations: Minimum average, normal, maximum, and instantaneous flows and data.
      f. Certification of Structural Calculations: Letter of certification for structural design of mechanism, shall be signed and sealed by professional engineer registered in the State of Texas. Copies of detailed structural design calculations shall not be submitted for review. If submitted, calculations will be returned without review.
      g. Structural Loads: Static, dynamic, and torque reaction loads to be transferred into structure at center column and access bridge support locations.
      h. Details of torque sensing and load indication device.
      i. External utility requirements such as air, water, power, drain, etc., for each component.
      j. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
      k. Power and control wiring diagrams, including terminals and numbers.
      l. Painting/Coating System(s): Include manufacturer's descriptive technical catalog literature and specifications.
      m. Diameter of ball race.

B. Informational Submittals:
   1. Designer's qualifications.
   2. Manufacturer's Certificate of Compliance: Commercial products, including painting/coating system(s).
   3. Special shipping, storage and protection, and handling instructions.
   4. Test procedures.
   5. Test results, reports, and certifications.
   6. Welder/welding operator qualifications.
   7. Welding inspector credentials.
   8. Welding Inspector's Report.
   9. Operation and Maintenance Data: As specified in Section 01782, OPERATION AND MAINTENANCE DATA.
   10. Manufacturer's Certificate of Proper Installation.
   11. Service records for maintenance performed during construction.

1.8 OPERATION AND MAINTENANCE MANUALS

A. Provide manufacturer's Operation and Maintenance Manual(s) (O&M) and Maintenance Summary Form(s) in accordance with OPERATION AND MAINTENANCE DATA in Section 01782.

1.9 WARRANTY

A. Equipment warranty requirements shall comply with Section 01740, WARRANTIES.

B. Submit warranty from the equipment manufacturer clearly stipulating that manufacturer's warranty period shall be for two (2) years commencing at final acceptance by the OWNER.

1.10 PRODUCT, DELIVERY, STORAGE, AND HANDLING

A. Product delivery, storage, and handling shall comply with Section 01610, BASIC PRODUCT REQUIREMENTS.

1.11 MANUFACTURER'S CERTIFICATES

A. Provide manufacturer's certificate(s) in accordance with Paragraph 3.03 MANUFACTURER'S CERTIFICATE OF COMPLIANCE in Section 01640.

1.12 SPARE PARTS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools for each clarifier provided (unless otherwise noted).
   1. ~~Two (2) set scum trough seals for pipe trough connection.~~ Two (2) sets of neoprene skimmer mechanism wipers.
   2. ~~One (1) set of all bearings for skimmer system.~~ Two (2) set of all bearings for skimmer system (for all eight units and not 2 per clarifier).
   3. Special tools (if required) to maintain or dismantle scum collection assemblies, drive unit except for low speed main bearing, but including that required for removal/insertion of main bearing race balls.

PART 2 - PRODUCTS

2.1 GENERAL

A. Where an approved manufacturer's standard equipment name and/or model number is listed, the equipment system shall conform to the performance, functions, features, and materials of construction specified below.

2.2 MANUFACTURERS

A. The following clarifier manufacturers are approved for this project:
   1. Ovivo/EIMCO
   2. Evoqua/Envirex
   3. Wes Tech
   4. Walker Process

2.3 SERVICE CONDITIONS

A. Material Handled: Screened raw sewage.

B. Influent Liquid Temperature Range: 40 degrees F minimum to 86 degrees F maximum.

C. Influent pH Range: 6.5 minimum to 8.0 maximum.

D. Site Conditions:
   1. Mechanism and bridge design shall be in accordance with conditions and requirements stated in Section 01610, BASIC PRODUCT REQUIREMENTS. In addition, design shall accommodate the following site conditions:
      a. Exposure: Ultraviolet radiation of sun.
      b. Ambient Temperature Range: Minimum 0 degree F to 100 degrees F, maximum.
      c. Ambient Humidity Range: Minimum 10 percent to 98 percent relative humidity, including rain, and ice.

2.4 MANUFACTURED UNITS

A. Furnish units meeting performance and design requirements as specified below.

B. General Description:
1. Suitable for installation in an existing 140-foot diameter by 12-feet 3/4-inches side water depth (SWD) clarifier having floor slope, as shown on Drawings.
2. Center pier-supported, center drive type.
3. Furnished skimmer mechanism and scum trough, ~~rake (plate & squeegee)~~ bolted squeegee plate, and all other necessary parts, including anchor bolts.
4. Direction of mechanism rotation shall be as shown on Drawings clockwise.
5. Existing effluent weirs and baffle plate shall be reused.

C. Performance Requirements
1. Collect and convey screened raw sewage to center solids hopper.
2. Collect, convey, and discharge floating scum from surface of clarifier to defined area at outside perimeter of unit.
3. Head Loss: 3-inch W.L. maximum in influent piping and ports (from point where flow enters manufacturers' supplied equipment) at the defined influent flows.

2.5 SLUDGE SCAPER ARMS WITH ~~DIAGONAL RAKE BLADES (PLATE AND SQUEEGEE ONLY)~~ BOLTED SQUEEGEE PLATE

A. 304 Stainless Steel ~~(ASTIM A240) (Scum Scraper Plate)~~ Scum Scraper Plate.

B. Sludge scraper arms ~~with diagonal rake blades on both arms~~ fitted with stainless steel squeegees.

C. Sufficient strength and rigidity such that at Ultimate Torque load, and while sweeping in floor grout, no member will be stressed to level beyond maximums allowed by current AISC Specifications.

D. Squeegees:
1. Materials: 27-gauge, spring brass or 20-gauge, type 304 stainless steel.
2. Attached to stainless steel sludge scraper blades. Do not replace scraper blades.
3. Bolts, Nuts, and Washers: Type 316 stainless steel.
4. Vertical Alignment: Between ½-inch minimum and 1 ½-inch maximum clearance above grouted clarifier bottom.

~~E. Counterweight Assembly:~~
~~1. On rake arms to balance weights of scum skimmer components or other appurtenances as necessary.~~
~~2. Design: By mechanism manufacturer.~~
~~3. Fabricated welded steel box filled with proper quantity of steel punching and topped with 2 inches minimum of grout or multiple steel plates of various thickness and quantities supported by baseplate and forming stack bolter together by at least two Type 316 stainless steel bolts.~~

2.6 SCUM SKIMMING SYSTEM

A. Mechanically collect and discharge surface scum from annular space between center influent stilling well and outer perimeter scum baffle.

B. Skimming Arm and Skimmer Blade Assemblies: Support from sludge collector truss.
1. Quantity: Two.
2. Supports: Maximum 20-foot centers.
3. Bolted Connections: Permit plate removal.

C. Skimming Arm:
1. Extend tangentially from, but not necessarily attached to, center influent stilling well continuously outward to skimmer blade assembly at perimeter of clarifier.
2. A36 Painted Steel (ASTM A123/123M), plate and shapes, minimum thickness 1/4 inch

3. Extend plate from 3 inches above to 3 inches below static liquid level (weir invert elevation) in clarifier.

D. Skimmer Blade Assembly:
   1. A36 Painted Steel (ASTM A123/123M), plate and shapes, minimum thickness 1/4 inch
   2. Trap scum at perimeter scum baffle and discharge it into scum trough.
   3. Hinged, adjustable unit designed such that when passing over scum trough bottom, blade edge is always in contact with trough even if trough is not horizontal or plumb.
   4. Lockout Device: Permits unit to be raised and maintained out of liquid.
   5. Lift Mechanism: Operable from exterior walkway or bridge deck.
   6. Blade: Extend full width of scum trough.
      a. Bottom and Edges: Replaceable neoprene seal strips to ensure continued entrapment and discharge of scum into scum trough.
      b. Inner and Outer Edges: Suitable, separate wearing surfaces.
   7. Adjustable, spring-loaded device, minimum applied force of 5 pounds, or flexible neoprene wiper to constantly force seal with perimeter scum baffle.

E. Scum Trough Assembly:
   1. One per clarifier, including horizontal submerged shelf and inclined beach.
   2. ~~Painted Steel (ASTM A123/123M), plate and shapes, minimum thickness 1/4 inch.~~ Scum trough, plate, and shapes, 304 Stainless Steel minimum thickness 1/4 inch.
   3. Radial Width: Minimum ~~6 ft~~ 10-ft.
   4. Circumferential Length (Including Inlet and Outlet Beaches): Match existing scum box dimensions (4-ft Minimum).
   5. Inlet Inclined Beach Length: Minimum 65 percent of total circumferential length of trough.
   6. Trough Opening: Minimum ~~4 feet wide~~ 7-inches, radially sloped bottom, with 6-inch outlet.
   7. Support from basin weir wall and connect to scum baffle with adequate supports.
   8. Support of skimming blade as it passes over scum trough opening shall be provided by support bars over opening or roller and track assembly.
   9. Track: Vertically and horizontally adjustable, arranged to properly engage roller assembly on skimmer blade assembly at outside perimeter edge.
   10. Support Bars: Maximum of three per scum trough, sized to provide adequate support for skimmer blade.

2.7 SCUM SPRAY SYSTEM

A. A scum spray system shall be provided by the manufacturer of the sludge collector equipment to provide a means of spraying scum or foam to break it up and assist in skimming. The spray header shall extend across the scum box and supported from the access bridge. The spray water shall be provided from the plant non-potable water system.

B. Design Requirements:
   1. Application Rate: 0.5-gpm per linear foot of basin radius.
   2. Supply header: minimum 2-in pipe size.

C. Operation and Control:
   1. The spray system shall allow for manual operation.

D. Equipment:
   1. The spray system shall consist of a spray manifold mounted from the access bridge.
   2. The spray header shall be ~~Schedule 80 PVC~~ Stainless Steel Pipe and shall be a minimum of 2 IN pipe size. ~~Galvanized~~ Stainless supports shall be provided for mounting to the access bridge. Supports shall be placed per manufacturer's recommended spacing at no greater than 5-ft.
   3. The spray nozzles shall be positioned approximately 12-in from the water surface and shall have a wide flat pattern that impacts the water surface at approximately 15-degrees from horizontal. Spray nozzles shall be stainless steel with swiveling/adjustable heads.

2.8 DISSIMILAR METALS

A. Isolate dissimilar metals or connectors to prevent direct contact and electrical conductivity.

B. Use 1/8-inch thick continuous neoprene gasket to insulate aluminum grating, checker plate, and handrail post bases from access walkway support bridge and other components.

C. Use insulating washer and Teflon sleeves at bolted connections.

2.9 ACCESS WALKWAY (ADDTIVE ALTERNATE NO. 1)

A. General Provide access walkway from side of clarifier to center drive unit and access platform around center drive unit

B. Support System:
   1. Painted Steel (A36) in compliance with ASTM A123/123M truss type bridge construction rigidly supported on center pier and at access end on clarifier wall with thermal expansion compensating anchorage.
   2. ~~Diagonally cross brace and space beams~~ Angle truss system is necessary to carry loads and produce required clear walkway width. Extend full radius. Clarifier manufacturer is responsible for the design of the walkway.

C. Bridge Design:
   1. Maximum Vertical Deflection: 1/360 of span under uniform 50 pound per square foot of walkway surface live load, plus dead load. Camber for 1/3 live load plus dead load.
   2. Maximum Horizontal Deflection: 1/360 of span under uniform horizontal loading of 50 pounds per linear foot.
   3. Horizontal and vertical design live loads need not be applied simultaneously.
   4. Walkway Surface Elements: Do not utilize to reduce calculated bridge deflections.
   5. Provide step(s) as necessary at outboard end of bridge to allow access from walking surface adjacent to clarifier at elevation as shown on Drawings. Stair tread(s) shall be 12 inches with 1-inch nosing to provide effective 11-inch tread, equally spaced to provide equal risers at maximum 7 inches from access landing to bridge surface. <u>The drawings show re-use of existing concrete apron and steps to be re-used.</u>

D. Surface:
   1. Material: Aluminum Grating.
   2. Thickness: Minimum, ~~2 inch~~ 1-¾ -inch.
   3. Width: Extend minimum to guardrail/handrail supports.

E. Width:
   1. 36-inches minimum clear between guardrails/handrails.
   2. ~~8 feet square minimum clear working space with 30 inches minimum clearance all around center drive unit.~~

F. Guardrails/Handrails:
   1. Extend along both sides of bridge and around center platform.
   2. Truss type bridge members shall not be used as guardrail/handrail. Use standard pre-manufactured wall bracket units to attach top and intermediate rails to bridge elements.

G. Kickplates:
   1. Anodized Aluminum: 4-inch high by 3/16-inch minimum thickness.
   2. Fasteners: Type 316 stainless steel.
   3. Locate around center platform perimeter and full length of both sides of access walkway.

2.10 ACCESSORIES

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

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

C. Equipment Identification Plates: 16-gauge, Type 316 stainless steel, securely mounted on each separate equipment component and control panel in readily visible location. Plate shall bear 3/8-inch high die-stamped block type black enamel filled equipment identification number and letters.

2.11 FABRICATION

A. Painted Steel (A36) components in compliance with ASTM A123/123M. ~~Field cutting or welding will not be permitted~~.

B. All A36 steel shall be minimum 1/4 –inch thick.

C. Shop fabricate and assemble mechanism components in largest sections practicable and permitted by transportation carrier regulations.

D. Welded Construction: Comply with AWS Dl. 1 for procedures, appearance, and quality of welds, and methods used in correcting welding.

E. Shop/Factory Finishing:
1. Shop prime ferrous metal in accordance with and as specified in Section 09900, PAINTING AND PROTECTIVE COATINGS, for all submerged surfaces and for all non-submerged, non-galvanized surfaces.
2. Exposed metal surfaces of motors, gear reducers, assemblies, shall be factory prepared and primed and field finish coated in accordance with manufacturer's recommendations.
3. Surfaces inaccessible subsequent to erection, shall be prepared, primed, and finished with the applicable coating prior to erection.
4. Seal welding shall be provided for submerged welded joints. Skip welds are not acceptable.

2.12 SOURCE QUALITY CONTROL

A. Factory Inspections: Inspect all equipment for required construction, electrical connection, and intended function.

B. Factory Adjustments: Calibrate torque controls.

C. CWI shall be Present whenever Shop Welding is performed and shall:
1. Monitor conformance with approved welding procedure specifications.
2. Monitor conformance of welder/welding operator qualifications.
3. Inspect weld joint fit-up and provide in-process inspection.
4. Provide 100 percent visual inspection of welds in accordance with AWS D1.1, Paragraph 6.9.
5. Maintain records and prepare report confirming results of inspection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. In accordance with manufacturer's written instructions.

B. No field welding, except seal welding will be allowed. Seal weld continuously at connections for tightness against leakage. Seal welding shall comply with applicable requirements of AWS D1.1.

C. Anchor Bolts: Place using steel templates furnished by manufacturer.

D. CONTRACTOR shall coordinate with mechanism manufacturer regarding acceptability of using clarifier mechanism to screed floor bottom grout. If this method is not acceptable to mechanism manufacturer, rake arms may be used only as guide for grout installation. See Section 03360, STRUCTURAL GROUT, for additional requirements on grout topping placement.

3.2 FIELD FINISHING

A. Paint ferrous metal in accordance with Section 09800, GENERAL PROTECTIVE COATING, for all submerged surfaces non-submerged, and non-galvanized surfaces. Shop primer shall be completely removed from submerged surfaces (as defined herein) by abrasive blasting prior to field priming and finish coating.

B. Paint exposed metal surfaces of motors, gear reducers, and assemblies in accordance with Section 09800, GENERAL PROTECTIVE COATING.

3.3 FIELD QUALITY CONTROL

A. Before placing clarifiers into service, check weir plate settings by filling clarifiers with water to design elevation 480.96 ft. Re-adjust as recommended by ENGINEER. Level weirs to within plus or minus 1/16 inch of design elevation.

B. Functional Tests:
   1. Conduct on each mechanism.
   2. Test for continuous 3-hour period without malfunction.

C. 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.
      a. 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.
      b. Demonstrate mechanism overload devices; verify actual torques at which Alarm and Cutout (shutdown) contacts and load limiting device are actuated. Correlate with scale indications.
      c. Replace shear pins after torque testing is completed.

3.4 MANUFACTURER'S SERVICES

A. Manufacturer's Services and Certificate of Compliance: Provide Manufacturer's Services and Manufacturer's Certificate of Compliance in conformance with the requirements of Section 01640, MANUFACTURER'S SERVICES. Manufacturer's representation shall provide supervision of equipment installations, field inspection of equipment before startup and the executed copies Manufacturers Services and Certificate of Compliance.

B. Provide manufacturer's services in accordance with Section 01640, MANUFACTURERS' CERTIFICATES OF COMPLIANCE and as follows:
   1. Manufacturer's Assistance to the CONTRACTOR: Four (4) days and 1 trip.
   2. Manufacturer's Certificate of Proper Installation: Four (4) days and 1 trip.

END OF SECTION