SECTION 08600

ALUMINUM ACCESS HATCHES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Access hatches

B. Provide fall protection grates where indicated.

1.02 SUBMITTALS

A. Product Data

1. Manufacturer's standard catalog information, drawings, specifications and accessories.
2. Storage, handling and installation instructions.
3. Anchorage details to the surrounding concrete, details of the recessed locking mechanism, safety grate details, and details of the compression spring lifting mechanism.

1.03 PERFORMANCE REQUIREMENTS

A. Structural Design:

1. Standard Weight Design Requirements: Design access hatch with ¼- inch aluminum plate, reinforced to withstand a live load of 300 pounds per square foot with a maximum deflection of 1/150 of the span.
2. Traffic Loading Design Requirements: Design access hatch with ¼-inch aluminum diamond pattern plate, reinforced to withstand an H-20 highway load with a maximum deflection of 1/150 of the span.

B. Operation: Smooth and easy opening and closing with controlled operation throughout the entire arc of opening and closing, regardless of ambient temperature. Provide lifting mechanism that retards downward motion of the cover when closing to prevent quick closing and slamming.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: One of the following or equal:

1. Bilco.

2. Flygt.
3. Halliday Products, Inc.

2.02 ACCESS HATCHES

A. Sizes and Design Loading Requirements: As indicated on the Drawings. Sizes indicated reflect the clear opening required for each access hatch.

B. Access Hatches

1. Double leaf or single leaf as indicated on the Drawings.
2. Provide each leaf with a minimum of two compression spring lifting mechanisms designed to prevent the entry of dirt and foreign matter into compression spring housing.
3. Provide a recessed locking mechanism and flush lift handles.
4. Leafs: Diamond pattern, milled aluminum, ¼-inch thickness, ASTM B 221, Alloy 5086. Reinforce as necessary to comply with design loading requirements.
5. Leaf Gaskets: EPDM or neoprene gasket, mechanically attached to the access hatch frame.
6. Type 316 stainless steel hardware throughout.

C. Hatch Hinges

1. Heavy forged aluminum with ¼-inch diameter stainless steel hinge pins provided, designed to pivot so the cover does not protrude into the channel frame.
2. Specifically designed for horizontal installation.
3. Through bolted to the covers with tamperproof Type 316 stainless steel lock bolts and through bolted to the frame with Type 316 stainless steel bolts and locknuts.

D. Lifting Mechanisms: Compression spring-type mechanism within a telescoping tube. Provide automatic hold-open arms with release handles. Attach lower tube of lifting mechanism to a flanged support shoe fastened to a formed 1/4" gusset support plate.

E. Locking Mechanisms:

1. Exterior: Provide removable turn/lift handle with spring loaded ball detent to open the cover. Protect latch release by a flush, gasketed, removable screw plug.
2. Interior: Provide Type 316 stainless steel snap lock with fixed handle mounted on the underside of the cover.

F. Frame: Aluminum channel frame, ¼-inch thickness, ASTM B221 alloy 6063-T5, with a perimeter anchor flange with anchor tabs around the perimeter.

G. Provide a 1-1/2 inch drainage coupling, zinc plated and chromate sealed, in a corner of the channel frame.

H. Finish

1. Mill-finish with one of the following applied to the exterior of the frame:
   a. Carboline "Bitumastic Super Service Black,"
   b. Tnemec "46-499 Heavy Duty Black".
   c. Valspar "High-Build Bitumastic Coating 35-T-10".

2.03 FALL PROTECTION GRATE

A. Underlying aluminum or fiberglass safety grates to allow inspection of the wet well while providing fall-through protection. Safety grates:

1. Designed to withstand a live load of 300 lb/ft2 with a maximum deflection of 1/150 of the span.
2. Fabricated from aluminum flat bars.
3. Openings between flat bars shall be not less than 4" x 4" to facilitate visual inspection.
4. Provided with a hinging system that will lock the grate in the 90° open position.
5. Provide an aluminum open arm with red vinyl grip.
6. Paint safety grates safety orange.

PART 3 – PRODUCTS

3.01 INSTALLATION

A. Install in accordance with the manufacturer's instructions.

B. Install access hatch with frame set level and flush with the surrounding surface.

C. Coat the exterior surfaces of hatch frames with a bituminous paint.

D. Connect a 1-½ inch diameter copper drain pipe to the drainage coupling on the hatch frame and route the drain pipe to the nearest drain.

3.02 ACCESS HATCH SCHEDULE

Location	Quantity	Opening Size	Design	Safety Grates	Style
1. Anchor Pump Station Wet Well	1	2.5' x 3'	H-20	Required	Single Leaf
2. Anchor Pump Station Valve Vault	1	5' x 5'"	H-20	Not Required	Double Leaf
3. Anchor Pump Station Flow Meter Vault	1	4' x 6'	H-20	Not Required	Double Leaf
4. Package Lift Station Wet well	1	2-5' x 3'	300lb/ft^2	Required	Single Leaf
5. Package Lift Station Wet well	1	2-5' x 3'	300lb/ft^2	Not Required	Single Leaf

****END OF SECTION****

SECTION 09900

PAINTING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes surface preparation and field painting of the following:

1. Exposed exterior items and surfaces.
2. Exposed interior items and surfaces.
3. Surface preparation of new and existing surfaces, priming, and finish coats specified in this Section are in addition to prepping, shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Engineer will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:
   a. Finished mechanical and electrical equipment.
   b. Light fixtures.
   c. Distribution cabinets.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
   a. Furred areas.
   b. Ceiling plenums.

c. Utility tunnels.

d. Pipe spaces.

3. Finished metal surfaces include the following:

a. Anodized aluminum.

b. Stainless steel.

c. Chromium plate.

d. Copper.

e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.

b. Linkages.

c. Sensing devices.

d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.03 RELATED SECTIONS

A. Section 09960 "High-Performance Coatings" for special paint coatings.

1.04 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1.05 SUBMITTALS

A. All finishes requiring color shall be submitted in one complete package. Partial submittals will not be allowed in accordance with section 01300, Submittals.

B. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.

3. Certification by the manufacturer that products as supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide Samples of each color defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

D. At completion of Work of this Section, submit manufacturer's or distributor's numbered invoices showing type and quantity of products used on this Project.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

B. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Engineer of problems anticipated using the materials specified.

C. Field Samples, Interior: Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.

1. The Project Inspector or Engineer will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted. Apply coatings in this room or surface in accordance with the schedule or as specified. After finishes are accepted, this room or surface will be used for evaluation of coating systems of a similar nature.

D. Material Quality: Provide the manufacturer's best quality, top of the line paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.08 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.09 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

1. Quantity: Furnish the Owner with 5 gallons of each color or type applied. Containers must be delivered unopened

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

1. Benjamin Moore
2. Dunn-Edwards Paints.
3. Frazee Paints.
4. ICI Dulux Paint.
5. PPG Industries, Inc. (PPG).
6. Sherwin Williams.

B. Basis of Design: Products listed within this specification section are manufactured by Frazee Paint Company San Diego, CA tel: (800) 477-9991, web: www.frazeepaint.com, and have been established as the basis of design for esthetics purposes and performance standards

2.02 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

3.02 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
2. Clean all existing exterior and interior surfaces to be refinished of all dirt, dust, oil, grease, oxidized loose and scaly paint film, mildew, rust on metal and other foreign substances by combination of the following methods:

C. Repairs: Repair all cracks, holes and voids in surfaces to be refinished with suitable and matching repair compounds to insure permanency to the surfaces compatible to the painting systems to follow. Fill, float, sand and texture to match adjacent surfaces. Allow repair compounds to fully dry prior to priming and applying final coats of paint.

1. Prepare wood surfaces in a similar procedure as noted above, and else within this section.

D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    a. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
2. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
    a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
3. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

E. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

3.03 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Provide finish coats that are compatible with primers used.

3. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.
4. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
6. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
7. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
8. Paint back sides of access panels and removable or hinged covers to match exposed surfaces, unless finish is stainless steel.
9. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

C. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer and specified.

D. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

E. Mechanical items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.
2. Heat exchangers.
3. Tanks.
4. Ductwork.
5. Insulation.
6. Motors and mechanical equipment.
7. Accessory items.

F. Electrical items to be painted include, but are not limited to, the following:

1. Conduit and fittings.
2. Switchgear.
3. Panelboards.

G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.04 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Project Engineer.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA Standard P1-92 "Touch-Up Painting and Damage Repair – Financial Responsibility".

3.06 EXTERIOR PAINT SCHEDULE

A. Ferrous Metals in immersion or/and corrosive environment (wet well, pump pits, valve vault, meter vault) -- Refer to Section 09960 High-Performance Coatings.

B. Galvanized Metals -- Refer to Section 09960 High-Performance Coatings.

****END OF SECTION****

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SECTION 09960

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes surface preparation and painting of the following:

1. Exposed metals (ferrous and non-ferrous).

1.03 SUBMITTALS

A. All finishes requiring color shall be submitted in one complete package. Partial submittals will not be allowed.

B. Product Data: For each coating system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material specified.

C. Certification by manufacturer that products supplied comply with requirements indicated that limit the amount of VOCs in coating products.

D. Samples for Verification: Of each color and material to be applied, with texture to simulate actual condition, on representative samples of the actual substrate.

1. Submit samples on the following substrates for Engineer's review of color and texture:
   a. Ferrous and Nonferrous Metal: Provide two 4-inch square samples of flat metal and two 8-inch long samples of solid metal for each color and finish.
   b. Concrete: Provide two 4-inch- (100-mm-) square samples for each color and finish.

E. At completion of Work of this Section, submit manufacturer's or distributor's numbered invoices showing type and quantity of products used on this Project.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed high-performance coating system applications similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.

B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the following information:

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying coatings.

1.06 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 and 95 deg F or manufacturers recommendations.

B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.

1.07 EXTRA MATERIALS

A. Furnish extra high-performance coating materials from the same production run as materials applied and in quantities described below. Package coating materials in unopened, factory-sealed containers for storage and identify with labels describing contents.

1. Quantity: Furnish an additional 5 gallons, as appropriate, of each material and color applied. Contractor shall furnish two copies of the mixing formula to the Engineer in addition to the instructions attached to paint containers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated in the coating system descriptions.

1. Carboline Company (Carboline).
2. Frazee ; Ameron International
3. ICI Dulux Paints; Devoe Coatings (ICI).
4. Pittsburgh Paint; PPG Industries, Inc. (PPG).
5. Tnemec Company, Inc.
6. Dunn-Edwards Paints; International Coatings

2.02 COATINGS MATERIALS, GENERAL

A. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's highest grade of the various high-performance coatings specified. Materials not displaying manufacturer's product identification are not acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 450 g/L or less.

2.03 COLORS

A. Colors: To be selected by Engineer if not noted on drawings.

2.04 HIGH-PERFORMANCE COATING SYSTEMS

A. All exterior exposed metals (ferrous and non-ferrous) shall be painted with products specified above in this Section 09960.

B. Specification is based on products manufactured by International Coatings and distributed by Dunn-Edwards Paints.

1. Ferrous Metal (pipes, valves, supports): Provide the following finish system in dry mil thicknesses as shown, over exterior ferrous-metal surfaces:

1 coat	Int'l INTERSEAL 670 HS High-build surface tolerant epoxy primer	(min. 4 dry mils)
1 coat	Int'l INTERTHANE 990 HS Acrylic polyurethane enamel	(max. 3 dry mils)

2. Non-Ferrous and Galvanized Metal (where indicated on the Plans for coating): Provide the following finish system in dry mil thicknesses as shown, over exterior non-ferrous-metal surfaces:

1 coat	Int'l INTERSEAL 670 HS High-build surface tolerant epoxy primer	(min. 4 dry mils)
1 coat	Int'l INTERTHANE 990 HS Acrylic polyurethane enamel	(max. 3 dry mils)

PART 3 - EXECUTION

3.01 EXAMINATION

A. With Applicator present, examine substrates and conditions under which high-performance coatings will be applied, for compliance with coating application requirements.

1. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
2. Start of application is construed as Applicator's acceptance of surfaces within that particular area.

B. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.

3.02 PREPARATION

A. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

B. Cleaning: Before applying high-performance coatings, clean substrates of substances that could impair bond of coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and coating application so dust and other contaminates from cleaning process will not fall on wet, newly coated surfaces.

C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
2. Ferrous-Metal Substrates: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
3. Nonferrous-Metal Substrates: Clean nonferrous and galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required.
4. Cementitious Substrates: Prepare concrete, brick, concrete masonry block, and cement plaster surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
   a. Use abrasive blast-cleaning methods if recommended by coating manufacturer.
   b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions

D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
3. Use only the type of thinners approved by manufacturer and only within recommended limits.
4. Coating colors, surface treatments, and finishes are indicated in the coating system descriptions.
5. Provide finish coats compatible with primers used.

6. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
   a. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
   b. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

E. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required is the same regardless of application method.
   a. Omit primer on metal surfaces that have been shop primed and touchup painted.
   b. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
   c. Where manufacturer's written instructions require sanding, sand between applications to produce a smooth, even surface.
   d. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat does not cause undercoat to lift or lose adhesion.
2. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.

F. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brush Application: Use brushes best suited for material applied and of appropriate size for the surface or item being coated.
   a. Apply primers and first coats by brush unless manufacturer's written instructions permit using roller or mechanical applicators.
   b. Brush out and work brush coats into surfaces in an even film.
   c. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for the material and texture required.

3. Spray Equipment: Use mechanical methods to apply coating if permitted by manufacturer's written instructions and governing regulations.

   a. Use spray equipment with orifice size recommended by manufacturer for material and texture required.

   b. Apply each coat to provide the equivalent hiding of brush-applied coats.

   c. Do not double back with spray equipment building-up film thickness of two coats in one pass, unless recommended by manufacturer.

G. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.

1. Recoat primed and sealed substrates if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.

J. Insert requirements for electrostatically applying coatings on metal substrates if process is acceptable to manufacturer.

K. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

L. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques best suited for the material being applied.

2. Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.

3. Apply second coat only after the first coat is thoroughly dry.

3.04 CLEANING

A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Engineer, and leave in an undamaged condition.

1. Provide "Wet Paint" signs to protect newly coated finishes. After completing coating operations, remove temporary protective wrappings provided by others to protect their work.
2. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces. Comply with procedures specified in PDCA P1.

****END OF SECTION****

SECTION 09962

WET WELL LINING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section specifies rehabilitating concrete wet well walls and coating for the wet wall walls, bottom slab and underside of the top slab.

1.02 SUBMITTALS

A. The Contractor shall provide submittals in accordance with Section 01300 - Submittals.

B. The Contractor shall at minimum submit the following:

1. Submit product technical data acknowledging that products meet requirements of standards referenced.
2. Submit shop drawings and catalog cuts for underlayment, filler compounds and epoxy top coat surfacing.
   a. Include application equipment.
3. Submit experience requirement documentation and experience references.

1.03 QUALITY ASSURANCE

A. Manufacturer: Shall have a minimum of 5 years experience manufacturing products for rehabilitating manholes.

B. Contractor/Applicator: Shall have a minimum of 2 years experience or 3 projects applying the manufacturer's product.

C. All materials must comply with Placer County Air Pollution Control District requirements and restrictions.

D. Spark testing of rehabilitated manholes will be required. Successful spark testing (i.e. no pinholes/holidays) will be required for payment.

PART 2 – MATERIALS

2.01 GENERAL

A. Manufacturer: The products indicated are manufactured by Sauereisen to indicate the character and quality of material to be provided. Similar products manufactured by Con-Tec or equal may be provided subject to review and approval by the Engineer.

2.02 UNDERLAYMENT

A. Type: Hydraulic cement based.

B. Strength:

1. 28-day compressive strength: 3,500 psi, minimum.

A. Material:

1. Sauereisen F-120;
2. Con-tec equivalent;
3. or equal.

2.03 FILLER COMPOUND

A. Type: Epoxy.

B. Strength: Compressive Strength: 10,000 psi (ASTM C579), Flexural Strength: 4,000 psi (ASTM C580)

C. Material:

1. Sauereisen 209;
2. Con-tec equivalent;
3. or equal.

2.04 TOP COAT

A. Type: Aggregate filled epoxy.

B. Strength: Compressive: 6,800 psi (ASTM C579).

C. Material:

1. Sauereisen 210 or 210S;
2. Hydro Pox by Cont-Tec;
3. or approved equal.

PART 3 – EXECUTION

3.01 PREPARATION

A. Cut off and remove existing manhole steps.

B. Shotblast, abrasive blast or high pressure water blast existing concrete to solid material.

C. Spent abrasives, concrete and debris shall be captured within the structure and removed for proper disposal. Debris shall not be allowed to be carried into the piping where it could block sewage flow.

3.02 SEALING

A. Seal active leaks with quick setting hydraulic current grout (Hydro Plug, Sauereisen Insta Plug or equal).

B. Fill/patch cracks, holes and voids with filler compound.

3.03 WALL BUILD UP

A. Build up wall thickness removed during blasting/jetting of deteriorated surfaces.

B. Build up material shall be underlayment compound.

C. Build out to make a smooth, firm surface for top coat application. Minimum thickness ½-inch.

D. Trowel or spray apply.

3.04 TOP COAT

A. Allow underlayment compound to cure.

B. Spray/trowel to 60 mil dry film thickness.

3.01 QUALITY ASSURANCE

A. Top coat shall be spark tested after fully covered.

1. Ventilate manhole. Provide air testing equipment to verify air within the manhole is outside lower explosive limits for methane and hydrogen sulfide.
2. Spark test apparatus shall be Tinker Razor Holiday Detector, Model AP/W or equal.
3. Test voltage shall be 100 volts per mil of coating thickness, and no less than 6,000 volts.
4. Pinholes and holidays identified shall be marked and repaired per coatings manufacturer's recommendations.

****END OF SECTION****

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SECTION 11000

GENERAL REQUIREMENTS FOR EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE

This section specifies general requirements which are applicable to all mechanical equipment. The Contractor is responsible for ensuring that all mechanical equipment meets the requirements of this section in addition to the specific requirements of the individual equipment specification section.

B. EQUIPMENT LISTS

Equipment lists, presented in these specifications and as specified on the drawings, are included for the convenience of the Engineer and Contractor and are not complete listings of all equipment, devices and material to be provided under this contract. The Contractor agrees to prepare his own material and equipment takeoff lists as necessary to meet the requirements of this project manual.

1.02 QUALITY ASSURANCE

A. ARRANGEMENT

The arrangement of equipment shown on the drawings is based upon information available to the Owner at the time of design and is not intended to show exact dimensions peculiar to a specific manufacturer. The drawings are, in part, diagrammatic, and some features of the illustrated equipment installation may require revision to meet actual equipment installation requirements. Structural supports, foundations, connected piping, valves, and electrical conduit specified may have to be altered to accommodate the equipment provided. No additional payment will be made for such revisions and alterations.

B. REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ABMA Std 9	Load Ratings and Fatigue Life for Ball Bearings
ABMA Std 11	Load Ratings and Fatigue Life for Roller Bearings
ANSI B1.1	Unified Inch Screw Threads (UN and UNR Thread Form)
ANSI B1.20.1	Pipe Threads, General Purpose (Inch)
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
ANSI B18.2.1	Square and Hex Bolts and Screws (Inch Series)
ANSI B18.2.2	Square and Hex Nuts (Inch Series)

C. UNIT RESPONSIBILITY

1. Equipment systems made up of two or more components of different manufacturers shall be assembled as a unit by a single manufacturer who shall be responsible for the entire unit. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished under the specification for the equipment, including equipment specified elsewhere but referenced in the specification, is compatible and operates properly to achieve the specified performance requirements. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives or other entities who are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the Contractor of his responsibility to the Owner for performance of all work associated with the Contract as provided in Section 00700.

2. The Contractor shall assure that all equipment provided for the project are products for which unit responsibility has been accepted by the responsible manufacturer. Failure to provide acceptable proof that the unit responsibility requirement has been satisfied will result in withholding approval of progress payments for the subject equipment *even though the equipment may have been installed in the work.*

D. BALANCE

Unless specified otherwise, all rotating elements in motors, pumps, blowers and centrifugal compressors shall be fully assembled, including coupling hubs, before being statically and dynamically balanced. All rotating elements shall be balanced to the following criteria:

ISO 1940/1 Balance Grade Code: G6.3

Permissible unbalance shall be no greater than as determined by the ISO 1940 nomograph or by the following equation:

$$U = 9549 \times G \times m/rpm$$

Where:

U= permissible unbalance, g*mm
G= balance grade code, 6.3
m= rotating mass, Kg
rpm= maximum service speed of rotation, revolutions per minute

Balancing reports, demonstrating compliance with this requirement, shall be submitted as product data.

PART 2 - PRODUCTS

2.01 FLANGES AND PIPE THREADS

A. Flanges on equipment and appurtenances provided under this section shall conform in dimensions and drilling to ANSI B16.1, Class 125. Pipe threads shall conform in dimension and limits of size to ANSI B1.1, coarse thread series, Class 2 fit.

B. Threaded flanges shall have a standard taper pipe thread conforming to ANSI B1.20.1. Unless otherwise specified, flanges shall be flat faced.

C. Flange assembly bolts shall be heavy pattern, hexagonal head, carbon steel machine bolts with heavy pattern, hot pressed, hexagonal nuts conforming to ANSI B18.2.1 and B18.2.2. Threads shall be Unified Screw Threads, Standard Coarse Thread Series, Class 2A and 2B, ANSI B1.1.

2.02 BEARINGS

A. Unless otherwise specified, equipment bearings shall be oil or grease lubricated, ball or roller type, designed to withstand the stresses of the service specified. Each bearing shall be rated in accordance with the latest revisions of ABMA Methods of Evaluating Load Ratings of Ball and Roller Bearings. Unless otherwise specified, equipment bearings shall have a minimum L-10 rating life of 50,000 hours. The rating life shall be determined using the maximum equipment operating speed.

B. Grease lubricated bearings, except those specified to be factory sealed and lubricated, shall be fitted with easily accessible grease supply, flush, drain and relief fittings. Extension tubes shall be used when necessary. Grease supply fittings shall be standard hydraulic alemite type.

C. Oil lubricated bearings shall be equipped with either a pressure lubricating system or a separate oil reservoir type system. Each oil lubrication system shall be of sufficient size to safely absorb the heat energy normally generated in the bearing under a maximum ambient temperature of 60 degrees C and shall be equipped with a filler pipe and an external level indicator gage.

D. All bearings accessible to touch and located within 7 feet measured vertically from floor or working level or within 15 inches measured horizontally from stairways, ramps, fixed ladders or other access structures shall either incorporate bearing housings with sufficient cooling to maintain surface temperature at 65 degrees C or less for continuous operation at bearing rated load and a 50 degrees C ambient temperature or appropriate shielding shall be provided that will prevent inadvertent human contact.

2.03 V-BELT ASSEMBLIES

A. Unless otherwise specified, V-belt assemblies shall be Dodge Dyna-V belts with matching Dyna-V sheaves and Dodge Taper-lock bushings, Wood's Ultra V-belts with matching Ultra-V sheaves and Wood's Sure-Grip bushings, or equal.

B. Sheaves and bushings shall be statically balanced. Additionally, sheaves and bushings which operate at a peripheral speed of more than 5500 feet per minute shall be dynamically balanced. Sheaves shall be separately mounted on their bushings by means of three pull-up grub or cap tightening screws. Bushings shall be key seated to the drive shaft.

C. Belts shall be selected for not less than 150 percent of rated driver horsepower and, where two sheaves sizes are specified, shall be capable of operating with either set of sheaves. Belts shall be of the antistatic type where explosion-proof equipment is specified.

2.04 PUMP SHAFT SEALS

A. GENERAL

Unless specified otherwise, seals for water and wastewater pump shafts shall be mechanical seals. Unless specified otherwise, mechanical seals or stuffing boxes shall conform to the requirements set forth in this paragraph.

B. MECHANICAL SEALS

1. Mechanical seals shall be of a nondestructive (nonfretting) type which requires no wearing sleeve for the shaft. Shafts for pumps specified with mechanical seals shall be furnished with no reduction in size through the seal area. Mechanical seals shall be the cartridge type, requiring no field assembly, other than insertion into the pump. Metal parts shall be Type 316 or 316L stainless steel. Springs shall be Hastelloy C. Rotary faces shall be tungsten carbide or silicon carbide. Stationary faces shall be ceramic, tungsten carbide, or silicon carbide.
2. Unless otherwise specified, mechanical seals for overhung shaft, constant speed pumps and split case, centrifugal pumps shall be self-aligning, single, rotary type, Chesterton 155, Crane 5610, or equal.
3. Unless otherwise specified, mechanical seals for variable speed, overhung shaft pumps shall be double, balanced, self-aligning type, Crane 5620, Chesterton 222 or 255, or equal.
4. Boxes for mechanical seals on pumps for contaminated water service (sludge, grit, wastewater, scum, reclaimed water, etc.) shall be drilled and tapped for installation of clean water barrier fluid supply piping.

C. SHAFT PACKING

1. Where shaft packing is specified, stuffing boxes shall be tapped to permit introduction of seal liquid and shall hold a minimum of five rows of packing. Stuffing boxes shall be face attached. Stuffing box and shaft shall be suitable for field installation, without machining or other modifications, of the mechanical seal specified in paragraph 11000-2.04 B for the applicable pump and operating conditions.
2. Unless otherwise specified, lantern rings shall be bronze or Teflon, packing shall be die-molded packing rings of nonasbestos material suitable for the intended service and as recommended by the manufacturer, and glands shall be bronze, two piece split construction. Lantern rings shall be of two-piece construction and shall be provided with tapped holes to facilitate removal. Lantern rings shall be drilled and tapped 1/4 NC-20. Threaded lantern ring removal tools shall be provided with spare parts for each pump.

2.05 COUPLINGS

A. Unless otherwise specified in the particular equipment sections, equipment with a driver greater than 1/2 HP, and where the input shaft of a driven unit is directly connected to the output shaft of the driver, shall have its two shafts connected by a flexible coupling which can accommodate angular misalignment, parallel misalignment and end float, and which cushions shock loads and dampens torsional vibrations. The flexible member shall consist of a tire with synthetic tension members bonded together in rubber. The flexible member shall be attached to flanges by means of clamping rings and cap

screws, and the flanges shall be attached to the stub shaft by means of taperlock bushings which shall give the equivalent of a shrunk-on fit. There shall be no metal-to-metal contact between the driver and the driven unit. Each coupling shall be sized and provided as recommended by the coupling manufacturer for the specific application, considering horsepower, speed of rotation, and type of service.

B. Where torque or horsepower capacities of couplings of the foregoing type is exceeded, Thomas-Rex, Falk Steel Flex, or equal, couplings will be acceptable provided they are sized in accordance with the equipment manufacturer's recommendations and sizing data are submitted. They shall be installed in conformance to the coupling manufacturer's instructions.

2.06 GUARDS

Exposed moving parts shall be provided with guards which meet the requirements of OSHA. Guards shall be fabricated of 14-gage steel, 1/2-13-15 expanded metal screen to provide visual inspection of moving parts without removal of the guard. Guards shall be galvanized after fabrication and shall be designed to be readily removable to facilitate maintenance of moving parts. Reinforced holes shall be provided. Lube fittings shall be extended through guards.

2.07 CAUTION SIGNS

Equipment with moving parts which operates automatically or by remote control shall be identified by signs reading "CAUTION - EQUIPMENT STARTS AUTOMATICALLY ". Signs shall be constructed as specified in Section 10431. Signs shall be installed near the moving parts.

2.08 GAGE TAPS, TEST PLUGS AND GAGES

Gage taps shall be provided on the suction and discharge sides of pumps, blowers and compressors. Pressure and vacuum gages shall be provided where specified. Gage taps, test plugs, and gages shall be as specified in Divisions 15.

2.09 NAMEPLATES

Nameplates shall be provided on each item of equipment and shall contain the specified equipment name or abbreviation and equipment number. Equipment nameplates shall be engraved or stamped stainless steel and fastened to the equipment in an accessible location with stainless steel screws or drive pins.

2.10 LUBRICANTS

The Contractor shall provide for each item of mechanical equipment a supply of the lubricant required for the commissioning period. Lubricants shall be of the type recommended by the equipment manufacturer and shall be products of the City of Vacaville's current lubricant supplier. The Contractor shall limit the various types of lubricants by consolidating them, with the equipment manufacturer's approval, into the least number of different types. Not less than 90 days before the date shown in his construction schedule for starting, testing and adjusting equipment, the Contractor shall provide the Owner with three copies of a list showing the required lubricants, after consolidation, for each item of mechanical equipment. The list shall show estimated quantity of lubricant needed for a full year's operation, assuming the equipment will be operating continuously.

2.11 ANCHOR BOLTS

Anchor bolts shall be designed for lateral forces for both pullout and shear in accordance with the provisions of Section 05501. Unless otherwise stated in the detailed specification, anchor bolt materials shall conform to the provisions of Section 05501.

2.12 SPARE PARTS

A. Spare parts, wherever required by detailed specification sections, shall be stored in accordance with the provisions of this paragraph. Spare parts 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 a hinged wooden cover and locking hasp. 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.

B. The Contractor shall provide for each item of mechanical, electrical, and instrumentation equipment a supply of the spare parts and special tools required for the starting, testing and adjustment of equipment, the testing and reliability testing of completed portions of the work, and the testing and reliability testing of the completed project in accordance with Section 01660.

PART 3 – EXECUTION

Installation of equipment accessories included in this section shall be as recommended by the equipment manufacturer unless otherwise specified in the individual equipment specification section.

****END OF SECTION****

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SECTION 11310

PACKAGE SEWAGE LIFT STATION

PART 1 – GENERAL

1.01 DESCRIPTION

Work Included: Furnish and install all materials and perform all labor necessary for the complete, tested, and operating duplex fiberglass body package sewage lift station with valve box as indicated on the Drawings and herein specified. Cast-in-place concrete or pre-cast concrete lift stations will not be acceptable.

The Contractor shall include costs to handle, transport, install, startup and test, troubleshoot, provide installation certification, and train City personnel. Contractor shall also be responsible for all bypass pumping necessary to maintain sanitary sewer flows during demolition of existing facilities and construction of the work.

The Work also includes coordinating, providing, and installing 208 volt, 3-phase power (or other as required by the package lift station manufacturer for a fully working system) with Pacific Gas & Electric. Specifics for power and control are referred to but not specifically called out for in the plans due to the possibility of multiple configurations and/or the individual component requirements of different potential package lift station suppliers. The Contractor shall be responsible for providing a complete working system similar to that of Anchor Pump Station, including appurtenant electrical requirements per Division 16 (one-line diagrams, interconnection diagrams, pedestals, metering, disconnects, etc.).

1.02 LIFT STATION COMPONENTS

Components of the package sewage lift station shall include, but not be limited to:

A. Fiberglass lift station wet well body with integral anti-floatation measures, 6-inch and 8-inch nominal pipe inlets as shown on the drawings.

B. Fiberglass valve box with 4-inch nominal integral inlet and outlet and a drain to lift station wet well with a check valve.

C. Sewage Pumps

D. Pump discharge piping and valves as indicated on the Plans. Pump discharge shall have a cast-iron guiderail base elbow and Schedule 80 PVC discharge piping.

E. Bulkhead fittings for inlets, outlets, and other fiberglass lift station and valve box penetrations.

F. Level control floats and anti-tension supports as shown on the electrical drawings.

G. NEMA 4X junction box and fittings for the connection of pump power/control and level control wiring.

H. NEMA 4X, lockable, dead-front door, remote mounted Field Control Station with conduit and wiring as required by package lift station supplier for a fully operating system between the electrical service, control panel, and lift station, with visible alarm light indicator.

I. Components and appurtenances required for package lift station electrical service and controls.

J. Utility Meter and NEMA 4X Metering Pedestal with disconnect as shown on the electrical drawings.

K. Lockable access covers as indicated on the Drawings.

L. Stainless Steel upper guide bar brackets.

M. Stainless Steel intermediate guide bar brackets.

N. Stainless Steel safety cable hooks.

O. Stainless steel cable holders.

P. Cable support grips.

Q. Stainless steel anchor bolts.

R. Stainless steel lifting chain or cable.

S. Spare parts.

T. Operation and Maintenance Manuals.

1.03 SUBMITTALS

A. Submittals required under this Section shall be in accordance with Section 01300.

B. Submit all items of equipment included in this section in one package.

C. Shop Drawings: Submit shop drawings for approval of all package lift station components specified in this Section and other appurtenances provided by the manufacturer.

1. Certified shop and installation drawings and data regarding pump and motor characteristics and performance. The data shall include performance curves, based on actual shop test, for head, capacity, efficiency, and horsepower. Indicate separately the minimum submergence required at the guarantee point.

2. Make, model, weight, and horsepower of each equipment assembly.

3. Materials of construction of individual items.

4. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.

5. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.

6. Detailed mechanical and electrical drawings showing the equipment dimensions, size, and locations of connections and weights of associated equipment.

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

8. Shop coating systems.

D. Quality Control Submittals

1. The following quality control Submittals shall be provided by the Contractor:

a. Manufacturer's printed installation instructions.

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

c. Factory Functional Test Report.

d. Field Test Procedures.

e. Manufacturer's Certificate of Proper Installation.

f. Suggested spare parts list to maintain the equipment in service for a period of one year. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.

g. Warranty for one year after Project acceptance date.

PART 2 – PRODUCTS

2.01 DUPLEX FIBERGLASS LIFT STATION COMPONENTS

Acceptable manufacturers include Yeomans Chicago Corporation Easy-Lift, Flygt Top Station, or equal.

A. WET WELL

1. The wet well shall be of the size and configurations shown on the Drawings and specified herein.

2. The wet well shall be a duplex pump station configuration.

3. The wet well shall be of the laminated fiberglass type constructed of commercial grade resin and glass fiber reinforcing material. Fiberglass wet well shall be a minimum of ¾ inch thick. The wet well manufacturer shall design the wet well, taking into account all normally imposed loads arising from floatation, soil pressures, normal backfill, handling loads, operating loads and static loads imposed by equipment used in hoisting the pumps in and out the station, with a safety factor of two (2). The manufacturer shall provide design calculations bearing the stamped of a registered professional engineer for review.

4. The wet well shall be furnished with an integral bottom plate or anti-flotation flange near the bottom of the wet well and sufficient to withstand the forces acting upon the station due to the subsoil conditions and water pressure. Contractor shall install the bottom plate or anti-floatation flange in accordance with the manufacturer's recommendations and the Drawings.

5. Locations and orientations of well penetrations for inlets/outlets, drains, and electrical/controls shall be confirmed and coordinated between the Contractor and the wet well manufacturer and shall be located and sized to consider connection appurtenances, inlet/outlet pipe materials, inlet/outlet pipe outer diameters, and other work.

6. Integral lifting lugs shall be required as appropriate per manufacturer's recommendations.

B. VALVE BOX

1. The package lift station shall include a valve box fabricated in a manner identical to the wet well and shall be large enough to allow entry for routine maintenance and inspection.

2. The valve box shall serve the duplex pump station configuration discharge piping and valves.

3. The valve box may be either attached or separate from the wet well. The Contractor shall make all necessary coordination and provide ancillary materials to construct the package lift station for either attached or separate valve box configuration.

4. The valve box shall be furnished with an integral drain and check valve assembly to provide drainage from the valve box to the main basin.

5. Locations and orientations of valve box penetrations for inlets and/or outlets shall be confirmed and coordinated between the Contractor and the valve box manufacturer and sized to consider connection appurtenances, inlet/outlet pipe materials, inlet/outlet pipe outer diameters, and other work.

6. Integral lifting lugs shall be required as appropriate per manufacturer's recommendations.

C. VALVES

1. CHECK VALVES – Per Section 15220

2. PLUG VALVES – Per Section 15190

D. PUMP DISCHARGE PIPING

Shall be Schedule 80 PVC. Connections shall be per fiberglass package lift station manufacturer's recommendations and per the Drawings.

E. BULKHEAD FITTINGS

Shall be installed in the wet well and valve box walls as indicated on the Drawings and specified herein.

F. GUIDE RAIL SYSTEM

Shall be of stainless steel materials and designed by the package lift station manufacturer and installed per the package lift station manufacturer's recommendations.

G. LIFTING CHAIN

Shall be stainless steel material.

H. SAFETY CABLE HOOKS

Shall be provided by the Contractor.

2.02 SEWAGE PUMPS

A. PUMPS

1. Two single stage submersible, solids handling pump/motor units shall be supplied and installed in the lift station.

2. Submersible sewage pumps shall be installed in a circular fiberglass wet well. A fiberglass vault shall be provided for the plug valves and check valves as indicated on the Drawings.

B. PUMP PERFORMANCE

The pumps shall be submersible, solids handling, Yeomans Chicago Corporation 6" Model 4073 with impeller No. Y-4615, or equal, with characteristics that meet the following conditions:

Performance Data	Requirement
Number of Pumps	2
Capacity (each), gpm	220
Total Dynamic Head, feet	22
Minimum Shutoff Head, feet	44
Pump Speed, rpm	1,750
Horsepower, Hp	3
Voltage, volts/Phase	208/3
Minimum efficiency (at design condition)	50%

C. PUMP CONSTRUCTION

1. The pump system including the pump, motor and power cable shall be approved for use in areas classified as hazardous locations in accordance with NEC, Class 1, Division 1, Group C & D Service. The pump unit shall be explosion proof.
2. Casings shall be ASTM A48, Class 30, cast iron with 4" horizontal discharge and shall provide for 3" unobstructed flow for any solids that can be passed by the impeller. Rotating wear ring of 304 stainless steel and fixed ring of nitrile rubber shall be provided.
3. Impellers shall meet the physical and tensile strength requirements of ASTM A48, Class 30 cast iron. Impeller shall be cast in one piece single or double vane design and shall be statically and dynamically balanced. The design of the impeller and the shape of the blades shall be such that rags or similar materials will not clog the pump to seriously affect the efficiency. The impeller shall be keyed to the shaft and firmly held in place by a stainless steel socket head bolt. The arrangement shall be such that the impeller cannot be loosened by torque from either forward or reverse rotation.
4. Pump bearings shall be of the ball or roller type. Each motor pump shaft shall be supported by two ball bearings arranged for grease lubrication. Bearing shall be designed in accordance with the Anti Friction Bearing Manufacturers Association, Inc. Standards Class M2, B 10 rating life of 20,000 hours.

   Anti-friction bearings that are prelubricated shall be protected in accordance with the bearing manufacturer's recommendations against the formation of rust during a period of storage while awaiting the completion of installation and startup.

5. Each pump shall be provided with a tandem double mechanical shaft seal running in an oil reservoir, composed of two separate lapped face seals. Lower seal shall consist of one stationary and one rotating tungsten carbide ring. The upper seal shall contain one stationary tungsten carbide ring and one driven rotation carbon ring with each pair of rings held in contact by a separate spring. The seals shall not require regular maintenance or adjustment and shall be easily inspected and replaceable. Conventional double mechanical seals, with a single or double spring between rotation faces that require a constant differential pressure to effect sealing and subject to opening and penetration by pumping forces, will not be acceptable.

6. All nuts and bolts exposed to sewage or corrosive atmosphere shall be Type 304 stainless steel.

7. Pump motor shall be housed in as air filled, watertight casting of NEMA B design and shall have Class F insulated windings, which shall be moisture resistant. Pump motors shall be capable of continuous operation in a totally, partially, or nonsubmerged condition, including a minimum of 6 starts per hour. The pumps shall be capable of running dry in a totally dry condition without damage for 24 hours. The power cable shall be of adequate length to reach the furthest end of the motor control center plus ten feet. Provide motors with single cables of submersible pump application with p.122 MSHA approval.

8. Equip motors with three normally closed thermal switched embedded in the end coils of the stator winding (one per phase). These switches shall be set to open at 260°F.

9. Sealing of the pumping unit to the discharge connection shall be accomplished by a simple linear downward motion of the pump along the guide rails with the entire weight of the pumping unit pressing tightly against the discharge connection. No portion of the pump shall bear directly on the floor of the wet well and no rotary motion of the pump shall be required for sealing. Maximum leakage allowable to be less than 0.005 times total flow at design point.

10. Cable entry design shall preclude specific torque requirements. The cable entry shall have single grommet, washers, compressed by the entry body containing a strain relief function. The cable entry junction chamber and motor shall be separated by a full terminal board. Epoxies or other secondary sealing systems are not considered acceptable.

11. Package Lift Station shall be provided with the following accessories, installed as indicated on the Drawings or as recommended by the pump manufacturer:

    a. Access cover size and reinforcement as indicated on the Drawings and specified in the Contract.

    b. Upper guide bar brackets.

    c. Intermediate guide bar brackets.

d. Safety cable hooks.
e. Cable holders.
f. Cable support grips.
g. Anchor bolts, Type 316 stainless steel.
h. Stainless steel lifting chain or cable.
i. Pump discharge piping.
j. Fiberglass lift station body and valve box.
k. Valving as indicated on the Plans.
l. Level control floats.
m. Controls.
n. Bulkhead fittings for connection of inlets and outlets to fiberglass package lift station body in the amounts and sizes shown in the Plans.

PART 3– EXECUTION

3.01 INSTALLATION

Equipment and accessories shall be installed in accordance with approved written procedures submitted with the shop drawings, and as indicated on the Drawings, secure in position and alignment, and neat in appearance.

A factory representative, who has complete knowledge of proper installation and maintenance of the equipment furnished shall be provided for two (2) working days (exclusive of travel time) to assist with the installation and startup of the equipment.

The factory representative shall provide a Manufacturer's Certificate of Proper Installation indicating that the pump installation conforms to pump manufacturer's requirements.

3.02 INSPECTION AND TESTING

After installation but prior to acceptance of the pumping equipment, each unit shall be given a running test during which it shall demonstrate its ability to operate within vibration limits set forth in the Hydraulics Institute Standards, and without overheating and to meet the performance data listed herein. Tests shall include electrical, head and discharge measurements sufficient to duplicate the head discharge and efficiency curves submitted with the shop drawings.

Submit a test plan to the Engineer for approval prior to final performance tests.

Two weeks after completion of tests, the Contractor shall submit the Pump Performance Test results showing satisfactory performance of each unit.

All defects revealed by the tests shall be corrected at the Contractor's expense and the tests shall be repeated until satisfactory results are obtained.

The Contractor shall furnish all labor, piping, equipment, pressure gauges and materials necessary for conducting the tests, including necessary clean water.

3.03 TRAINING AND INSTRUCTION

A factory representative, who has complete knowledge of proper operation and maintenance of the equipment furnished shall be provided for a minimum of four (4) hours to train representatives of the City on the proper operation and maintenance of the equipment. It shall not be assumed that this instruction will occur on the same day as the inspection of the installation for certification purposes and/or field testing required by the Contract. Operation and maintenance training shall be provided following successful performance and operational testing and following approval of the operating and maintenance manuals by the Engineer.

****END OF SECTION****

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SECTION 11315

SUBMERSIBLE WASTEWATER PUMP ASSESSORIES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included: Contractor shall furnish all materials, equipment, labor, and incidentals necessary to provide and place in the accessories for the existing submersible pumps, including all auxiliary equipment and accessories as indicated on the Drawings and specified below.

B. There are two existing pumps. Each will receive a new discharge elbow and new guide rails with mounting brackets. The existing pumps with the new accessories shall be installed as indicated on the Plans.

C. The existing pumps are Flygt C 3085.

D. The Contractor shall include costs to handle, transport, install, startup and test, troubleshooting, and installation certification in its bid.

1.02 SUBMITTALS

A. Submittals required under this Section shall be in accordance with Section 01300 of these technical specifications.

B. Shop Drawings: Submit shop drawings for approval of: pumps and related equipment specified in this Section.

1. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
2. Detailed mechanical drawings showing the equipment dimensions, size, and locations of connections and weights of associated equipment.
3. Mounting requirements and anchorage calculations. The anchorage calculations shall bear the stamp of a profession engineered registered in California. The anchorage calculations shall reflect siesmic Zone 4 requirements.
4. Shop painting system.
5. Submit a test plan to the Engineer for approval prior to final performance tests.

C. Manuals: Furnish manufacturer's installation, lubrication, operation and maintenance manuals, bulletins, and parts lists. Operation and maintenance manuals shall be provided.

D. Quality Control Submittals:

1. The following quality control Submittals shall be provided by the Contractor:

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

   b. Manufacturer's printed installation instructions.

   c. Field Test Procedures

   d. Manufacturer's Certificate of Proper Installation.

   e. Suggested spare parts list to maintain the equipment in service for a period of one year. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.

   f. Warranty for one year after equipment Manufacturer's Certificate of Proper Installation.

PART 2 – PRODUCTS

2.01 DISCHARGE ELBOW

ASTM A 48 Grade B cast iron designed to mate with a metal-to-metal contact with the pump. Discharge connection shall be bolted to the floor of the wet well and so designed as to receive the pump connecting flange without the need of any bolts, gaskets, or nuts. The discharge elbow shall have a 4-inch inlet and 4-inch outlet.

2.02 GUIDE RAILS

The guide rails shall be Schedule 40 Type 304 stainless steel, 2 inches in diameter. Provide joint couplings and mounting brackets per pump manufacturer requirements.

PART 3 – EXECUTION

3.01 INSTALLATION

Equipment and accessories shall be installed in accordance with approved written procedures submitted with the shop drawings, and as indicated on the Drawings, secure in position and alignment, and neat in appearance.

3.02 INSPECTION AND TESTING

After installation but prior to acceptance of the pumping accessories equipment, each unit shall be given a running test during which it shall demonstrate its ability to operate. Tests shall include electrical, head and discharge measurements sufficient to document the head discharge and efficiency curves submitted with the shop drawings.

Submit a test plan to the Engineer for approval prior to final performance tests.

Two weeks after completion of tests, the Contractor shall submit the Pump Performance Test results showing satisfactory performance of each unit.

All defects revealed by the tests shall be corrected at the Contractor's expense and the tests shall be repeated until satisfactory results are obtained.

The Contractor shall furnish all labor, piping, equipment, pressure gauges and materials necessary for conducting the tests, including necessary clean water.

****END OF SECTION****

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SECTION 13200

FIBERGLASS REINFORCED POLYESTER UNDERGROUND GREASE INTERCEPTOR TANKS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Furnish and install fiberglass reinforced polyester (FRP) grease interceptor as indicated on the Drawings and as specified in these Specifications

1.02 QUALITY ASSURANCE

A. Acceptable Manufacturer:

1. Xerxes Corporation
2. Containment Solutions
3. or equal

B. Governing Standards, as applicable:

1. Tank manufacturer shall be in the business of manufacturing tanks to Underwriters Laboratories (UL) Standard 1316.
2. Tank manufacturer shall be in the business of manufacturing tanks with materials conforming to the requirements of ANSI/AWWA D120-02 Thermosetting Fiberglass-Reinforced Plastic Tanks.

PART 2 - PRODUCTS

2.01 SINGLE-WALL FIBERGLASS REINFORCED PLASTIC (FRP) UNDERGROUND STORAGE TANKS

A. Loading Conditions – Tank shall meet the following design criteria:

1. Internal Load – Tank shall withstand a 5-psig air-pressure test (3 psig for a 12'-diameter tank) with 5:1 safety factor. When tank is designed for onsite testing, contractor shall individually test tank for leakage prior to installation. Maximum test pressure is 5 psig (3 psig for a 12'-diameter tank).
2. Surface Loads – Tank shall withstand surface H-20 axle loads when properly installed according to tank manufacturer's current Installation Manual and Operating Guidelines.
3. External Hydrostatic Pressure – Tank shall be capable of being buried in ground with 7' of overburden over the top of the tank, the hole fully flooded and a safety factor of 5:1 against general buckling.

4. Tank shall support accessory equipment – such as inlet and outlet piping and vents, baffles, anchor straps

B. Product Storage

1. Tank shall be capable of storing wastewater products limited to the collection and storage of human solid or liquid organic sewage.
2. Tank shall be vented to atmospheric pressure.
3. Tank shall be capable of storing products identified in the manufacturer's current standard limited warranty.

C. Materials

1. Tank shall be manufactured with 100% resin and glass-fiber reinforcement. No sand fillers.
2. Resin used in tank and accessories shall be premium isophthalic polyester.

D. Tank Dimensions

1. Tank shall have a minimum nominal capacity of 2,000 gallons.

2.02 ACCESSORIES

A. Piping

1. Internal piping: Schedule 40 PVC or FRP pipe shall be used for inlet and outlet piping.
2. External sewer piping: C900 PVC
3. Couplings: Mission Rubber MR51 ARC series with stainless Steel shear band
4. When a PVC pipe is affixed to the tank, a fiberglass lay-up is used.
5. All piping affixed to the tank shall be factory-sealed to enable field tightness testing with at least one pipe opening provided with a threaded fitting for connecting a pressure-test manifold.

B. Access Openings

1. All access openings 24"-diameter or larger shall be manufactured of FRP.
2. Location(s) shall be as shown on tank drawings.
3. Riser extensions shall be FRP or PVC.
4. Riser extension covers shall be gasketed FRP.
5. With tanks designed for onsite tightness testing, all access openings shall be factory-sealed to enable field tightness testing.

C. Anchor Straps

1. Straps shall be FRP anchor straps as supplied by tank manufacturer.

2. Number and location of straps shall be specified in current literature by tank manufacturer.

3. All FRP and PVC nozzles shall be flat-faced and flanged, and shall conform to ANSI B16.5 150# bolting pattern.

PART 3 - TESTING AND INSTALLATION

3.01 TESTING

A. Testing – Tank shall be tested according to the tank manufacturer's Manual and Operating Guidelines in effect at time of installation.

B. Testing – Prior to installation, a tank-tightness test consisting of a 5-psig air-pressure/soap test shall be performed per the tank testing procedures outlined in the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

3.02 3.02 INSTALLATION

A. Tank shall be installed according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

B. Contractor shall be trained in proper installation procedures by the tank manufacturer, the state or other approved agency.

****END OF SECTION****

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