ADDENDUM NO. 1
TO THE CONTRACT DOCUMENTS
for the construction of
Salmon Creek Treatment Plant Dewatering
Equipment Replacement Project

Date: March 4, 2026
B&C Project No. 180156
DCWA Project No. 93-2021-0058

To All Plan holders and/or Prospective Bidders:

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents for the construction of Salmon Creek Treatment Plant Dewatering Equipment Replacement Project, dated January 2026 as fully and completely as if the same were fully set forth therein:

A. VOLUME I, SPECIFICATIONS

1. CALL FOR BIDS

   a. Delete "Award of contract is not anticipated to occur prior to March 31, 2026" and replace with "Award of contract is not anticipated to occur prior to April 14, 2026"

2. Specification Section 01 11 00 Summary of Work-1.01 A. 1

   a. Delete "Install two new dewatering screw presses" and replace with "Provide two new dewatering screw presses pre-selected by Owner"

B. VOLUME II, SPECIFICATIONS

1. Specification Section 40 05 02.53 Thickening and Dewatering

   a. DELETE in its entirety and replace with the attached

2. Specification Section 41 12 13.16 Screw Conveyor

   a. DELETE in its entirety and replace with the attached

3. Specification Section 46 76 27 Screw Press Dewatering System

   a. DELETE in its entirety and replace with the attached

4. Specification Section 46 71 01 Temporary Dewatering Facilities-2.03.F.1

   a. DELETE table in its entirety and replace with the following:

Temporary Piping Component	Acceptable Construction Material(s)
Digested Sludge	Lined DIP, SS 316, HDPE

Polymer	Schedule 80 PVC, CPVC
Washwater	HDPE, PVC
Filtrate	HDPE, PVC

C. VOLUME III, DRAWINGS

1. Drawing 00-G-003

a. Add note "5. Entrance Gate must be disassembled for wide deliveries"

D. ADD VOLUME IV, PRE-SELECTED EQUIPMENT QUOTE AND SUBMITTALS

1. Volume 4 (180 pp)

This Addendum does not change the date or time of when bids are due. All Bidders shall acknowledge receipt and acceptance of this Addendum No. 1 in the Bid Form. Bid Forms submitted without acknowledgment will be considered in nonconformance.

Clark Regional Wastewater District

Christopher Stangl

Digitally signed by Christopher Stangl
DN: C=US, E=cstangl@crwwd.com, O=Clark Regional Wastewater District, CN=Christopher Stangl
Reason: I am the author of this document
Date: 2026.03.04 15:08:15-08'00'

Chris Stangl
Construction Manager

Appended hereto and part of Addendum No. 1:

A. Specification Section 40 05 02.53 Thickening and Dewatering

B. Specification Section 41 12 13.16 Screw Conveyor

C. Specification Section 46 76 27 Screw Press Dewatering System

D. Volume 4 Pre-Selected Equipment Quote and Submittals

Appended hereto and not part of Addendum No. 1:

A. Pre-bid Meeting Agenda Minutes
B. Pre-Bid Meeting Attendees Sign In Sheet
C. NFPA Arch Flash Report
D. Ex Belt Filter Press Shop Drawing

END OF ADDENDUM NO. 1

Schedule 40 05 02.53 – Thickening and Dewatering

Process Service	Dewatered Biosolids	Digested Sludge	Screw Press Feed				
Process Service Identifier	DB	DS	SPF				

Test Conditions

Pressure (psig)	Duration (min.)	Medium
200	120	Water

General Requirements

1. Full-Faced flanges mated with raised face flanges are not permitted.
2. Mating flanges for pipe shall be of the same Standard, Class and Series. Mating flanges at valves and equipment shall have specified rating and matching drilling pattern.
3. Pipe Threads per ASME B1.20.1. Match metal alloy/grade/type for any metal welded to pipe or fittings. (e.g. Do not weld carbon steel to stainless steel; weld Type 316L to Type 316L pipe material.)
4. All welding and cutting must be performed before glass lining is applied. Field welding or field cutting glass lined pipe is not permitted.

Notes:

1. Bolt length per ASME B16.5 plus three additional threads. Hex head bolt dimensions per ASME B18.2.1. Class 2A standard coarse series threads per ASME B1.1, standard coarse thread series. Hex nut dimensions per ASME B18.2.2 (Heavy Hex). Class 2B standard coarse series threads per ASME B1.1.
2. Rolled or cut grooves installed prior to application of glass lining. Field installation of grooves is not permitted.
3. Provide Long Radius Elbows. Provide full flow fittings. Segmentally welded elbows are not acceptable.
4. Provide long radius five cut mitered elbows for segmentally welded fittings.
5. Provide square nut operator, extension stem, and valve box for buried valves.
6. Provide Concrete Surround for pipe buried below structures.
7. Bolts and nuts with metallurgy specified in AWWA C111.
8. Except at flanged connections at valves, flanged connections/joints not permitted on buried Ductile Iron Pipe.
9. FNPT tap at factory installed tapping boss.

Indoor Dry, Indoor Wet, Outdoor, Process Corrosive, Headspace, Submerged - Exposed

Component	Line Size, in	Rating	Conn./Joints	Material	Spec Section	Notes
Pipe	1/8 thru 2-1/2					
	3 thru 24	Class 53	CGRV, RGRV, FLG	Ductile Iron: ASTM A536-Gr 65/45/12, galvanized, Dim. per ASME B16.3	40 05 19	2
Lining for Pipe & Fittings	1/8 thru 2-1/2	—	—	None	—	
	3 thru 24	10 mils	—	Glass: Ferrock MEH-32, Vitco SG-14 or equal	40 05 24	

Schedule 40 05 02.53 – Thickening and Dewatering

Process Service	Dewatered Biosolids	Digested Sludge	Screw Press Feed				
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Indoor Dry, Indoor Wet, Outdoor, Process Corrosive, Headspace, Submerged - Exposed

Component	Line Size, in	Rating	Conn./Joints	Material	Spec Section	Notes
External Coating	All	16 mils DFT	—	Liquid Epoxy: Factory Applied, AWWA C210	40 05 24	
	Valves	16 mils DFT	—	Manufacturer's Standard Shop Coating:	—	
Fittings	1/8 thru 2-1/2	Class 150	THD	Ductile Iron: ASTM A536-Gr 65/45/12, galvanized, Dim. per ASME B16.3	40 05 24	
	3 thru 24	Class 150	CGRV	Malleable Iron Grooved End: ASTM A47, Dim. per manufacturer's standard	40 05 24	2, 3
		M or E Pipe	CGRV	Ductile Iron Grooved End: ASTM A536-Gr 65/45/12, Dim. per manufacturer's standard		2, 3
Taps	1/2 thru 2-1/2	Class 3000	THD	Forged Steel Tee: ASTM A105, galvanized, Dim. per ASME B16.11	40 05 24	
		Class 150	THD	Ductile Iron Tee: ASTM A536-Gr 65/45/12, galvanized, Dim. per ASME B16.3		
		Class 150	THD	Malleable Iron Tee: ASTM A47 or ASTM A197, galvanized, Dim. per ASME B16.3		
	3 thru 72	Class 3000	FP Beveled Fillet Weld	Forged Steel Threadolet or Half Coupling: ASTM A105, Dim. per ASME B16.11	40 05 24	
Grooved Coupling	3 thru 12	M or E Pipe	CGRV, RGRV	Rigid Coupling: ASTM A536-Gr 65/45/12, Groove Dim. per AWWA C606 Flexible Coupling: ASTM A536-Gr 65/45/12, Groove Dim. per AWWA C606	40 05 24	
	14 thru 24	M or E Pipe	CGRV, RGRV	Flexible Coupling: ASTM A536-Gr 65/45/12, Groove Dim. per AWWA C606	40 05 24	
	14 thru 72	M or E Pipe	PGRV, RJC	Flexible Coupling: ASTM A536-Gr 65/45/12, Groove Dim. per manufacturer's standard dim.	40 05 24	10
Flanges	4 thru 24	Class 150	LWN, WN, SO	Forged Steel: ASTM A105, FF, Dim. per ASME B16.5	40 05 24	
		Class D	SO	Plate Steel: FF, Material and Dim. per AWWA C207		
	26 thru 72	Class D	SO	Plate Steel: FF, Material and Dim. per AWWA C207	40 05 24	
FLG Bolts, nuts and hardware	All	All	—	Carbon Steel Bolts: ASTM A307-Gr A. Carbon Steel Nuts: ASTM A563, 1/4" thru 1-1/2" use Gr A hex nuts, 1-5/8" thru 3" use Gr A heavy hex nuts.	—	1
Flange gaskets	1/8 thru 10	1/16 in Thk.	FLG	Nitrile or Neoprene	40 05 01	
	12 thru 72	1/8 in Thk.	FLG	Nitrile or Neoprene	40 05 01	
Mechanical Coupling Gaskets	3 thru 72	—	CGRV, RGRV	Nitrile: ASTM D2000 Type 5BG615A14B24 and AWWA C606 Neoprene	40 05 01	
Compression and Push-On Gaskets	All	—	—	None	—	

Schedule 40 05 02.53 – Thickening and Dewatering

Process Service	Dewatered Biosolids	Digested Sludge	Screw Press Feed				
Process Service Identifier	DB	DS	SPF				

Indoor Dry, Indoor Wet, Outdoor, Process Corrosive, Headspace, Submerged - Exposed

Component	Line Size, in	Rating	Conn./Joints	Material	Spec Section	Notes
Valves	3/4 thru 2-1/2	—	THD	Ball: Stainless Steel Ball/Body, 40 05 63.03	40 05 60	
	3 thru 48		FLG	Swing Check: Lever Arm and Spring, Class 150, 40 05 65.16Eccentric Plug: Standard Port, Glass Lined, 40 05 62.11		

END OF SECTION

SECTION 41 12 13.16

SCREW CONVEYOR

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies the screw conveyor system for the conveyance of dewatered biosolids generated from municipal wastewater treatment processes. This Section specifies the conveyor system installed in Building 72, Solids Processing Center. Equipment provided for the temporary dewatering system including temporary conveyors are specified in Section 46 71 01 Temporary Sludge Dewatering Facilities. The screw conveyance system shall be integrated into the existing screw conveyance system, which requires modifying the existing conveyors to accept new components and integrating controls into the Owner's existing control system.

B. The manufacturer providing equipment for this Section is responsible for furnishing the screw conveyor, the motor and drive assembly, the transfer slide gates and electric gate actuators, the discharge chutes, conveyor supports, and ancillary items. modifications to the existing screw conveyors that are needed for installation of the transfer conveyor. The manufacturer's responsibility extends to field verification of dimensions of existing equipment and structures prior to fabrication of new equipment, testing, and commissioning the system.

C. Contractor is responsible for modifications to the existing screw conveyor that are needed for installation of the new conveyor, including but not limited to, the new transition fitting.

D. Equipment numbers associated with items specified in this section are listed in the table below.

1. FKC Screw Presses

Item	Equipment No.
Cake Collection Screw 1	72CON4201

1.02 QUALITY ASSURANCE

A. This Section incorporates by reference the latest revisions of the following documents. They are part of this Section insofar as specified and modified herein. In the event 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 on the effective date of the Agreement. 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.

Reference	Title
ASTM A480	General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

Reference	Title
ASTM A 240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A 276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A 479	Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
ASTM A 312	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
ASTM A380	Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

B. Unit Responsibility:
   1. General: The Contractor shall assign unit responsibility, as specified in Section 43 05 11, to the screw conveyor system manufacturer for the conveyor system specified in this Section. Complete and sign the certificate of unit responsibility provided at the end of this Section.
   2. Responsibilities: The unit responsibility supplier shall select and furnish all of the components specified in this section and certain components specifically detailed in related sections where included by specific reference. In addition, the unit responsibility supplier shall be responsible for the following:
      a. Confirming existing conditions within the conveyor room including horizontal dimensions, vertical distances, and clearances around existing equipment and features.
      b. Preparation of conveyor and slide gate fabrication and installation drawings. Installation drawings shall clearly identify existing conditions and physical constraints. The layout of the new equipment shall accommodate the existing conditions and constraints.
      c. Design and installation of transition pieces that are necessary to connect new equipment to existing equipment.
      d. Coordination of production, factory testing, and delivery of all components furnished under the provisions of this Section.
      e. Coordination between operation and control of the existing conveyance system components and new components furnished and installed under this Contract.
      f. Integration of control and electrical systems associated with the equipment furnished and for insuring compatibility with external systems where interconnections are required.
      g. Final alignment, testing, initial start-up and commissioning of the equipment in accordance with the provisions of Section 01 91 00 and requirements specified in this Section.
      h. Training, as specified in this Section and related sections.
      i. Production and delivery of operation and maintenance information as specified in this Section.
      j. Production of required documentation.

C. Factory Testing: The components of the conveyance system shall be factory assembled, inspected, and tested before being packed for shipping.
   1. The inspection and testing shall include the following minimum requirements:
      a. Verification of all materials used for construction.

b. Dimensional check of all fabricated components.
c. Quality assurance of all welds.
d. Testing of all motors, gearboxes, controls, safety equipment (including emergency stops), and electrically actuated gates.
e. Certificate that an inspection was conducted and that all materials and workmanship meet specification.

D. Manufacturer's Experience:
1. Qualified manufacturers shall have minimum 5 years' experience manufacturing screw conveyors similar to the type described in this Section. The manufacturer shall have at least 15 screw conveyor installations in the United States at separate locations. At least 7 of the installations must have been in continuous service for at least four years.
2. To verify experience, the manufacturer shall submit a comprehensive installation list including the location of the installation, date of installation, capacity, service requirements, and performance criteria. Contact information for someone currently associated with the operation and maintenance of the equipment shall be provided for at least 7 installations that have been in continuous service for at least 4 years.

1.03 SUBMITTALS

A. Procedures: In compliance with Section 01 33 00.

B. Submittal Items:
1. Certificate of Unit Responsibility. No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.
2. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked (✓) to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated and, therefore requested by the Vendor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Vendor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
3. Manufacturer's experience statement with a list of installations and contact information.
4. Manufacturer's data confirming rated capacity, safety provisions, equipment weight, and electrical requirements.
5. Shop drawings showing the layout of the new transfer screw conveyor, equipment dimensions, drain connections, electrical connections, instrumentation, and structural connections.
6. Conveyor and slide gate fabrication drawings showing materials of construction, structural member sizes and locations of appurtenances.

7. Contractor to submit shop drawings showing the modifications to the existing screw conveyors that are needed to integrate the new transfer conveyor into the existing conveyance system. Provide a list of components and materials of construction.
8. Certification attesting that all stainless steel components have been cleaned, passivated and tested in accordance with the procedures described in this section.
9. List of spare parts or special equipment.
10. Product data for all auxiliary components.
11. Motor sizing calculation based on the design requirements specified in this Section.
12. Sizing calculations for slide gate actuators based on force requirements.
13. Stamped and signed anchorage system calculations as specified in Section 01 73 24.
14. Electrical internal connection diagrams, and external interconnection diagrams, drawn in accordance with JIC and/or ICS standards. Connection diagrams shall be the conventional type with lines showing point-to-point wiring, terminals, and devices as viewed by the electrician; wireless or wire schedule types are not acceptable.
15. Range and settings for indicators, instruments, timers, and other related devices.
16. Operating and Maintenance information as specified in Section 01 78 23.
17. Equipment Warranty.
18. Factory test and inspection results as required in this Section.
19. Installation Manual containing instructions to be followed in the installation of the equipment. The manual, as a minimum, shall contain the following information:
    a. Major parts list including weights of component parts.
    b. Procedures to be followed in unpacking and unloading, including directions indicating proper methods for moving the equipment.
    c. Instructions for field assembling of match/marked components as they will be shipped.
    d. Instructions for alignment, leveling, and all pertinent information for the proper installation of the equipment.
    e. Instructions for anchoring the equipment.
    f. Wiring instructions for electrical components.
20. Site storage and protection requirements for the equipment prior to installation.

1.04 SEISMIC ANCHORAGE AND STRUCTURAL DATA

A. Mechanical, instrumentation and control, electrical, nonstructural systems, components, and elements permanently attached to the structure shall be anchored and braced to resist seismic forces. Manufacturer shall design the structural components, seismic attachment, braces, and anchors to existing structures for all parts or elements of the mechanical and electrical systems in accordance with Section 01 73 24. Calculations shall be stamped by a professional engineer registered in the State of Washington.

1.05 PERFORMANCE REQUIREMENTS

A. Service Conditions: Equipment shall be suitable for installation and service at a wastewater treatment plant for conveyance of dewatered sludge.

Service Conditions	
Area Exposure	indoor wet
Material Being Conveyed	Anaerobically digested sludge from municipal wastewater, dewatered using screw press, with total solids concentration between a minimum of 15 percent by weight and a maximum of 20 percent by weight.

B. Design Requirements: The transfer screw conveyance system shall be designed for the conditions listed in the table below.

Criteria	Value
Material conveyed	Dewatered digested municipal sludge
Avg. material density	65 - 75 lbs/cf
Capacity	4.5 wet tons per hour
Number conveyors	1
Nominal conveyor length	See Drawings, field confirmation required. Final discharge location is the biosolids storage bay.
Basis of Design – Fill Volume	30% full
Conveyor incline	Zero
Minimum shaft diameter and wall thickness	as determined by manufacturer to meet shaft deflection requirements
Spiral diameter	as determined by manufacturer to meet specified capacity
Spiral pitch	as determined by manufacturer to meet specified capacity
Spiral speed	35 rpm max
Trough diameter	Minimum 12 inches
Trough thickness	3/16 inch
Cover thickness	3/32 inch
Cover panel length, max.	60 inches
Chute thickness	10 ga
Motors	as determined by manufacturer based on design requirements, 5 HP minimum
Discharge locations	Cake transfer screw (with slide gate) Biosolids storage bay (open discharge)
Total number slide gates	1
Discharge gate actuators	Electric
Drain Connections	1 4” drain per conveyor

PART 2 PRODUCTS

2.01 GENERAL

A. This section describes the general requirements, design features and functionality of the screw conveyor system. Screw conveyor systems without these design features and functionality will not be acceptable.

B. The Scope of supply shall include but not be limited to the troughs, trough covers, rotor with spiral flights, chutes, end shafts, electric motors and gear reducers, floor supports, fabricated connection pieces to connect the existing conveyor to the new equipment, seismic restraints, slide gates with electric actuators, safety accessories, spare parts, and all other incidentals for a fully functioning spiral screw conveyor system.

C. Stainless steel fabrications shall be cleaned to remove all scale and welding carbon by pickling and passivating, then rinsed.

D. All welds shall be continuous unless otherwise specified. Facing surfaces of field-welded components shall be beveled and match marked. Sharp corners of all cut and sheared edges shall be made smooth.

2.02 CANDIDATE MANUFACTURERS/PRODUCTS

A. Candidate manufactures are listed below. To conform to specified requirements, the manufacturer's standard product may require modification.
   1. Fukoku Kogyo Company (FKC)Approved equal

2.03 MATERIALS

A. The materials of construction shall meet or exceed the following:

Component	Material
All fabricated components not listed below	ASTM A240 Type 304L stainless steel
Gaskets	Neoprene
Fasteners and misc. hardware	ASTM A240 Type 316 stainless steel

2.04 PASSIVATION OF STAINLESS STEEL

A. General:
   1. Equipment specified under this section shall be cleaned and passivated in accordance with methods defined in ASTM A380 – Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, and the specific requirements of this section.
   2. For purposes of this section, cleaning and passivation is defined as the removal of surface contaminants including exogenous iron or iron compounds and the removal of oxide films from the surface of stainless steel by means of mechanical cleaning and mechanical descaling.
   3. The processes specified in this section shall be performed in the manufacturer's facility or in a shop specializing in post fabrication treatment of stainless steel.

4. Equipment components that bolt together shall be disassembled prior to passivation to provide access to all surfaces of the equipment.
5. All fasteners and anchor bolts required for assembly and mounting of equipment shall conform to the requirements of Section 43 05 11.
6. The use of "fabricator's crayons" shall be prohibited during fabrication of equipment as these marks may prevent proper passivation.

B. Passivation Process Requirements:
   1. The processes required for proper passivation shall include precleaning, mechanical descaling, post-treatment inspection, testing, certification, and protection as defined below.
      a. Precleaning – Precleaning required for the removal of all grease, oil, paint, soil, grit and other gross contaminants preparatory to the fabrication process shall be accomplished by vapor degreasing, immersion or spray application of alkaline or emulsion cleaners, steam, or high pressure water jetting.
      b. Mechanical Cleaning and Descaling – Mechanical cleaning is the removal of surface contamination, exogenous iron and rust. Mechanical descaling is the removal of oxide films resulting from high temperature processes such as heat treatment and welding from the surface of stainless steel. Mechanical cleaning and descaling shall be accomplished by abrasive bead blasting but may also include a combination of sanding, grinding, and power brushing to provide a surface that is smooth, uniform and free from all foreign matter, weld slag, corrosion, coatings, heat tint, discoloration, and mill scale. Grinding wheels and sanding tools should not contain iron, iron oxides, zinc or other materials that could contaminate the stainless steel surface. Abrasive blasting materials shall be unused glass beads or iron-free silica or alumina sand. Blasting equipment should not have been previously used for cleaning carbon steel or other materials containing free iron. All surfaces shall be wiped clean following mechanical cleaning.
      c. Post Cleaning Inspection – Post treatment inspection of the part shall exhibit a clean, bright and uniform surface with no signs of etching or pitting from the abrasive blasting procedure. All traces of oxide films from high temperature processes shall have been removed.
      d. Testing – The passivated part shall be tested for the presence or absence of free iron with a solution of potassium ferricyanide as defined in Verification Test Practice E, ASTM A967. The test solution shall be mixed and used within 24-hours or less and applied with sterile cotton swabs.
      e. Protection – Protection shall be provided by applying shrink wrap to all parts of the equipment sufficient to prevent exposure of passivated surfaces to contaminants during handling, shipping and installation. Protected equipment shall be tagged with highly visible warning signs stating the equipment has been passivated and shall only be opened by authorized personnel. Equipment arriving at the project site without proper protection will require retesting for the presence of free iron and re-passivation if free iron is detected.

2. Assembly of equipment following passivation – If assembly of bolted parts is required following passivation, it shall be done at the manufacturing facility under clean conditions such that the parts will not be contaminated with exogenous iron or iron compounds. Equipment requiring assembly shall be re-wrapped sufficient to prevent exposure of passivated surfaces to contaminants during handling, shipping and installation and tagged with warning signs.

2.05 EQUIPMENT FEATURES

A. Screw Conveyor:
   1. The screw conveyor shall be provided as a continuous, full length rotor with flights. The screw conveyor shall not be provided in sections.
   2. Spiral flights and rotor shall be cold-formed from AISI SAE 8620 steel plate, minimum 3/16-inch thick and with a minimum hardness of 175 Brinnell. The spiral flights shall be fastened to the rotor by full depth continuous welds on both sides of the flight.
   3. Rotor shall be designed with sufficient diameter and wall thickness to limit deflection to a maximum of 1/16-inch between any two bearing support points.
   4. The torsional rating of the auger flighting shall exceed the torque rating of the drive motor at 150% of its nameplate horsepower. The "spring effect" of the spiral shall not exceed + 0.16” per foot of length at maximum load conditions. The minimum outer spiral thickness shall be 0.75”.
   5. The spiral flighting shall be formed in sections from one continuous flat bar and shall be concentric to within +0.125”. Sectional flighting formed from plate shall not be permitted.
   6. Spirals should conform to CEMA 300 as published by the Conveyor Equipment Manufacturers Association for US standard conveyors.
   7. Stuffing boxes with packing material shall be provided at the drive end of the conveyor to prevent leakage between the shaft and the trough end plate. Provide a packing ring to allow adjustment to tighten the packing against the shaft.
   8. The connection of the spiral to the drive system shall be through a flanged connection plate that is welded to the spiral forming a smooth and continuous transformation from the flange plate to the spiral. The drive shaft shall have a mating flange and shall be bolted to the spiral connection plate. A gland packing ring consisting of two Teflon fiber packing rings shall seal the drive shaft at its penetration through the end plate.

B. Conveyor Trough:
   1. The conveyor trough shall be U-shaped and to the dimensional standards of CEMA 300 and enclosure classification IIE.
   2. The conveyor trough shall be equipped with inlet and discharge openings as shown on the Drawings. Inlet opening shall be flanged and designed to connect to the slide gate frame. Discharge openings shall be flanged suitable for connection to the flange of the outlet chute. Interconnecting devices such as chutes and slide gates shall be fabricated from the same grade of material as the troughs and with a gauge thickness to suit the application requirements.
   3. Troughs shall be designed without the use of steel hold down bars. For pushing drive conveyors, hold-down guide liners mounted in the trough sides above the design load

fill level are acceptable providing they do not interfere with the flow of conveyed product.

4. The conveyor shall be provided with a bolted cover. Covers shall be manufactured in maximum 5 foot sections. Quick opening covers shall be bolted to prevent access during operation. Each conveyor shall be fixed with warning labels to call for lock out – tag out of the electrical system before the covers are removed. Inspection hatches or sample ports with finger guards will be provided at a minimum of 2 locations along the conveyor.
5. The troughs shall have removable end plates to facilitate installation and removal of the spiral from the ends of the troughs.

C. Drive Unit:

1. The screw conveyor shall be driven by a reversible constant-speed gear reducer motor drive unit. Direct coupling of the gear reducer/motor drive unit to the end flange of the conveyor will not be acceptable.
2. In the event of a prolonged power failure or emergency system shutdown the drive system shall be designed, at a minimum, to start the conveyor from a dead stop with the trough filled at 2 X the design load for loads designed up to 67% fill rate and 1.5 X for loads designed exceeding 67% fill rate.
3. Drive motors shall be a minimum of 5 HP and shall meet the requirements of Section 43 05 21.
4. Gears shall be AGMA Class II, single or double reduction, helical gear units with high capacity roller bearings. Bearings shall be designed for the thrust loads from the fully loaded startup condition and shall have an AFBMA B-10 life of 50,000 hours.
5. The gear reducer will be air-cooled unit with no auxiliary cooling requirement and be sized with a torque service factor of 1.5 times the absorbed power or 1.1 times the motor nameplate, at the driven shaft speed, whichever is greater.

D. Slide Gates and Actuators:

1. Slide gates shall be installed at the transfer point between the existing screw conveyor and the new screw conveyor. Slide gates shall be installed as close to the bottom of the trough of the existing conveyor as possible to minimize bridging.
2. Location of the slide gate shall be field verified by the contractor and coordinated during construction to determine.
3. Contractor shall determine the requirements necessary to connect the new cake collection screw conveyor to the existing cake transfer screw. Discharge chutes shall meet the requirements as stated in this Section.
4. The slide gate opening shall be at least the full width of the conveyor trough. The slide gates shall be fabricated of Type 316L stainless steel with UHMW PE seal, all minimum 3/16" thickness. The UHMW PE shall have a machined groove to accept the gate blade and give a positive seal.

5. Each slide gate shall be provided with a electric actuator sized to move the slide gate from the fully closed position to the fully open position and back to fully closed.Open/close time shall be adjustable.
    a. Actuators shall be double acting (air to open, air to close) with bearing surfaces and the inside cylinder wall and guides coated with a permanent, dry-film lubricant and corrosion inhibitor.

E. Conveyor Supports:
1. Supports for the conveyor shall be as indicated on the Reference Drawings. Contractor may propose alternative designs complying with seismic design requirements specified in Section 01 73 24 and at no additional cost to the Owner. Design shall be based on a completely filled trough plus dead load of the conveyor. Supports shall be fabricated from Type 304L stainless steel.

F. Control and Safety Features:
1. The conveyor drive unit shall be equipped with a zero speed motion failure alarm unit mounted external to the conveyor to detect spiral failure.
2. Furnish a cable operated OSHA safety stop switch with continuous cable run on both sides of the conveyor. The trip switch shall immediately stop the conveyor when the switch is actuated. Provide normally closed, 120-volt contacts for the interlocking circuit.
3. Provide torque and temperature protection for the motor.
4. Provide a single NEMA 4X junction box on each gate for connection of field-installed conduit and wiring. Provide conduit and wiring mounted on the gate frame from the junction box to each device mounted on the gate. Provide terminal strips mounted within the junction box for connection of field wiring.

2.06 SPARE PARTS

A. Tag and store as specified in Section 43 05 11.

B. Provide the following spare parts:
1. One motor.
2. One motor starter (by Contractor).
3. One gearbox.
4. One complete liner set.
5. One spare auger.
6. Five spare fuses of each size and type.
7. Two spare relays of each size and type.
8. Any special tools required for disassembly.

PART 3 EXECUTION

3.01 SHIPMENT, PROTECTION AND STORAGE

A. Contractor shall be responsible for field verifying dimensions, including the size of doors and wall openings that may be utilized to get the equipment within the building. The equipment shall be shipped from the Manufacturer's facility in components such that the largest equipment component can be brought inside the dewatering facility through the existing openings in the walls or through the access doors without structural modifications or disassembly of the equipment on-site. Equipment shipment and protection shall conform to the requirements specified in Section 01 66 00.

3.02 INSTALLATION

A. Proper handling shall incorporate all practices described in Section 8.5 – Protection of Cleaned Surfaces, ASTM A380. Passivated parts contaminated due to improper handling and installation will require retesting for the presence of free iron and re-passivation if free iron is detected.

B. Screw conveyance equipment shall be installed in accordance with the Manufacturer's installation instructions, and in compliance with all OSHA, local, state, and federal codes and regulations.

C. Manufacturer shall provide 8-hours of services of a factory trained Factory Representative to check installation and start-up. Factory Representative shall have complete knowledge of proper installation, operation, and maintenance of equipment supplied.

D. Factory Representative shall inspect the final installation, work with the electrical subcontractor and/or the supplier of the local control panels, supervise the start-up test of the equipment, and provide written certification of the acceptability of the installation.

3.03 PROJECT-SPECIFIC INSTALLATION REQUIREMENTS

A. Contractor shall confirm all elevations and dimensions in the field and provide information to the Manufacturer to allow development of a custom designed and custom fabricated transfer screw conveyor system. Detailed layout and fabrication drawings submitted for review shall indicate field measured elevations and dimensions.

B. The existing screw conveyors shall be modified by cutting an opening in the bottom of each trough and installing a custom designed and fabricated connection for the transfer screw conveyor. Grind edges of openings smooth. Field weld connection piece to existing conveyor trough using seal welds. Pickle and passivate areas of the stainless steel surfaces that are affected by the welding. Manufacturer to provide recommended methods and products.

3.04 TESTING

A. Testing and commissioning of the equipment shall be performed in accordance with Section 01 45 23 and 01 91 00 and the requirements of this Section. Contractor shall coordinate testing and commissioning such that the Manufacturer's Factory Representative and the electrical subcontractor are present simultaneously to check the proper functioning of local control panels and proper integration with the existing SCADA system as specified in Section 01 79 00.

3.05 TRAINING

A. The Contractor shall provide two 2-hour instructional sessions conforming to the requirements specified in Section 01 79 00 and taught by the Factory Representative.

B. The training sessions shall include preventive maintenance requirements, overhaul and troubleshooting instructions, and normal operating practices.

END OF SECTION

SECTION 46 76 27

SCREW PRESS DEWATERING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Scope:

1. This section specifies the screw press dewatering systems, complete with screw presses, floc tanks, floc tank mixers, polymer injection rings, solenoid valves, instruments, control systems and control panels (including, but not limited to electric motors, variable frequency drives (VFD), control panels, shafts, safety guards, speed gear reducers, sludge conditioning devices, and spare parts) for the design, assembly, delivery, installation supervision and inspection starting and testing of the screw press equipment.
2. This specification is used for the design and performance criteria for the FKC screw press system that was pre-selected by the Owner. The contractor shall coordinate with the pre-selected manufacturer for all requirements stated in this specification.

B. Type:

1. Equipment furnished under this section shall be suitable for dewatering anaerobically digested sludge at a municipal wastewater treatment plant and located indoors in an unclassified, non-environmentally controlled building.

C. Equipment List:

Item	Equipment Number
Screw Press 1 Control Panel	72LCP2601
Screw Press 1 Floc Tank	72T262610
Screw Press 1 Floc Tank Mixer	72MIX2610
Screw Press 1	72SCP2620
Screw Press 2 Control Panel	72LCP2701
Screw Press 2 Floc Tank	72T262710
Screw Press 2 Floc Tank Mixer	72MIX2710
Screw Press 2	72SCP2720

1.02 QUALITY ASSURANCE

A. 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.

Reference	Title
ABMA 9	Load Ratings and Fatigue Life for Ball Bearings
ABMA 11	Load Ratings and Fatigue Life for Roller Bearings
AISC	American Institute of Steel Construction –Manual of Practice
ANSI/ASME B46.1	Surface Texture, Surface Roughness, Waviness and Lay
NEMA 250-85	Enclosures of Electrical Equipment
IEEE 112	Polyphase Induction Motors and Generators

Reference	Title
UL 508A	Industrial Control Panels
NFPA 79	Electrical Standard for Industrial Machinery
NEMA ICS 6	Enclosures for Industrial Controls and Systems

B. Structural Design Standards:
   1. All steel structural components shall be so designed that the stresses developed under the specified conditions will not exceed the allowable stresses defined by the AISC standards and the above-mentioned standards.

C. Equipment Manufacturer's Experience:
   1. Company specializing in manufacturing products specified in this section with minimum three (3) years' documented experience and at least eight (8) screw presses 1.0 meter in diameter or larger in operation or under contract in North America.
   2. Company manufacturing products specified in this section shall have a minimum of eight (8) Service Technicians who are direct full-time, fully-trained employees of the equipment manufacturer and not provided for by a local dealer, distributor or other contract.

D. Provide services of factory-trained Service Technician, specifically trained on type of equipment specified:
   1. Service Technician providing requested services must have a minimum of five (5) years of experience, all within the last seven (7) years, on applicable type and size of equipment.
   2. Service Technician must be present on site for all items listed below. Person-day requirements listed are exclusive of travel time, and do not relieve the equipment manufacturer of the obligation to place equipment in operation as specified.
   3. Factory Acceptance Test: Verify proper operation of all system components, including the screw presses, floc tanks, and electrical/control panels prior to shipping.
      a. 2 person-days
   4. Installation: Inspect grouting, supports, location of anchor bolts; setting, leveling, alignment, field erection; coordination of electrical and miscellaneous utility connection:
      a. 10 person-days.
   5. Field Functional Testing: Calibrate, check alignment and perform a functional test. Tests to include all items specified.
      a. 3 person-days.
   6. Field Optimization: Optimize press setpoints, polymer consumption, polymer mixing, and any other system settings to reach specified performance.
      a. 5 person-days.
   7. Field Performance Testing: Inspect and monitor equipment during specified initial operation and acceptance testing.
      a. 2 person-days exclusive of optimization time.

8. Vendor Training: Provide classroom and field operation and maintenance instruction including all materials, slides, videos, handouts and preparation to lead and teach classroom sessions.
    a. 10 person-days total, 2 trips
9. Any additional time required of the factory trained service technician to assist in placing the equipment in operation, or testing or to correct deficiencies in installation, equipment or material shall be provided at no additional cost to the Owner.

E. Provide all components made of stainless steel in accordance with paragraph 2.11.

1.03 SUBMITTALS

A. General Requirements:
    1. The following information shall be provided in accordance with Section 01 33 00.
    2. With every submittal, provide a copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included.
        a. Provide this specification with each applicable paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
        b. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated and, therefore requested by the equipment manufacturer, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the equipment manufacturer with the specifications.
        c. The submittal shall be accompanied by a detailed, written justification for each deviation.
        d. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

B. Informational Submittals
    1. Certificate of Unit Responsibility attesting that the equipment manufacturer has accepted unit responsibility in accordance with the requirements of this section. No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.
    2. Experience statement with list of installations.
        a. Provide listing of five reference installations with contact names, mail addresses, and telephone numbers.

C. Shop Drawing Submittals
    1. General Requirements:
        a. Provide a copy of the contract documents relating to the submitted equipment, with addendum updates that apply to the equipment in this section, marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing or drawings shall be marked "no changes

required". Failure to include copies of the relevant drawings with the submittal shall be cause for rejection of the entire submittal with no further review.

b. Provide certified shop and erection drawings. Submit electronic files of the proposed equipment in the capacity, size, and arrangement as indicated and specified.

1) Electronic files shall conform to the following minimum requirements:

a) Electronic Files: AutoCAD 2022 and PDF latest version, drawn to scale.

b) Submit electronic files as part of the Shop Drawing submittal.

2. Process/Mechanical Shop Drawings

a. Drawings shall include plan views, sectional views, title block, tag numbers, serial numbers, parts list (identifying each component), dimensions, connection sizes and types and all details of all related items. In cases where certain information is proprietary and is omitted, provided a statement indicating that the information is proprietary and is being omitted.

b. Plan, section, and P&ID drawings including location of all piping, electrical, instrumentation, supports, and structural connections.

c. Drawings showing materials of construction, thicknesses, operating and maintenance envelope and key component and assembly weights.

d. Certified setting plans, with tolerances, for anchor bolts.

e. Complete weight of screw presses and foundation point loads for both empty and fully loaded presses. Identify any dynamic or vibration loads transmitted to foundation or supporting structure.

3. Electrical, Instrumentation, Controls Shop Drawings

a. Electrical elementary diagrams, internal connection diagrams, and external interconnection diagrams, drawn in accordance with ICS standards. Connection diagrams shall be the conventional type with lines showing point-to-point wiring and must show terminals and devices as viewed by the Supplier/Subcontractor; wireless or wire schedule types are not acceptable.

b. Electric motor control schematics for motor and VFD control.

c. Cable Schedule.

d. Local Control panel (LCP) layout drawings indicating the front door and panel equipment arrangement and dimensions and LCP wiring drawings demonstration power distribution and all other internal connections. Indicate customer connections, including network connections.

e. Complete system interconnection diagrams between power supply, control panel, motors, VFDs, and all related components and customer connections for control. Include PLC input/output (I/O) diagrams.

f. Detailed written control description with references to the P&IDs. Include descriptions of all functions monitored, controlled, and alarmed as it pertains to the equipment supplied.

D. Product Data Submittals

1. General Requirements:

a. Submit Product Data Submittal within 5 days of submitting the Shop Drawing Submittal

b. Where the content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.

2. Process/Mechanical Product Data
   a. Detailed listing of screw press and ancillary equipment components and materials.
   b. Material Certification:
      1) Provide certification from the equipment manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of three (3) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.
      2) Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.
   c. Equipment manufacturer's literature as needed to supplement certified data.
   d. Data regarding equipment performance and motor characteristics and performance.
   e. Gear reduction unit catalog data including service factor, efficiency, torque rating, service factor, AGMA classification and materials.
   f. Bearing temperature operating range for the service conditions specified.
   g. Bearing Life: Certified by the equipment manufacturer at the design conditions listed herein.
   h. Lubrication data including quantities required and product provided.
   i. All utility requirements for screw press operation, including, but not limited to, compressed air and plant water. Provide any quantity, pressure, and quality requirements for each utility.
   j. Equipment manufacturer’s product data, specifications, and color charts for shop painting.
   k. Shop drawing data for accessory items.
   l. List of recommended spare parts other than those specified.
3. Electrical, Instrumentation, Controls Product Data
   a. VFD data including:
      1) Product Data, including marked manufacturer data sheet, dimensions, weight.
      2) Schematic diagrams and wiring connection diagrams showing functions and identification of terminals.
   b. Motor data including:
      1) Marked manufacturer Motor Data Sheets
      2) Motor mounting, outline, dimensions, and weight
      3) Motor nameplate data (power rating, horsepower, voltage, full load current)

c. Instrumentation List including tag name, drawing number, manufacturer, and model.
d. I/O List including tag name and I/O designation (Rack, Slot, and Channel).
e. Catalog data on all instrumentation and applicable appurtenances, such as manifold valves, thermowells, bridles, etc.
f. Catalog data on all components installed within electrical panels and control panels including:
    1) Power Supplies
    2) Terminal Blocks
    3) Circuit Breakers
    4) Fuses
    5) Programmable Logic Controllers
    6) I/O Modules
    7) Communication Modules
    8) Network Switches

E. Action Submittal – Pre-Test Submittal
1. Factory Acceptance Test procedures and forms.
2. Field inspection reports and forms.
3. Programming
    a. One PDF copy of the printed programming logic
        1) Fully annotated with no non-functional code
4. OIT screens
    a. One PDF copy of all OIT screens and graphics

F. Action Submittal – Pre-Shipment Submittal
1. Equipment Factory Acceptance Test (shop test) results.
2. Motor Factory Acceptance Test (shop test) results.
3. Number, size, and weight of pieces shipped.
4. Recommendations for short and long-term storage.
5. Equipment weights and lifting points for installation and removal purposes.
6. Fabrication plan and schedule.
7. List of special tools for fabrication.
8. Field testing procedures, set up and equipment to be used.
9. Qualifications of field service engineer.
10. List of service person-days provided and per diem field service rate.
11. A copy of the equipment manufacturer's warranty.

G. Closeout Submittal
1. As-built shop drawings and product data.
2. Field Testing results
3. Operating and maintenance instructions and parts lists per Section 01 78 23.
4. As-Built programming

a. One PDF copy of the printed programming logic
    1) Fully annotated with no non-functional code
b. One electronic copy of the programming logic in native format.

5. As-Built OIT screens
    a. One PDF copy of all OIT screens and graphics
    b. One electronic copy of the OIT graphical interface in native format.

1.04 NAMEPLATES

A. Nameplates shall be provided on each item of equipment. Equipment nameplates shall be 16-gauge Type 316 stainless steel bearing the equipment name and equipment number legibly engraved in ¾-inch high letters. Nameplates shall be attached to the equipment in an accessible location with Type 316 stainless steel screws.

1.05 GUARANTEED PERFORMANCE REQUIREMENTS

A. The Equipment shall be capable of operating as a Sludge Dewatering System, as shown on the Drawings to meet the following guaranteed performance requirements:
    1. The System shall receive, flocculate, condition, and dewater the feed sludge specified herein, and neatly discharge to the dewatered sludge cake conveyors as shown on the Drawings.
    2. The System shall operate continuously or intermittently on demand. The System shall be suitable for dewatering the specified sludge and shall perform the required dewatering operations at the loading and operating conditions specified herein.
    3. The System shall perform at the operating conditions and meet the guaranteed minimum performance requirements specified in Part 1.06 while treating the feed sludge produced at the Salmon Creek WWTP.
    4. The System shall utilize the existing polymer feed system including the Liquid Polymer Storage Tank (76T0601), Polymer Blend Unit (76M1002), Polymer Mixing Tank (76T6001), Polymer Feed Tank (76T5801), and Polymer Feed Pumps (76P201 and 76P6202). The existing system utilizes Clarifloc WE 2009. Alternate emulsion polymer may be used per manufacture's recommendation during the performance test.
    5. The System shall utilize a connection to the existing 3W system. Manufacturer shall provide pressure control valves and solenoid valves as required for flushing.

1.06 PERFORMANCE REQUIREMENTS

A. Service and Operating Conditions

Operating Condition	Value
Operating days per work week	7
Operating hours per work day*	10
Type of Sludge	Anaerobically Digested Blended Waste Activated and Primary Sludge
Feed sludge dry solids concentration (TS)	1.7 – 2.8%
Feed Sludge temperature	4 degrees C to 38 degrees C
Feed sludge pH	6 to 8
Conditioning Flocculant	Emulsion polymer

Operating Condition	Value
Existing Polymer Feed Pumps, gpm	4 - 12
Wash water	Plant Utility Water (W3)
Available wash water flow rate per press, gpm	100
Available wash water pressure, psig,	90

* Equipment shall be designed for continuous operation 24 hrs/day, 7 days/week.

B. Guaranteed Performance Requirements

Item	Value
Total Solids Loading (Rated) Capacity	900 lb dry feed solids per hour per press[1]
Press volumetric capacity (1.7% feed)	105 gpm per press
Press volumetric capacity (2.8% feed)	65 gpm per press
Minimum Cake Solids Concentration	15%
Minimum System Solids Capture (SC)	92%
Maximum Polymer Dosage Rate	45 lb of active polymer per dry ton of sludge, at a maximum 1 percent polymer solution concentration

[1] Solids loading shall be independent of sludge total solids feed.

1. For the purpose of this specification, "Solids Capture (SC)" will be defined as:

   Solids Capture (SC) = [(C/F) x (F-T)/(C-T)] x 100

   Where: C = Cake TS (mg/kg)

   F = Feed TS (mg/kg) – where feed is defined as the sludge stream, excluding any dilution due to polymer solution addition.

   T = Filtrate TS (mg/kg) – where filtrate is defined as the stream attributable to the screw press dewatering of the sludge feed only, excluding any dilution due to polymer solution dilution and/or washwater.

1.07 GUARANTEE OF PERFORMANCE

A. It shall be the responsibility of the equipment manufacturer to provide personnel trained in the equipment proposed to demonstrate that the equipment performs as herein specified in the Guaranteed Performance Requirements. The equipment manufacturer's qualified personnel shall be present at all times during the acceptance testing.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of an equipment manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. All equipment and associated materials shall be new and without imperfections.

B. The equipment system shall be designed to extract water (dewater) from the anaerobically digested sludge specified herein after conditioning of the sludge with a solution of emulsion polymer. Dewatering by a screw press shall be accomplished by slowly squeezing the flocculated sludge and allowing the liquid to escape through perforated screens surrounding the screw while retaining the solids inside the press. The function of the screw press shall be to generate dewatered sludge such that the discharged cake solids concentration, polymer usage, and solids capture comply with the Guaranteed Performance Requirements specified herein.

C. The equipment shall be fully assembled and factory tested as far as practical prior to shipment. The Owner may elect to inspect the system prior to shipment. Equipment manufacturer shall notify Owner of all factory testing a minimum of 30 days prior to conducting tests.

D. The system equipment shall be oriented and configured as the equipment manufacturer's standard unit as shown on the Drawings. Manufacturers may propose an alternative arrangement in proposal if the arrangement shown on Drawings is not optimal for submitted equipment design.

E. All parts of the mechanisms shall be amply proportioned for all stresses that may occur during fabrication, shipment, erection, and operation.

2.02 MANUFACTURERS

A. All of the equipment described herein shall be supplied by the pre-selected manufacturer in order to provide unit responsibility.

B. Screw Press:
   1. Fukoku Kogyo Company (FKC), Model BHX-1350

C. Floc Tanks
   1. Floc tanks and mixers shall be provided by the pre-selected manufacturer and as specified herein.

2.03 CONSTRUCTION AND MATERIALS

A. All wetted elements of the equipment shall be fabricated from 304 stainless steel, or equally corrosion-resistant material. The principal elements of the equipment shall be fully assembled for simplified movement and installation.

B. Floc Tanks, Floc Tank Mixer Motors:
   1. The floc tanks shall be non-pressurized open-top design with a minimum volume of 540 gallons. The inlet pipe shall be fitted with an ANSI flange and located at the bottom of the tank. Conditioned sludge will discharge from the outlet pipe ANSI flange located near the top of the tank. Tank drain with valve shall be provided.
   2. The floc tank shall be equipped with a 6" nozzle for connection to the odor control system.
   3. The floc tanks shall be supplied complete with an agitator and fixed flow breakers. The agitator drive shall include electric motor and speed reducer. Agitator speed shall be controlled by a VFD supplied by the equipment manufacturer.
   4. The floc tank mixer motor shall be furnished as follows:

a. UL Listed, squirrel cage induction motor.
b. Motor Horsepower: 1.5 hp
c. 480V/3 phase/60Hz, Totally Enclosed Fan Cooled (TEFC) Frame meeting IEEE 841 standards, suitable for variable speed operation with a PWM constant torque inverter, NEMA Premium efficiency inverter duty rated, and severe duty motor with 1.15 service factor.
d. Include lifting lugs on motors, stainless steel nameplate, cast iron housing and conduit box, corrosion resistant hardware, and the manufacturer's standard corrosion resistant epoxy finish.

5. Variable frequency drive for the Floc Tank Mixer shall conform to the requirements of paragraph 2.04 herein.
6. Floc tank shall include high-level probe to prevent overflow.
7. Floc tank mixer motor is powered and controlled from the vendor-provided local control panel.

C. Screw Presses, Screw Press Motors:

1. The screw presses shall be horizontal screw presses and shall include the following components and features.
   a. Screw press with screw
   b. Removable press screen basket
   c. Screen spray cover with hinged inspection doors
   d. Speed reducer
   e. Direct mounted drive motor
   f. Washdown mechanism
   g. Flanged filtrate and cake solids outlets
   h. Cake solids chute
   i. Cake discharge sample port
   j. Cake solids chute and piping flexible connectors
   k. Adjustable back pressure cone
2. Screw press assemblies shall consist of a cylindrical perforated screen basket with two longitudinal flanges to permit disassembly for service; screens shall be horizontal to the ground, not inclined. Internal screw shall generate increasing pressure on the sludge during the axial passage of the sludge through the press to achieve dewatering. Screw flights shall be welded to the shaft and shall not be bolted or removeable. Screw flights shall be designed to maintain dewatering performance without a wearable elastomeric seal on the tip of screw flight. Provide manufacturer's recommended clearance between screw flight and screen.
3. Screw press "wetted" parts including cake solids chute shall be constructed of 304 stainless steel throughout. Screw press structural base and other "non-wetted" parts shall be constructed of 304 stainless steel or carbon steel with the equipment manufacturer's standard corrosion resistant coating.
4. Each screw press shall be equipped with minimum of three (3) 6-inch vents to be connected to the odor control system.
5. The screw press drive motor shall be furnished as follows:
   a. UL Listed, squirrel cage induction motor.
   b. Maximum Motor Horsepower: 7.5 hp

c. 480V/3 phase/60Hz, TEFC Frame meeting IEEE 841 standards, suitable for variable speed operation with a PWM constant torque inverter, NEMA Premium efficiency inverter duty rated, and severe duty motor with 1.15 service factor.

d. Include lifting lugs on motors, stainless steel nameplate, cast iron housing and conduit box, corrosion resistant hardware, and the manufacturer's standard corrosion resistant epoxy finish.

6. The press equipment shall be supplied with a geared speed reducer direct coupled/mounted to drive motor on input and screw press shaft on output. The presses shall be driven from the discharge end of the screw press units.
7. Variable frequency drive for screw press main drive shall conform to the requirements of paragraph 2.04 herein.
8. Any couplings and other high-speed rotating parts shall be provided with OSHA approved guards, unless otherwise enclosed by design (e.g., direct coupled).
9. The screw presses shall be provided with removeable lightweight stainless-steel spray cover for the top and sides of the screw press for sanitation and personnel protection.
10. All piping connections shall be either ANSI, class 150, standard raised face flanges or NPT threaded.
11. Cake solids connection shall be bolted and flanged.
12. Washdown mechanism shall be stationary spray bars with an array of spray nozzles to clean the exterior of the screw screen. Wash water shall be plant utility water. Frequency of wash cycle shall be configurable and controlled at the press control panel. Wash water pressure shall be 60 psi minimum during wash cycle.
13. All mechanical and electrical connections to the screw press, including, but not necessarily limited to, the feed sludge, centrate and cake solids, sample line, and electrical raceways shall be equipped with flexible connections supplied by the Contractor as required. All flexible connections shall isolate screw press vibrations from fixed, rigid external connections. No external loads shall be transferred to a screw press by external connections to the machine. Cake solids flexible connection shall be flanged and fabricated from neoprene, with Type 316 stainless steel bolts with Type 316 stainless steel retainer plates at each end. Piping flexible connectors shall be metal reinforced elastomer with flanged connections. Tubing flexible connectors shall be Type 316 stainless steel braided hose.
14. Chute for solids discharge shall be designed to provide a smooth interior surface for optimum vertical transport of solids without buildup.
15. The screw presses will be installed on support frame at an elevation that permits discharge into screw conveyor. Support frame dimensions will be determined during final design.
16. Equipment manufacturer shall provide all necessary dimensions that are fully coordinated with all cross conveyor interface requirements to allow for the proper design of adjacent free standing platforms and stairs provided by others to accommodate press access.

D. Polymer Injection Rings

1. Polymer injection rings shall be provided for primary polymer injection upstream of the mixing tank.
2. Injection wafers shall be designed to be installed between flanges using ring style design which fits within the bolt circle of the flange bolts.

3. Injection ports shall be full diameter through the injection wafer. The use of diffuser style ports at injection points is not permitted.
4. Design requirements:

Injection Ring Information	Value
Type	Primary
Location	Upstream of floc tank
Process pipe connection diameter, inches	6
Flow rate, gpm	52
Ring thickness, inch	2
Materials of construction	Stainless Steel, AISI Type 304 or Acetal(Delrin)
Number of ports	4
Port Diameter, inches	1
Port connection type	threaded

2.04 VARIABLE FREQUENCY DRIVES

A. Floc Tank Mixer Drive
   1. The floc tank mixer drive system shall consist of an electric motor coupled to a speed reducer and suitable for use with a variable frequency drive (VFD) system as required to provide full load capacity and also to withstand the full starting torque of the system. Floc tank mixer shall be electronically controlled by means of a VFD.
   2. The system size and torque requirements shall be in accordance with the screw press manufacture's design requirements of the driven equipment.
   3. Communication options to, at a minimum, include options below:
      a. Analog I/O as required to meet the operational requirements of the control description.
      b. Discrete I/O as required to meet the operational requirements of the control description.
      c. Ethernet Communication supporting Ethernet IP network protocol.
   4. VFD shall be integral to the LCP (local control panel) provided with screw press system.
   5. Manufacturer: Provide VFD to meet operational and performance requirements.
      a. Allen Bradley PowerFlex
      b. Or approved equal

B. Screw Press Drive
   1. The screw press drive system shall consist of an electric motor coupled to a speed reducer and suitable for use with a variable frequency drive (VFD) system as required to provide full load capacity and also to withstand the full starting torque of the system. Screw speed shall be electronically controlled by means of a VFD.
   2. The system size and torque requirements shall be in accordance with the screw press manufacture's design requirements of the driven equipment.
   3. Communication options to, at a minimum, include options below:
      a. Analog I/O as required to meet the operational requirements of the control description.

b. Discrete I/O as required to meet the operational requirements of the control description.
c. Ethernet Communication supporting Ethernet IP network protocol.

4. VFD shall be integral to the LCP (local control panel) provided with screw press system.
5. Manufacturer: Provide VFD to meet operational and performance requirements.
   a. Allen Bradley PowerFlex
   b. Or approved equal

2.05 LOCAL CONTROL PANELS

A. Description:
   1. Provide one local control panel (LCP) for each screw press.
   2. Local control panels shall contain operator control devices, control relays, indicating lights and other panel devices to provide the specified system operation as specified herein.
   3. Local control panels shall contain:
      a. Starters and Drives
      b. Programmable Logic Controller (PLC)
      c. Panel mounted Operator Interface Terminal (OIT)
      d. Ethernet switch
      e. Any hardwired control logic required
      f. Panel enclosure ventilation, heating, and cooling as required. Maintain NEMA rating.
   4. Integrate motor starters, VFDs, the PLC, OIT and other required devices into the design of the control panel.
   5. The LCP will serve as the source of power, communication, and control for all of the equipment supplied by the vendor.
   6. Screw press system and equipment will be installed in a wet and corrosive environment. All electrical components associated with the system shall be suitable for this harsh environment. Junction boxes and other electrical devices required shall be provided with NEMA 4X 316 SST enclosures.
   7. The local control panels will be mounted remotely, but within the same room as the screw presses.

B. Performance/Design Criteria
   1. Approvals/Listing: UL 508 Approved
      a. The local control panels shall bear the UL 508 label. The UL label shall apply to the enclosure, the specific equipment supplied within the enclosure, and the installation and wiring of the equipment within and on the enclosure. The fabricator shall be an approved UL listed manufacturer.
   2. Power Supply to Cabinet: Single Source 480 Vac, 60 Hz, 3 Phase
   3. The panel shall include a main circuit breaker with flange type disconnect handle. The Short Circuit Rating of unit shall be 65 KAIC.
   4. Include surge protection at power supply connection in the LCP.

5. Configure where upon loss of power and return of power the system shall return to the ready state.
6. Control Power:
    a. Provide 480 VAC to 120 VAC transformer for control power. Provide primary and secondary fuses.
    b. Provide 24 VDC power supply
        1) Operate controls at 24 VDC volts supplied from power supply.
        2) Provide primary and secondary fuses.
    c. Provide UPS and battery within the local control panel.
        1) 24 VDC input
        2) 24 VDC output
        3) UPS shall provide backup power for PLC components, Network components, and loop-powered Instrumentation.
        4) Provide power calculations demonstrating available standby power for 5 minutes upon loss of line power.
7. Separate 24 VDC and 120 VAC control power components from 480 VAC power components using a painted metal barrier. 480 VAC to 120 VAC transformer shall be located on the 480 VAC side of the metal barrier.
8. Ventilation
    a. Provide a ventilation system (fan and intake) and Maintain NEMA Rating of the panel.
9. All components in the control panel:
    a. Shall be completely factory wired.
    b. Shall be finger safe.
    c. All external control connection points shall terminate on a terminal strip. There shall be a minimum of 20% spare terminal connections supplied.
10. Drives (VFDs)
    a. Install the drives for the Screw Press motor and Reaction Rank Mixer motor on the 480 VAC side of the barrier in the LCP.
    b. Include all circuit protective devices for the VFD and Motor within the LCP.
    c. Include complete control power system including transformer and auxiliary devices for control of the circuit within the LCP.
    d. Provide an externally mounted reset button for the VFD.
11. PLC
    a. Power the PLC with 24 VDC Control Power, backed up by UPS.
    b. The PLC shall interface via Ethernet to the plant-wide control systems.
    c. For Discrete Inputs and Discrete Outputs interfacing with power sources that is not 24VDC control power originating from the LCP, provide interposing relays.
    d. The PLC shall interface via Ethernet to the plant-wide control systems and include the following:
        1) Provide a contiguous list of data for monitoring and control from SCADA.
        2) Provide interlock and alarm data for each individual data point to alert operations via SCADA of the particular issue and or alarm.

3) Equipment data shall also include elapsed time, yesterday's run hours and today's run hours in tenths of hours.
4) Provide a PLC clock synchronization provision.
5) Provide heartbeat logic for network monitoring status to SCADA.

12. OIT
    a. Power the OIT with 24 VDC Control Power, backed up by UPS.
    b. The following status shall be displayed on the OIT:
        1) System Run indicator (Red)
        2) System Off indicator (Green)
        3) System Fault indicator (Amber)
        4) Screw Press Feed Pump Flow rate (from SCADA)
        5) Run indicator for each motor (Red)
        6) Off indicator for each motor (Green)
        7) Fault indicator for each motor (Amber)
        8) High motor torque and overload for each motor (Amber)
        9) High motor Temperature indicator for each motor (Amber)
        10) Motor speed for each motor
            a) Can be adjusted if motor HOAs are in Hand
        11) Headbox Level
        12) Wash sequence status
        13) Screw torque (or equivalent)
        14) Alarm Banner with system alarms
    c. The OIT shall allow the operator to run the Screw Press manually.
13. Network
    a. Power the network switch with 24 VDC Control Power, backed up by UPS.
    b. Provide connection from LCP to plant SCADA using Ethernet IP.
14. Pilot Devices
    a. Primary power on – indicating light (Grace products Model R-3W(2)-KB-L or equal)
    b. Control power on – indicating light (White)
    c. System Run light (Red)
    d. System Off light (Green)
    e. System Fault/Reset light pushbutton (Amber)
    f. HOA switch for each motor (Black)
    g. System E-Stop (Red Mushroom head Pushbutton with cover)

C. Materials or Components
1. Enclosure
    a. NEMA 4X
    b. Dimensions not to exceed 40in x 24in x 72in (W x D x H)
2. Main Disconnect Switch:
    a. Thermal magnetic circuit breaker, 65 KAIC.
    b. Circuit breaker handle, flanged type.

3. Surge Protection
    a. Vendor Standard
4. Control Power Transformer: Sized for load plus 50% spare capacity.
5. Control Power 24 VDC power supply
    a. 120 VAC input
    b. 24 VDC output
    c. Manufacturer: Phoenix Contact QUINT or approved equal.
6. Control Power UPS and battery
    a. UPS Manufacturer: Phoenix Contact QUINT or approved equal.
    b. UPS Battery Manufacturer: Phoenix Contact UPS-BAT or approved equal.
7. Wire management:
    a. Slotted wall wire duct
8. Control Relays:
    a. Provide LED or mechanical status indication on Relay.
    b. Contacts rated 10 amps.
9. Fuse Terminals:
    a. Provide with blown fuse indicators.
10. Drives (VFDs)
    a. Provide VFDs for the screw presses and floc tank agitators.
        1) The drives for the Screw Press motor and Reaction Rank Mixer motor shall be as specified in paragraph 2.04.
11. Programmable Logic Controller (PLC)
    a. Manufacturer: Allen-Bradley CompactLogix without exception
    b. Networking Connections: Ethernet/IP
    c. Processor:
        1) Power Supply
            a) Mod Power: 24 VDC
            b) SA Power: 24VDC
        2) Memory:
            a) 0.6 MB or greater
            b) Memory shall be provided so that 50% is available after program is tested.
        3) Programming languages: Ladder Diagram, Function Block Diagram, Sequential Function Chart
        4) Built in Communication ports: one USB port, and two Ethernet (RJ-45) Ports
        5) Maximum Local IO Modules: 8
        6) Allen-Bradley CompactLogix 5069-L306ER or approved equal.
    d. Input and Output Modules:
        1) General: Compact 5000 I/O modules
        2) Discrete Inputs: 24 VDC, 16 channel.
        3) Discrete Outputs: 24 VDC, 8 channel.
        4) Relay Outputs: Normally Open, 8 channel.

5) Analog Inputs: 4-20 mAdc, 24 VDC, 8 channel.
6) Analog Outputs: 4-20 mAdc, 24 VDC, 4 channel.
7) Spare Input/Output channels: 20 percent of each type provided per control panel.

e. Provide all cables, taps, terminators, power supplies, and accessories for a complete operating PLC system.

12. OIT
    a. 10 inch TFT LCD Screen, Touchscreen
    b. NEMA 4X front panel
    c. Ethernet port
    d. Power: 24VDC
    e. Capable of displaying all data, graphics, and alarms.
    f. Manufacturer: Allen-Bradley PanelView 5000 or approved equal.
13. Network Switch
    a. Managed Industrial Ethernet Switch
    b. Input Power: 24 VDC
    c. Fast Ethernet Ports: 6 at minimum
    d. Manufacturer:
        1) Allen Bradley Stratix
        2) Cisco IE
        3) N-Tron
        4) Or approved equal managed switch.
14. Pilot Lights and Devices:
    a. Match enclosure NEMA rating.
    b. Heavy duty type: Watertight and corrosion resistant
    c. 30 mm.

D. Interfaces
1. Provide pilot devices and OIT on the front door of each LCP enclosure.
2. OIT shall be configured for connection to the PLC via the Ethernet IP.
3. Provide network connection for complete monitoring and control to SCADA using Ethernet IP.
    a. Provide a read-only register map for all monitored data points.
    b. Provide ability to read data from the plant SCADA for proper function of the screw press.
4. Provide hardwire connection for monitoring and control to SCADA for the following signals:
    a. See Control Description in paragraph 2.07.

2.06 INSTRUMENTATION

A. General:
   1. Screw press vendor shall provide the field instrumentation for the screw press system in order to monitor and control the screw press system. Instruments shall be suitable for the environment of installation.
   2. Screw press vendor shall provide the appropriate equipment protection devices. This may include overload, over-torque, low/high pressure, etc. Equipment shall be appropriately protected, and protection shall be incorporated into the controls systems provided by the vendor.
   3. Screw press vendor shall provide ancillary devices for system operation as required, including solenoid valves, actuators for control valves, and safety devices.

B. Instrumentation:
   1. Provide instrumentation per vendor standards for monitoring and control. In addition, include the following:
      a. Application: Screw Press Level
         1) Signal Output:
            a) Analog, 4-20mA HART
         2) Loop powered
         3) Diaphragm
            a) 316 stainless steel with 3-inch flush-mounted sensing surface
         4) Electrical Housing
            a) Aluminum
         5) Conduit Entry:
            a) 1/2-inch NPT
         6) Calibrated for required range
      b. Application: Floc Tank Level
         1) Signal Output:
            a) Dry contact
         2) 120 VAC
         3) Electrical Housing
            a) Aluminum
         4) Conduit Entry:
            a) 1/2-inch NPT
         5) Calibrated for required range

2.07 CONTROL DESCRIPTION

A. Provide a Control Description that describes the programming of the PLC and completely describes the following:
   1. All manual modes of operation
   2. All automatic modes of operation
      a. Each screw press shall be capable of operating either:
         1) a constant sludge feed flow/variable press speed control strategy

2) or variable sludge feed flow/constant press speed control strategy.

3. All Permissives and Interlocks:
   a. A screw press will automatically start only after all run permissives in a screw press train are satisfied. Provide a list of permissives for each mode of operation.
   b. If a screw press is running, it will stop if an interlock condition occurs. Provide list of interlocks for each mode of operation.
4. All monitoring functions.
5. All alarm conditions.

B. All monitored data points, alarms, and statuses of equipment shall be communicated from the screw press LCP to the Plant SCADA system over Ethernet connection. Provide a read-only register map for communication from the LCP to the plant SCADA.

C. All required inputs from Plant SCADA and all required outputs to Plant SCADA for correct function
   1. Include a summary list of all required inputs and outputs

D. Inputs from the Plant SCADA to the Screw Press LCP shall be communicated over Ethernet connection and shall include the following at a minimum:
   1. Sludge feed pump running status
   2. Sludge feed pump fault status
   3. Sludge feed flow to each screw press
   4. Polymer feed pump running status
   5. Polymer pump fault status
   6. Polymer flow to each screw press
   7. Wash Water pump running status
   8. Run status for each conveyor (assume up to 3 conveyors)
   9. Fault for each conveyor (assume up to 3 conveyors)

E. Provide Hardwire connections for monitoring and control to SCADA for the following signals:
   1. Screw Press Running Status
   2. Screw Press Fault Status
   3. SCADA Stop Command
   4. SCADA Start Command

F. Provide the ability to monitor and control the Screw Press Feed Pumps from the Screw Press Control Panels (specified herein) using the network connection from the SCADA system to the screw press control panels.
   1. Provide a screen on the panel-mounted HMI on the local control panels for the monitoring and control of the Screw Press Feed Pumps

2.08 PROGRAMMING REQUIREMENTS

A. Systems shall be monitored via the Ethernet/IP communications connection to plant SCADA.

B. Provide memory map of all internal registers in the PLC.

C. Provide manufacturer supplied memory map of all internal registers in the VFDs.

D. Provide control through hardwired PLC outputs by plant SCADA, and local equipment control panel as described in the control description.

E. Submit PLC program as described in the submittals portion of this specification section. The program shall be developed in RS Studio per Owner's plant standards. The program shall be ladder logic, function block, or sequential function chart. The program shall be fully annotated with the program's intent on every logic rung, function block, and sequential step.
   1. Submit proposed program under the Pre-Test submittal. Submit as-built programming under the Closeout Submittal.

F. Submit all OIT screens, navigation elements, faceplates, and other graphical elements as described in the submittals portion of this specification section. The OIT shall be developed in Ignition per Owner's plant standards.
   1. Submit proposed OIT graphics under the Pre-Test submittal. Submit as-built OIT graphics under the Closeout Submittal.

2.09 ANCHOR BOLTS, FASTENERS AND EQUIPMENT MOUNTING

A. All anchor bolts shall be made of type 316 stainless steel. The equipment manufacturer shall furnish all anchor bolts, nuts, and washers required for the equipment. Anchor bolts shall be adhesive epoxy type.

B. All fasteners shall be made of type 316 stainless steel. The equipment supplier shall size and furnish fasteners required for the assembly of the equipment.

2.10 COATINGS

A. Screw press components shall be shop finish painted according to the equipment manufacturer's standard system for the application: Polyamide Epoxy Basecoat, Polyurethane Topcoat. Stainless steel surfaces shall remain unpainted.

B. Ferrous surfaces which are not to be painted shall be given a shop applied coat of grease or rust resistant coating.

C. Provide additional shop paint coating for touch-up to all surfaces after installation and testing is completed and equipment accepted.

2.11 PASSIVATION OF STAINLESS STEEL

A. General:
   1. Equipment specified under this section shall be cleaned and passivated in accordance with methods defined in ASTM A380 – Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, and the specific requirements of this section.
   2. For purposes of this section, cleaning and passivation is defined as the removal of surface contaminants including exogenous iron or iron compounds and the removal

of oxide films from the surface of stainless steel by means of mechanical cleaning and mechanical descaling.

3. The processes specified in this section shall be performed in the manufacturer's facility or in a shop specializing in post fabrication treatment of stainless steel.
4. Equipment components that bolt together shall be disassembled prior to passivation to provide access to all surfaces of the equipment.
5. All fasteners and anchor bolts required for assembly and mounting of equipment shall conform to the requirements of Section 43 05 11.
6. The use of "fabricator's crayons" shall be prohibited during fabrication of equipment as these marks may prevent proper passivation.

B. Passivation Process Requirements:
   1. The processes required for proper passivation shall include precleaning, mechanical descaling, and post-treatment inspection as defined below.
      a. Precleaning – Precleaning required for the removal of all grease, oil, paint, soil, grit and other gross contaminants preparatory to the fabrication process shall be accomplished by vapor degreasing, immersion or spray application of alkaline or emulsion cleaners, steam, or high pressure water jetting.
      b. Mechanical Cleaning and Descaling – Mechanical cleaning is the removal of surface contamination, exogenous iron and rust. Mechanical descaling is the removal of oxide films resulting from high temperature processes such as heat treatment and welding from the surface of stainless steel. Mechanical cleaning and descaling shall be accomplished by abrasive bead blasting but may also be supplemented with a combination of sanding, grinding, and power brushing to provide a surface that is smooth, uniform and free from all foreign matter, weld slag, corrosion, coatings, heat tint, discoloration, and mill scale. Grinding wheels and sanding tools should not contain iron, iron oxides, zinc or other materials that could contaminate the stainless steel surface. Abrasive blasting materials shall be iron-free silica or alumina sand. Blasting equipment previously used for cleaning carbon steel or other materials containing free iron shall be cleaned to prevent contamination of stainless steel passivation process. All surfaces shall be wiped clean following mechanical cleaning.
      c. Post Cleaning Inspection – Post treatment inspection of the part shall exhibit a clean, bright and uniform surface with no signs of etching or pitting from the abrasive blasting procedure. All traces of oxide films from high temperature processes shall have been removed.

2.12 SAFETY ITEMS

A. All equipment furnished shall be manufactured to comply with the most recent safety standards of the Federal Occupational Safety Health Act and all other applicable safety codes.

2.13 FACTORY ACCEPTANCE TEST DOCUMENTATION

A. All major system components shall be factory tested (shop tested) for proper function, and a certification of the results of these tests shall be submitted for review prior to shipment.
   1. Provide a FAT with the test and subsequent retests.

2. Load software and configuration for control system panels, controllers, operator interfaces, and the programming and graphic configuration application at the control system equipment supplier's factory prior to the FAT.
3. Inspect equipment, panel instruments, panels, or cabinets with factory testing performed.
4. Verify all wiring according to panel wiring diagrams and complete a pull-test of all wire terminations
5. Provide written notice to the Engineer and Owner a minimum of 30 working days before the commencement of the FAT activity and include:
    a. Schedule for the FAT.
    b. Location of the FAT.
    c. Testing equipment used.
    d. Detailed test procedure with forms for the recording of test results.
    e. All panel drawings with incorporated submittal comments.
    f. Sign-off spaces for the individuals performing and witnessing the tests.

B. Provide motor shop testing documentation.

C. Provide Control Panel Testing documentation.
    1. Test all functions and alarms of each control panel.

2.14 PRODUCT DATA

A. The following information shall be provided as indicated:
    1. Operation and maintenance (O&M) manuals and data shall be provided in accordance with Section 01 78 23. O&M manuals shall be provided prior to delivery of the equipment.
    2. Three copies of Installation Certification Form 43 05 11-A as specified in Section 01 99 90 shall be provided prior to any testing of the equipment.
    3. Three copies of Training Certification Form 01 78 23-A as specified in Section 01 99 90 shall be provided immediately after completion of training.

2.15 SPARE PARTS

A. The following spare parts shall be provided:
    1. Four screen sections.
    2. One motor coupling.
    3. First filling of lubricants
    4. Ten of each fuse type and size used.
    5. Two of each relay type and size used.
    6. Five of each type pilot light/indicator used.
    7. One set of special tools if needed
    8. Spare parts shall be tagged and stored as specified in Section 43 05 11.

2.16 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Equipment, products and materials shall be shipped, handled, stored, and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the Owner.

B. 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.

PART 3 EXECUTION

3.01 FACTORY ACCEPTANCE TESTING

A. Provide a 30-day minimum notice prior to testing.

B. A service technician employed by the equipment manufacturer shall be present for a the entire FAT (minimum of two (2) consecutive days) to demonstrate and perform the FAT.

C. Conduct factory tests (shop tests) to verify proper operation of all system components, including the screw presses, floc tanks, motors, drives, and electrical/control panels prior to shipping.

D. Submit complete testing documentation for review prior to shipment.

E. Repeat tests until specified results are obtained.

F. Correct or replace promptly all defects or defective equipment revealed by or noted during tests at no additional cost to the Owner.

3.02 DELIVERY, STORAGE AND HANDLING

A. All equipment shall be factory assembled, crated or shrink wrapped, and delivered to protect against damage during shipment as practical to suit shipment and installation requirements.

B. All exposed flanges shall be covered and sealed with shrink-wrap to prevent the entrance of moisture. Finished iron or steel surfaces not painted shall be properly protected with factory applied corrosion inhibiting coating.

C. All equipment delivered to the site shall be stored as specified in accordance with the equipment manufacturer’s instructions.

3.03 INSTALLATION

A. The equipment shall be installed in strict conformance with equipment manufacturer's instructions. Equipment shall be shipped in the minimum practical number of pieces for field installation. The equipment manufacturer shall provide the recommended limits of equipment disassembly for installation.

B. The equipment manufacturer shall provide factory trained personnel to supervise installation, adjustment, field testing, and initial operation of all components. The screw presses shall be aligned, connected, and installed at the locations shown and in accordance with the equipment manufacturer's recommendations.

C. A service technician employed by the equipment manufacturer shall be on site for a minimum of ten (10) consecutive days to supervise the installation requirements.

3.04 FIELD TESTING

A. Comply with the requirements specified in Section 01 91 00 and as specified herein.

B. Field testing will not be conducted without an accepted procedure with no exceptions noted, calibration certificates for all testing equipment, and a completed and signed pretesting check list.

C. After installation of equipment, and after inspection, operation, testing and adjustment have been completed by the equipment manufacturer's field service technician, conduct a dry running test and an acceptance test for each unit in presence of the Owner or Owner Representative to determine its ability to deliver its rated capacity under specified conditions.

D. Functional Testing:
   1. Make all necessary adjustments and settings to the drive mechanism and tripping device at the time of the test to demonstrate that the equipment will stop at the appropriate trip setting.
   2. Perform a functional test on each screw press to demonstrate the correct alignment, smooth operation, freedom from vibration, excessive noise and overheating of the moving parts and bearings.
   3. Perform a functional test on each screw press to demonstrate the correct operating and shutdown sequence and alarms.
   4. Perform a functional test on each screw press to demonstrate the ability of the equipment to successfully operate without vibration or jamming.
   5. All defects recorded during the above functional tests and all defects and failures occurring within the first year of operation shall be corrected at no additional cost to the Owner.
   6. A service technician employed by the equipment manufacturer shall be on site for a minimum of three (3) consecutive days with a total of one (1) trip to execute the Functional Testing requirements.
   7. During this period, the presses will be optimized by the supplier, including identifying optimum polymer selection and dose.

E. Performance Testing (Acceptance Testing):

1. Field performance testing will occur at such time as the installation work is complete, functional testing has been completed, equipment is available for operations, and equipment manufacturer has test operated equipment sufficiently to establish operating conditions conducive to performance testing
2. A performance testing plan must be sent by equipment manufacturer and approved by engineer no later than thirty (30) days prior to performance testing. During the acceptance testing, the equipment manufacturer, with the assistance of the Owner's trained personnel, shall startup and operate the equipment; for the purpose of demonstrating conformance to the Guaranteed Performance Requirements specified herein. Performance test shall be a minimum of 8 hours in duration of continuous dewatering for each press. Samples shall be pulled hourly and should include no less than seven (7) samples per press for each of the following: Inlet Solids TS%, Discharge Cake TS%, Filtrate Capture %. Presses may be ran simultaneously during the performance test. The performance test shall be run to determine the actual system operating conditions and verify that the systems (each press) meet the Guaranteed Performance Requirements of this Specification. Samples from each press shall be averaged to measure overall system performance. Feed conditions shall be adjusted during the performance testing to assess performance across a range of conditions and up to the rated capacity specified herein.
3. In the case of non-acceptable performance, the equipment manufacturer shall have 30 days from the initial performance test in which to perform, at the equipment manufacturer's sole expense, all equipment modifications to meet the Guaranteed Performance Requirements and request a retest performance testing. If the modified equipment continues to not meet the Guaranteed Performance Requirements, the equipment manufacturer shall have an additional 30 days from the date of retest in which to perform, at the equipment manufacturer's sole expense, all equipment modifications to meet the Guaranteed Performance Requirements. In no case shall the total retesting duration exceed 60 days.
4. Proposed test procedures shall be developed and submitted by the equipment manufacturer and approved by the Engineer. A qualified representative of the equipment manufacturer shall be responsible for operating all equipment during the testing period.
5. The Owner will provide all sludge feed, water, electrical power, and sludge disposal necessary to conduct the performance testing, at no cost to the equipment manufacturer.
6. The Owner will provide polymer based on manufacturer's testing and recommendations.
7. All sampling shall be as directed by the equipment manufacturer to confirm performance. Equipment manufacturer shall be responsible for sampling and lab testing in conformance with the applicable portions of the most recent edition of the Standard Methods and provide a summary report with the results after successful completion of the performance testing. Owner may elect to take split samples to conduct independent analyses.
8. All defects recorded during the above field tests and all defects and failures occurring within the first year of operation shall be corrected at no additional cost to the Owner.
9. A service technician employed by the Equipment Manufacturer shall be on site for a minimum of two (2) consecutive days with a total of one (1) trip at the onset of

Performance Testing, in addition to time required to optimize system operation prior to starting the performance testing on each press.

3.05 TRAINING

A. Training shall conform to Section 01 79 00.

B. A minimum of five (5) consecutive days training shall be provided with a total of two (2) trips.

C. Upon completion of the training activities, the Manufacturer shall provide an executed Instruction Certification Form 43 05 11-B.

D. The Supplier's representative shall provide one additional (4-hour) day on-site as part of a separate trip at the time of start-up to provide startup support and furnish additional training of the Owner's personnel in the operation and maintenance of the equipment.

3.06 WARRANTY

A. The Manufacturer shall furnish a full warranty for each equipment provided for a period of 2 years following successful completion of performance testing of the specific equipment. The warranty shall include one (1) inspection per year by a service technician employed by the equipment manufacturer during the 2 year warranty period. Each trip shall be 2 days in duration and shall occur during the final month of each warranty year period.

B. Submit warranty inspection results in written reports signed by factory authorized representatives of the equipment manufacturer.

END OF SECTION

Salmon Creek Treatment Plant
Dewatering Equipment Replacement
Project #93-2021-0058
Pre-bid Meeting
March 3, 2026 | 9:00 A.M.

1. Introduction

• Project Team Owner	Discovery Clean Water Alliance
• Owner's Representative	Clark Regional Wastewater District
• Engineer of Record	Brown and Caldwell
• Contract Documents	https://mrscrosters.bonfirehub.com/
• Sign in sheet	

2. Project Overview

- Solids Processing Center (Building 72): Replacement of existing dewatering belt filter presses with new dewatering screw presses. Modification of sludge feed piping, W3 water piping, polymer piping, and odor control ducting. Installation of personnel access grating and platforms, a new monorail system, and ancillary equipment.
- Solids Processing Center (Building 72): Installation of exterior stairs and entrance to upper level of facility.
- Digester/BFP Feed Control Building (Building 77): Replacement of BFP Feed Pumps with new Screw Press Feed Pumps.
- Temporary Systems: Installation and relocation of "temporary" screw press during the replacement of dewatering system.
- Installation of new level sensors for the Biosolids Blend Tank (Facility 76) and Sludge Blend Tank (Facility 74).
- Mandatory 15% apprentice labor hours required.
- Engineers Estimate – $7.7M

3. Proposal: **Electronic bids must include the following forms fully executed**

- Bid Proposal Form (Excel)
- Bid Deposit (PDF) (Bid bond, certified check, cashier's check, or cash equal to 5% of proposal)
- Certification of Compliance with Wage Payment Statutes (PDF)
- Proposal Signature Page (PDF)
- Subcontractor List (PDF)

4. Schedule

Electronic Sealed Bids Due on Bonfire	March 19, 2026 at 10:00 A.M.
Bid Opening via GoToMeeting	March 19, 2026 at 11:00 A.M.
Estimated Notice of Award	March 31, 2026
Estimated Notice to Proceed	April 7, 2026
Project Substantial Completion	714 days after notice to proceed Liquidated Damages ($1,600/day)
Final Completion	30 days after substantial completion Liquidated Damages ($825/day)

5. Permits / Bonding / Insurance

- District has secured/paid permit PLM-2026-00029 & CME-2025-00471, which contractor will need to obtain from Clark County, all other permits by the contractor.
- Contract Payment & Performance Bond required. Copy included in front end of bid documents.
- Insurance requirements referenced in Supplementary Conditions section 00 73 00 – 6 and the supplementary conditions (SC 6.03).

6. **FKC Pre-selected equipment**
    - Owner has pre-selected FKC for the new screw presses (reference 46 76 27) and temporary conveyor (46 71 01).
        - Price of the package is listed on the proposal form.
        - Awarded low & responsive bidder will enter into a contract with FKC per the proposal that will be added via addendum.
        - Product Data and Shop Drawing submittal for new equipment will be made available in addendum #1, to be issued on 3/4.

7. **Site Information**
    - Coordination will be required (shutdowns) as specified including notices.
    - Coordination of work shall be made with District Construction Manager as specified.
    - Several other projects will be taking place during this work, all projects have clearly identified lay down areas.

8. **Addenda – none at this time, one forthcoming to be issued on 3/4.**

9. **Questions**

10. **Site Tour**

SCTP DEWATERING EQUIPMENT REPLACEMENT
PROJECT #93-2021-0058
MARCH 3, 2026 9:00AM PRE-BID MEETING
SIGN-IN SHEET

Attendee Name	Company/Affiliation	Phone	Email
Dick McElligott	J.W. Fowler Co.	~~503 [redacted]~~ cell 503-990-5219 cell 503-623-5373 [illegible]	estimating@jwfowler.com dickm@jwfowler.com
Alex McCoy	Stellar J	360 225 7996	Bids@stellarj.com
Ryan Sondgroth	Prospect Construction	253.446.1600	bids@prospectconst.com
Dylan Surkinen	Rotschy Inc	360-334-3100	estimator@Rotschy.inc.com
PAT RANDLES	McCLURE & SON	425-316-6999	BIDS@MCCLUREANDSONS.COM
Ryan Simula	Cascade Electrical	360-518-1538	ryans@cascadeelec.com

SCTP DEWATERING EQUIPMENT REPLACEMENT
PROJECT #93-2021-0058
MARCH 3, 2026 9:00AM PRE-BID MEETING
SIGN-IN SHEET

Attendee Name	Company/Affiliation	Phone	Email
Ole Pedersen	Maxim Crane	360-916-1992	opedersen@maximcrane.com
Shawn Michael	Hamar Electric	360 431 9304	shawnmichael@hamarelectric.com
Rylan Hersey	Tapani, Inc.	360-687-1148	Quotes@tapani.com

Contract # 800482714

SHORT CIRCUIT ANALYSIS,
DEVICE EVALUATION,
PROTECTIVE DEVICE COORDINATION,
& ARC FLASH STUDY
FOR

Salmon Creek WWTP Clark County

Vancouver, Washington

REVISION 1
March 11, 2021

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1.0 EXECUTIVE SUMMARY

This report contains the results of the analysis and arc flash mitigation performed on the electrical distribution systems for Salmon Creek WWTP Clark County at Vancouver, Washington. The executive summary contains the objectives, description, and guide to the rest of the report. In addition, it contains the recommendations of the entire study.

1.1 OBJECTIVES

The objective of this report is to provide useful, accurate information which can be used by Salmon Creek WWTP Clark County to develop or enhance an effective electrical safety program, ultimately resulting in a safer workplace environment. A task-based risk assessment is the next logical step in utilizing this information effectively. A risk assessment will ultimately determine the correct course of action to address the areas of concern identified by this report. A risk assessment / hazard analysis is an important aspect of a safety program that complies with applicable legislation and standards. Other aspects include policies, procedures, training, and equipment, as well as regular internal audits. Refer to NFPA 70E Edition 2018 standard for additional guidance and information.

The power system study for this facility contains the following sections:

1.1.1 Short Circuit Study

A short circuit study is performed on the existing electrical distribution system as developed from the existing electrical drawings and available information as shown in the attached Single Line Diagrams in order to determine the available fault current at pertinent locations throughout the distribution system. The scope of study includes:

a) Analysis of the existing distribution system depicting maximum available fault currents. This study begins at the incoming utility service and extends down to the three phase 60A disconnect level. Data collection included the step down transformer from the utility service (including primary relaying) down through each 480V motor control center (MCC) and 240/208V panel for all systems where an

arc flash would sustain with an available short-circuit current below 2000A as per IEEE 1584-2018. Equipment surveyed included but was not limited to: Utility; Low and medium service transformers; Switchgears and breakers; Relays; Direct acting trip devices; Main over current protective devices to and from applicable equipment; 480V buss ducts and Motors equal to or greater than 50HP. Other data that was collected included: Conductor sizes and lengths; Circuit breaker sizes; Manufacturer, model and settings; Fuse sizes and types; Relay CT's and settings; Transformer sizes and types; Utility system and over current devices; plus all other data necessary for a complete analysis. If name plate data was not available, then assumptions about the equipment data were made by a trained professional. The calculations were assumed at worst case and are shown in this report as such.

b) The available fault currents determined by the short circuit study will be used in the coordination and device evaluation analysis.

1.1.2 Device Evaluation

The device evaluation will evaluate the interrupting duty (short circuit currents) and ratings of all protective devices contained in the power system study. Overdutied equipment will be identified, and solutions will be presented.

1.1.3 Coordination Study

The coordination study will evaluate existing equipment and protective device settings. Where applicable, suggestions for improvements will be made.

1.1.4 Incident Energy / Flash Hazard Analysis

An arc flash hazard analysis is performed per the guidelines of NFPA 70E and IEEE 1584 on the electrical distribution system described above in Section 1.1.1. The arc flash hazard analysis provides the levels of incident energy available at all faulted buses. Along with a task-based risk assessment, the analysis provides information to help determine the

level of hazard and the amount of personal protective equipment that must be used while working within the limited boundary and/or arc flash hazard boundary of energized electrical equipment. Solutions will be discussed that allow personnel to work safely around the electrical equipment.

1.2 ASSUMPTIONS

The following is a list of items that were unable to be field verified during the project. Assumed size and equipment type comes from similar equipment situations in other parts of the facility and judgment based on other associated equipment. During maintenance or other outages, it is recommended to verify these items so the model can be updated.

General Model:

1. As Utility and Generator details were not available, the following data was considered to perform Arc Flash Calculations:

3ph fault contribution @ 12.47kV	3ph X/R ratio	SLG fault contribution @ 12.47kV	SLG X/R ratio
8kA	6.5	8kA	6.5

Generator Name	MVA	kV	pf	Xd''	Xd'	X0
Gen-1	0.25	0.48	0.8	12%	18%	15%
Gen-2	1.5	0.48	0.8	12%	18%	15%

2. If cable information was not provided then an appropriately sized conductor was selected, with appropriate insulation based on our experience.

3. As data regarding the breakers listed below were not available, appropriate settings have been assumed to calculate Worst case Incident energy, also maintaining proper Co-ordination with downstream breakers, and are as provided in Appendix 3.3. All breakers assumed to have HI/Max instantaneous.

Connected to Bus	Equipment Name
SWGR-1	BKR-MCC-4
	BKR-SWGR-1A MAIN
	BKR-SWGR-BL
	BRK-MCC-3-BUS A
	BRK-MCC-2-BUS A
	BKR-SWGR-1A TIE
	BRK-MCC-2-BUS B
	BKR-GEN 1
	BRK-MCC-3-BUS B
SWGR-2	BKR-EFFLUENT PUMP-1
	BKR-EFFLUENT PUMP-3
	BKR-UV SYS PDC-1
	BKR-SWGR-2A MAIN
	BKR-MCC-D1
	BKR-MCC-6-A
	BKR-SWGR-2 TIE
	BKR-MCC-6-B
	BKR-MCC-D1S-B
	BKR-GEN-2
	BKR-UV SYS PDC-2
	BKR-EFFLUENT PUMP-2
	BKR-SWGR-2B-4B
	BKR-EFFLUENT PUMP-4
	BKR-SWGR-2B-3A
SWGR-4	BKR-BLOWER-5
	BKR-BLOWER-7
	BKR-SWGR-4 MAIN
	BKR-MCC-ST
	BKR-MCC-STS
	BKR-SWGR-4 TIE
	BKR-BLOWER-6
	BKR-SWGR-4B-2B
USS	FS-USS-1 MAIN

Connected to Bus	Equipment Name
	FS-USS-2 MAIN
	FS-USS-3 MAIN
	FS-USS-4 MAIN
MCC-4	BKR-MCC-4 MAIN
SWGR-BL	BRK-SWGR-BL MAIN
MCC-2 BUS A	BKR-MCC-2-A MAIN
MCC-2 BUS A	BKR-MCC-2 TIE
MCC-2 BUS B	BKR-MCC-2-B MAIN
PP2A	BKR-PP2A MAIN
PP2B	BKR-PP2B MAIN
PP2C	BKR-PP2C MAIN
MCC-D1	BKR-MCC-D2 M.SHOP
MCC-D1	BKR-MCC-D1S
MCC-6 BUS A	BKR-MCC-6 TIE
MCC-5A	BKR-MCC-5A MAIN
MCC-5B	BKR-MCC-5B MAIN

4. All local disconnect switches are assumed to be typical un-fused disconnects.

1.3 COMMENT ON THE RESULTS

There are Two (2) operating mode identified for Salmon Creek WWTP Clark County power system: The Base Case Mode fed by the service utility and the Generator Mode.

Recommendations contained in this report are example solutions that can be implemented to resolve specific issues or deficiencies that were identified. These are not the only solution(s) that could be employed, and there may be others which are more effective, practical or less costly for your application.

Your Rockwell Automation account manager, safety consultant, or authorized local distributor will be happy to discuss the results of this report and ways to remediate any areas of concern (solutions may include changes or upgrades to existing equipment, updating your electrical safety program, conducting a formal risk assessment, additional PPE, training, tools, etc.).

1.4 RECOMMENDATIONS

There is no recommendation at this time.

2.0 RESULTS OF THE ANALYSIS

2.1 SHORT CIRCUIT STUDY

Short circuit currents were calculated for three-phase bolted fault at each bus shown on the single line drawings found in Appendix 3.6.

HV Momentary Report

Vpu = 1.00

3 PHASE Fault		Total Fault Currents		
Bus Name	**Bus kV**	**Sym Amps**	**Asym Amps**	**2.6*Sym Amps**
PPSS-1	12.47	8265	11073.4	21489
SERVICE UTIL	12.47	8269.7	11082.7	21501.3
USS-1 LINK-1	12.47	8260.3	11064.2	21476.7
USS-1 TX PRI	12.47	8255.3	11054.5	21463.8
USS-2 LINK-1	12.47	8255.5	11054.9	21464.3
USS-2 TX PRI	12.47	8250.5	11045.1	21451.2
USS-3 LINK-1	12.47	8245.7	11035.9	21438.9
USS-3 TX PRI	12.47	8245.7	11035.9	21438.9
USS-4 LINK-1	12.47	8250.7	11045.6	21451.9
USS-4 TX PRI	12.47	8245.9	11036.2	21439.3

2.2 DEVICE EVALUATION

The device evaluation is based on the maximum available short circuit current. Appendix 3.6 of this report contains one lines showing fault current levels at all buses throughout the facility.

The short circuit ratings of protective devices and other distribution equipment are evaluated. A table of current and equipment rating, by device, is provided in Appendix 3.2.

Overdutied Equipment

There is no overdutied equipment in the distribution system.

Recommendations

There is no recommendation at this time.

2.3 COORDINATION STUDY

The coordination study evaluates the protective devices in the system and the ability to protect people and equipment. Correct coordination will isolate the least amount of equipment while clearing electrical faults.

Time-current curves can help to identify improperly coordinated protective devices and are displayed in Appendix 3.3.

TCC-1, TCC-2, TCC-3 & TCC-4 are the Time-Current Co-ordination plots for SWGR-1, SWGR-2, SWGR-3 and SWGR-4.

Using breaker settings as assumed in Appendix 3.3, It can be observed that all the breakers are properly Co-ordinated and there are no recommendations at this time.

Load studies will assist in determining optimal coordination of devices. In practice, nuisance trips are often a primary indicator of coordination issues.

2.4 INCIDENT ENERGY ANALYSIS

Details of the incident energy analysis are shown in Appendix 3.4 and 3.5. It shows required energy and boundary calculations.

The intent of the NFPA 70E-2018 and IEEE 1584 guidelines is to establish standard calculations to determine an approach boundary and an associated arc flash incident energy value that will prevent the onset of a second degree

burn to the face and the torso of the worker. Incident energy value of 1.2 cal/cm^2 (5 J/cm^2) represents the onset of a second-degree burn.

The guidance on selection of protective clothing and other Personal Protective Equipment (PPE) are described in the NFPA 70E-2018 standard by Table 130.5(G)). Incident energy values greater than 40 cal/cm^2 will be described in this study as “ENERGIZED WORK PROHIBITED”. Working on live electrical components at these hazardous locations is strictly prohibited.

The arc flash risk assessment considers each medium voltage, 600V and 480V system location within the scope of the work. No 208V locations where an arc flash would sustain with an available short-circuit current below 2000A, but the probabilities of an arc flash survival are minimal. This is based on IEEE 1584 -2018, which states that “Sustainable arcs are possible but less likely in three-phase systems operating at 240V nominal or less with an available short- circuit current below 2,000 Amps.”

a) >=40 cal/cm^2

   Fifteen (15) bus have an incident energy level greater than 40 cal/cm^2. Arc resistant PPE is generally not designed to protect against the blast pressures associated with high energy, high current arc faults. The equipment represented by these buses should not be interacted with while the equipment is energized.

b) >12 cal/cm^2

   Four (4) buses have an incident energy level greater than 12 cal/cm^2. These devices are operable using appropriate PPE, including arc rated clothing and a suitably rated flash suit hood (refer to NFPA 70E Table 130.5(G)).

c) >=1.2 cal/cm^2 & <=12 cal/cm^2

   Fifty-Nine (59) buses have an incident energy level greater or equal to 1.2 cal/cm^2 and below or equal 12 cal/cm^2. These devices are operable using appropriate PPE, including arc rated clothing and a

suitably rated flash suit hood or face shield and balaclava (refer to NFPA 70E Table 130.5(G)).

d) <1.2 cal/cm^2

The remaining 29 buses have an incident energy level below 1.2 cal/cm^2. These devices are operable using appropriate PPE. Arc rated PPE are not required (refer to NFPA 70E Table 130.5(G)).

Arc Flash Recommendations

Currently the levels are being calculated based on a person removing themselves from or being blown clear of the arc within Maximum of two seconds, Manual Time. Increasing the time will only further increase the arc flash category. Engineered solutions will be required to remediate these levels down any further.

NFPA 70E Article 130.7 section (c)(6) states “Workers shall wear arc-rated clothing wherever exposure to an electric arc flash above the threshold incident-energy level for a second-degree burn, i.e., 5 J/cm^2 (1.2 cal/cm^2), is possible.”

Working in an ‘electrically safe work condition’ (de-energized, locked out, and verified), is always the preferred method. Whenever possible, this condition should be achieved prior to any servicing, adjustment, maintenance, or other work done on electrical equipment. When ‘working live’ is required, it should only be performed by qualified personnel wearing appropriate PPE and following proper procedures.

3.0 APPENDIX

3.1 ANSI SUMMARY FAULT REPORT

LV Momentary Report

Vpu = 1.00

3 PHASE Fault		Total Fault Currents		Equipment Duties	
Bus Name	Bus kV	Sym Amps	Asym Amps	Equip Type	Duty Amps
37-MSO-205	0.48	22316.1	27965.1	LVPCB	22316.1
37-MSO-206	0.48	22651.6	28565.4	LVPCB	22651.6
37-MSO-207	0.48	22715.9	28688.9	LVPCB	22715.9
AREATION BLOWER-1	0.48	27701.5	31904.5	LVPCB	27701.5
AREATION BLOWER-2	0.48	25173.6	28079	LVPCB	25173.6
AREATION BLOWER-3	0.48	28402.2	33049.2	LVPCB	28402.2
AREATION BLOWER-4	0.48	28402.2	33049.2	LVPCB	28402.2
ATS-LP3	0.48	17969.6	18024.1	LVPCB	17969.6
ATS-LP4B	0.48	11385.3	11401.5	LVPCB	11385.3
ATS-MCC-5C	0.48	19767.4	23639	LVPCB	19767.4
ATS-MCC-D1S	0.48	21499.3	24126.9	LVPCB	21499.3
BLOWER-5	0.48	19694.4	23637.8	LVPCB	19694.4
BLOWER-6	0.48	20498.1	24905.8	LVPCB	20498.1
BLOWER-7	0.48	19191.5	21753.2	LVPCB	19191.5
CHILLER	0.48	10034.8	10043.9	LVPCB	10034.8
DIGESTER MIX PUMP1	0.48	18455.9	20011.3	LVPCB	18455.9
DIGESTER MIX PUMP2	0.48	18455.9	20011.3	LVPCB	18455.9
EFFLUENT PUMP-1	0.48	30537.3	36489.1	LVPCB	30537.3
EFFLUENT PUMP-2	0.48	30375.5	38202.2	LVPCB	30375.5
EFFLUENT PUMP-3	0.48	30537.3	36489.1	LVPCB	30537.3
EFFLUENT PUMP-4	0.48	31092.5	39527.8	LVPCB	31092.5
ELEVATOR CONTROLLER	0.48	17255.6	17944.5	LVPCB	17255.6
FILTRATE RECY PUMP1	0.48	7924.6	7927.8	LVPCB	7924.6
FILTRATE RECY PUMP2	0.48	7924.6	7927.8	LVPCB	7924.6
FILTRATE RECY PUMP3	0.48	7924.6	7927.8	LVPCB	7924.6
MCC-1	0.48	23448.1	24361.8	LVPCB	23448.1
MCC-2 BUS A	0.48	23778	27292.3	LVPCB	23778
MCC-2 BUS B	0.48	23778	27292.3	LVPCB	23778
MCC-3 BUS A	0.48	28525.5	34250.1	LVPCB	28525.5
MCC-3 BUS B	0.48	28525.5	34250.1	LVPCB	28525.5
MCC-4	0.48	21334.2	23953.8	LVPCB	21334.2
MCC-5A	0.48	21065.9	27063.8	LVPCB	21065.9
MCC-5B	0.48	20989.9	26911.6	LVPCB	20989.9
MCC-5C	0.48	19062.8	22250.9	LVPCB	19062.8
MCC-6 BUS A	0.48	33025.5	43327.1	LVPCB	33025.5
MCC-6 BUS B	0.48	33025.5	43327.1	LVPCB	33025.5
MCC-B	0.48	24998.2	26076.7	LVPCB	24998.2
MCC-BS	0.48	27400.9	29395.7	LVPCB	27400.9
MCC-D1	0.48	22458.4	25727.9	LVPCB	22458.4
MCC-D1S	0.48	20600.4	22736.9	LVPCB	20600.4
MCC-D2 M.SHOP	0.48	21620	24485.9	LVPCB	21620
MCC-ST	0.48	23570.1	30234.4	LVPCB	23570.1
MCC-STS	0.48	23513.4	30119.7	LVPCB	23513.4

MTS-LP6	0.48	19940.2	19993.8	LVPCB	19940.2
MTS-PP2A	0.48	20773.3	22597.1	LVPCB	20773.3
MTS-PP2B	0.48	20773.3	22597.1	LVPCB	20773.3
MTS-PP2C	0.48	20773.3	22597.1	LVPCB	20773.3
PNL-GEN-1	0.48	2499.7	3789.2	LVPCB	2762.4
PNL-GEN-2	0.48	15022.8	24023.3	LVPCB	17307.9
PNL-LP3	0.208	2835	2912.9	LVPCB	2835
PNL-LP4A	0.208	2757.3	2828.1	LVPCB	2757.3
PNL-LP4B	0.208	2700.2	2759	LVPCB	2700.2
PNL-LP4C	0.208	2722.9	2786.3	LVPCB	2722.9
PNL-LP4D	0.208	2722.9	2786.3	LVPCB	2722.9
PNL-LP5B1	0.208	1931.8	1986.8	LVPCB	1931.8
PNL-LP5B2	0.208	1923.5	1976.2	LVPCB	1923.5
PNL-LP5B4	0.208	2818.8	2909.7	LVPCB	2818.8
PNL-LP6	0.208	1933.3	1979.5	LVPCB	1933.3
PNL-PP4	0.48	19970.8	22199.8	LVPCB	19970.8
PNL-PP5A1	0.48	19568.8	23500.5	LVPCB	19568.8
PNL-PP5A2	0.48	19568.8	23500.5	LVPCB	19568.8
PNL-PP5B1	0.48	19149.3	22672.7	LVPCB	19149.3
PNL-PP5B2	0.48	19149.3	22672.7	LVPCB	19149.3
PNL-PPST	0.48	14530.1	14643.9	LVPCB	14530.1
PNL-UV 55BRK0101	0.48	4087.1	4622.9	LVPCB	4087.1
PNL-UV 55BRK0102	0.48	4124	4688.2	LVPCB	4124
PORTABLE WELDER	0.48	9085.9	9086.6	LVPCB	9085.9
PP2A	0.48	17439.6	18367.6	LVPCB	17439.6
PP2B	0.48	17439.6	18367.6	LVPCB	17439.6
PP2C	0.48	17291.7	18108.3	LVPCB	17291.7
RAS PUMP-1	0.48	20994.8	21407.4	LVPCB	20994.8
RAS PUMP-2	0.48	21442.5	21926.3	LVPCB	21442.5
RAS PUMP-3	0.48	22372.3	23042.3	LVPCB	22372.3
RAS PUMP-4	0.48	21670.7	22195.1	LVPCB	21670.7
RAS PUMP-5	0.48	20134.7	20436.7	LVPCB	20134.7
RAS PUMP-6	0.48	19520.7	19761	LVPCB	19520.7
SWGR-1A	0.48	36225.1	48525.8	LVPCB	36225.1
SWGR-1B	0.48	36225.1	48525.7	LVPCB	36225.1
SWGR-2A	0.48	34291.1	46018.5	LVPCB	34291.1
SWGR-2B	0.48	34291.1	46018.5	LVPCB	34291.1
SWGR-3A	0.48	21674.6	28262.5	LVPCB	21674.6
SWGR-3B	0.48	21674.6	28262.6	LVPCB	21674.6
SWGR-4A	0.48	25296.7	33750	LVPCB	25296.7
SWGR-4B	0.48	25296.7	33749.9	LVPCB	25296.7
SWGR-BL	0.48	33288.2	42535.3	LVPCB	33288.2
TX-LP3 SEC	0.208	2912.2	3006.2	LVPCB	2912.2
TX-LP4A PRI	0.48	13373.1	13434.4	LVPCB	13373.1
TX-LP4A SEC	0.208	2843.5	2933.4	LVPCB	2843.5
TX-LP4B PRI	0.48	10316	10323	LVPCB	10316
TX-LP4B SEC	0.208	2784.5	2859.1	LVPCB	2784.5
TX-LP4C PRI	0.48	11385.3	11401.5	LVPCB	11385.3
TX-LP4C SEC	0.208	2808	2888.4	LVPCB	2808
TX-LP4D PRI	0.48	11385.3	11401.5	LVPCB	11385.3

TX-LP4D SEC	0.208	2808	2888.4	LVPCB	2808
TX-LP5B1 PRI	0.48	15374.3	15562.6	LVPCB	15374.3
TX-LP5B1 SEC	0.208	1967.3	2029.7	LVPCB	1967.3
TX-LP5B2 PRI	0.48	14065.5	14149.2	LVPCB	14065.5
TX-LP5B2 SEC	0.208	1958.8	2018.7	LVPCB	1958.8
TX-LP5B4 PRI	0.48	17074.5	17896.7	LVPCB	17074.5
TX-LP5B4 SEC	0.208	2893.5	3003	LVPCB	2893.5
TX-LP6 SEC	0.208	1995.1	2056.2	LVPCB	1995.1
TX-UV SYS PDC-1 PRI	0.48	29028.6	35818.8	LVPCB	29028.6
TX-UV SYS PDC-1SEC	0.48	4248.3	4976.6	LVPCB	4248.3
TX-UV SYS PDC-2 SEC	0.48	4263.2	4998.2	LVPCB	4263.2
USS-1 TX SEC	0.48	36451	49024.2	LVPCB	36497.5
USS-2 TX SEC	0.48	34509.6	46501.8	LVPCB	34610.9
USS-3 TX SEC	0.48	21798.2	28513.2	LVPCB	21798.2
USS-4 TX SEC	0.48	25367.4	33895.7	LVPCB	25367.4
UV SYS PDC-1 TX PRI_A	0.48	29722.4	37002.3	LVPCB	29722.4
WATER PUMP-1	0.48	24995.5	26208.3	LVPCB	24995.5
WATER PUMP-2	0.48	26084.8	27671.5	LVPCB	26084.8

3.2 DEVICE EVALUATION REPORT

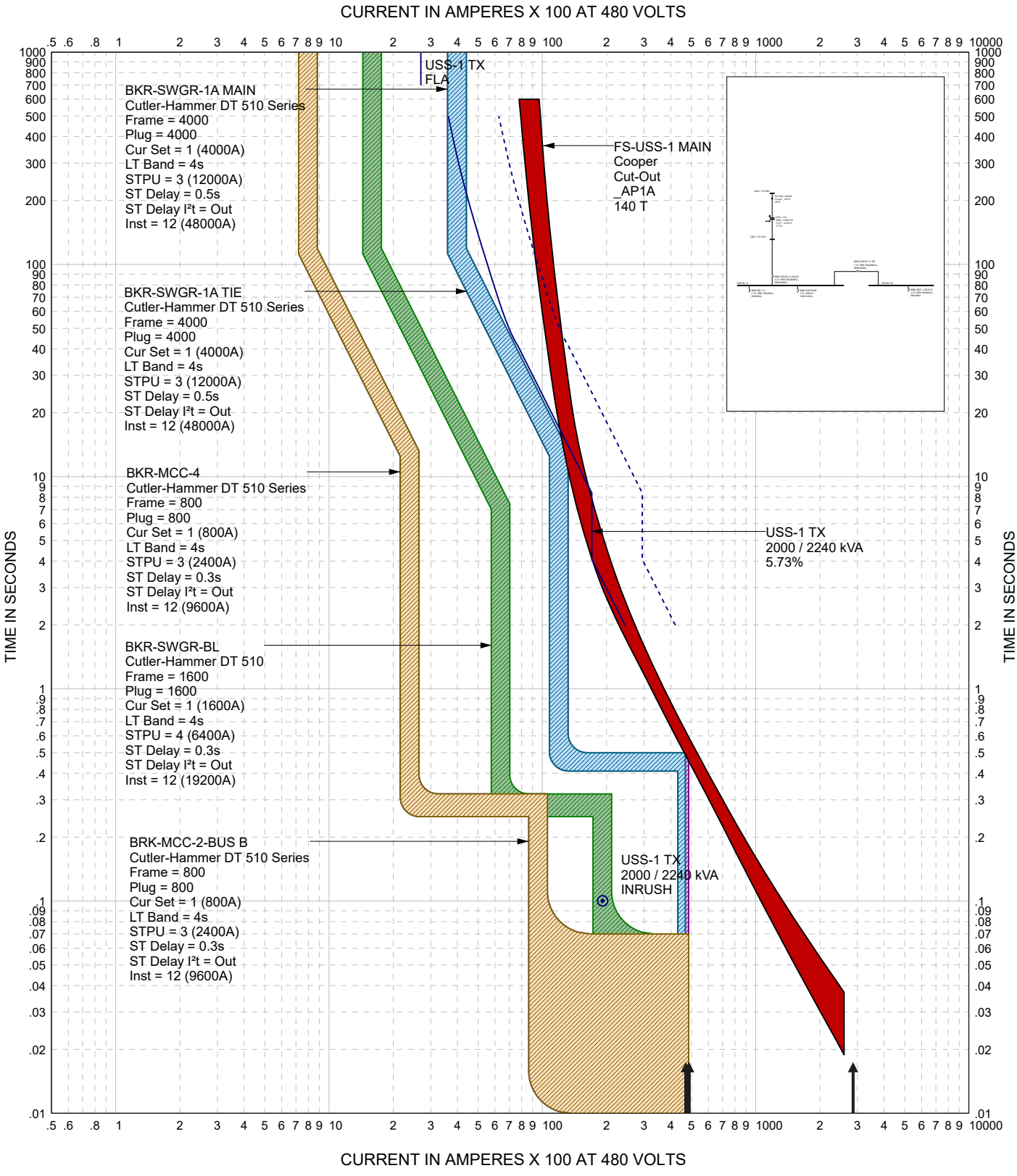
Bus Name	Equipment Name	Worst Case Scenario	Fault Type	Vpu	Bus Base kV	Manufacturer	Style	Test Standard	1/2 Cycle Rating (kA)	1/2 Cycle Duty (kA)	1/2 Cycle Duty (%)	Comments
37-MSO-205	BKR-BLOWER-5 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HMCP	ANSI-SYM	65.000	20.774	-68.0%	
37-MSO-206	BKR-BLOWER-6 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HMCP	ANSI-SYM	65.000	21.105	-67.5%	
37-MSO-207	BKR-BLOWER-7 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HKD	ANSI-SYM	65.000	20.878	-67.9%	
MCC-2 BUS A	BKR-MCC-2 TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	23.345	-33.3%	
	BKR-MCC-2-A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	22.832	-34.8%	
	BKR-MCC-2-A-PP2A	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	BKR-MCC-2-A-PP2B	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	BKR-MCC-2-A-PP2C	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	MCC-2 BUS A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	23.778	-63.4%	
MCC-2 BUS B	BKR-MCC-2 TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	23.345	-33.3%	
	BKR-MCC-2-B MAIN	Generator	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	2.822	-91.9%	
	BKR-MCC-2-B-PP2A	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	BKR-MCC-2-B-PP2B	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	BKR-MCC-2-B-PP2C	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	23.778	-63.4%	
	MCC-2 BUS B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	23.778	-63.4%	
MCC-3 BUS A	BKR-BUS A-LP3	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.526	-56.1%	
	BKR-MCC-3-A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HND	ANSI-SYM	65.000	28.207	-56.6%	
	BKR-RAS PUMP-1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.526	-56.1%	
	BKR-RAS PUMP-3	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.526	-56.1%	
	BKR-RAS PUMP-5	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.526	-56.1%	
	MCC-3 BUS TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HND	ANSI-SYM	65.000	28.336	-56.4%	
MCC-3 BUS B	BKR-BUS B-LP3	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.525	-56.1%	
	BKR-MCC-3-B MAIN	Generator	3 PHASE	1.00	0.480	Cutler Hammer	HND	ANSI-SYM	65.000	3.166	-95.1%	
	BKR-RAS PUMP-2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.525	-56.1%	
	BKR-RAS PUMP-4	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.525	-56.1%	
	BKR-RAS PUMP-6	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	28.525	-56.1%	
	MCC-3 BUS TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HND	ANSI-SYM	65.000	28.336	-56.4%	
MCC-4	BKR-CHILLER	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.334	-67.2%	
	BKR-MCC-4 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	21.218	-39.4%	
	BKR-PORTABLE WELDER	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.334	-67.2%	
	BKR-PP4	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HKD	ANSI-SYM	65.000	21.334	-67.2%	
	MCC-4	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	21.334	-67.2%	
MCC-5A	BKR-DIGESTER PUMP1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.383	-67.1%	
	BKR-DIGESTER PUMP2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.383	-67.1%	
	BKR-MCC-5A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	20.125	-42.5%	
	BKR-PP5A1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	21.383	-67.1%	
	BKR-PP5A2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	21.383	-67.1%	
	MCC-5A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	21.066	-67.6%	
MCC-5B	BKR-MCC-5B MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	21.266	-39.2%	
	BRK-ELEVATOR CONTR	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-FILTRATE PUMP1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-FILTRATE PUMP2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-FILTRATE PUMP3	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-LP5B1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	

	BRK-LP5B2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-LP5B4	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-PP5B1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	21.266	-67.3%	
	BRK-PP5B2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HJD	ANSI-SYM	65.000	21.266	-67.3%	
	MCC-5B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	20.990	-67.7%	
MCC-5C	BKR-MCC-5C MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HKD	ANSI-SYM	65.000	18.906	-70.9%	
	MCC-5C	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	19.063	-70.7%	
MCC-6 BUS A	BKR-LP6-A	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	34.167	-47.4%	
	BKR-MCC-6 TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	17.083	-51.2%	
	BKR-WATER PUMP-1	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	34.167	-47.4%	
	MCC-6 BUS A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	33.025	-49.2%	
MCC-6 BUS B	BKR-LP6-B	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	34.167	-47.4%	
	BKR-MCC-6 TIE	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	MD	ANSI-SYM	35.000	17.083	-51.2%	
	BKR-WATER PUMP-2	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	34.167	-47.4%	
	MCC-6 BUS B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	33.025	-49.2%	
MCC-B	BKR-MCC-B MAIN	Base Case	3 PHASE	1.00	0.480	West	HLD	ANSI-SYM	65.000	24.998	-61.5%	
	MCC-B	Base Case	3 PHASE	1.00	0.480	A-B		ANSI-SYM	65.000	24.998	-61.5%	
MCC-BS	BKR-MCC-BS MAIN	Base Case	3 PHASE	1.00	0.480	West	HLD	ANSI-SYM	65.000	27.401	-57.8%	
	MCC-BS	Base Case	3 PHASE	1.00	0.480	A-B		ANSI-SYM	65.000	27.401	-57.8%	
MCC-D1	BKR-MCC-D1 MAIN	Base Case	3 PHASE	1.00	0.480	Allen-Bradley	140G-M6X3	ANSI-SYM	65.000	22.400	-65.5%	
	BKR-MCC-D1S	Base Case	3 PHASE	1.00	0.480	Allen-Bradley	140G-J6H3	ANSI-SYM	65.000	22.458	-65.4%	
	BKR-MCC-D2 M.SHOP	Base Case	3 PHASE	1.00	0.480	Allen-Bradley	140G-J6H3	ANSI-SYM	65.000	22.458	-65.4%	
MCC-ST	BKR-MCC-ST MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HLDB	ANSI-SYM	65.000	23.462	-63.9%	
	BKR-PPST	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	23.891	-63.2%	
MCC-STS	BKR-MCC-STS MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HLDB	ANSI-SYM	65.000	23.803	-63.4%	
PNL-LP5B1	BKR-LP5B1 MAIN	Base Case	3 PHASE	1.00	0.208	Cutler Hammer	HFD	ANSI-SYM	65.000	1.932	-97.0%	
PNL-LP5B2	BKR-LP5B2 MAIN	Base Case	3 PHASE	1.00	0.208	Cutler Hammer	HFD	ANSI-SYM	65.000	1.923	-97.0%	
PNL-LP5B4	BKR-LP5B4 MAIN	Base Case	3 PHASE	1.00	0.208	Cutler Hammer	HFD	ANSI-SYM	65.000	2.819	-95.7%	
PNL-PP4	BKR-LP4A	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.971	-69.3%	
	BKR-LP4B	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.971	-69.3%	
	BKR-LP4C	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.971	-69.3%	
	BKR-LP4D	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.971	-69.3%	
	BKR-PP4 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	19.971	-80.0%	
PNL-PP5A1	BKR-PP5A1 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.569	-69.9%	
PNL-PP5A2	BKR-PP5A2 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.569	-69.9%	
PNL-PP5B1	BKR-PP5B1 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.149	-70.5%	
PNL-PP5B2	BKR-PP5B2 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	HFD	ANSI-SYM	65.000	19.149	-70.5%	
PNL-UV 55BRK0101	PNL-UV 55BRK0101	Base Case	3 PHASE	1.00	0.480	Cuttler Hammer		ANSI-SYM	35.000	4.087	-88.3%	
PNL-UV 55BRK0102	PNL-UV 55BRK0102	Base Case	3 PHASE	1.00	0.480	Cuttler Hammer		ANSI-SYM	35.000	4.124	-88.2%	
PP2A	BKR-PP2A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	JD	ANSI-SYM	35.000	17.440	-50.2%	
PP2B	BKR-PP2B MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	JD	ANSI-SYM	35.000	17.440	-50.2%	
PP2C	BKR-PP2C MAIN	Base Case	3 PHASE	1.00	0.480	Cutler Hammer	JD	ANSI-SYM	35.000	17.292	-50.6%	
SWGR-1A	BKR-MCC-4	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	36.110	-63.9%	
	BKR-SWGR-1A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	34.848	-65.2%	
	BKR-SWGR-1A TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	36.225	-63.8%	
	BKR-SWGR-BL	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-65	ANSI-SYM	65.000	36.225	-44.3%	

	BRK-MCC-2-BUS A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	35.278	-64.7%	
	BRK-MCC-3-BUS A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	35.910	-64.1%	
	SWGR-1A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	36.225	-44.3%	
SWGR-1B	BKR-GEN 1	Generator	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-65	ANSI-SYM	65.000	2.640	-95.9%	
	BKR-SWGR-1A TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	36.225	-63.8%	
	BRK-MCC-2-BUS B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	36.225	-63.8%	
	BRK-MCC-3-BUS B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	36.225	-63.8%	
	SWGR-1B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	36.225	-44.3%	
SWGR-2A	BKR-EFFLUENT PUMP-1	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-EFFLUENT PUMP-3	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-MCC-6-A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-MCC-D1	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.233	-65.8%	
	BKR-SWGR-2 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-SWGR-2A MAIN	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	34.233	-65.8%	
	BKR-UV SYS PDC-1	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	SWGR-2A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	34.291	-47.2%	
SWGR-2B	BKR-EFFLUENT PUMP-2	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-EFFLUENT PUMP-4	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-GEN-2	Generator	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	17.029	-83.0%	
	BKR-MCC-6-B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-MCC-D1S-B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-SWGR-2 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(4000A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-SWGR-2B-3A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-SWGR-2B-4B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	34.291	-65.7%	
	BKR-UV SYS PDC-2	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	34.291	-65.7%	
	SWGR-2B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	34.291	-47.2%	
SWGR-3A	BKR-MCC-5C-A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	21.675	-78.3%	
	BKR-SWGR-3 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	21.675	-78.3%	
	BKR-SWGR-3A-2B	Generator	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	18.627	-81.4%	
	SWGR-3A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	21.675	-66.7%	
SWGR-3B	BKR-MCC-5A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	20.436	-79.6%	
	BKR-MCC-5B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	21.675	-78.3%	
	BKR-MCC-5C-B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	21.519	-78.5%	
	BKR-SWGR-3 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	21.675	-78.3%	
	BKR-SWGR-3B MAIN	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	20.280	-79.7%	
	SWGR-3B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	21.675	-66.7%	
SWGR-4A	BKR-BLOWER-5	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	23.758	-76.2%	
	BKR-BLOWER-7	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	23.466	-76.5%	
	BKR-MCC-ST	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	24.873	-75.1%	
	BKR-MCC-STS	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	25.297	-74.7%	
	BKR-SWGR-4 MAIN	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(3000A)	ANSI-SYM	100.000	19.962	-80.0%	
	BKR-SWGR-4 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	23.753	-76.2%	
	SWGR-4A	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	25.297	-61.1%	
SWGR-4B	BKR-BLOWER-6	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(800A)	ANSI-SYM	100.000	23.753	-76.2%	
	BKR-SWGR-4 TIE	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	23.753	-76.2%	
	BKR-SWGR-4B-2B	Generator	3 PHASE	1.00	0.480	Cutler-Hammer	SPB-100(1600A)	ANSI-SYM	100.000	17.072	-82.9%	

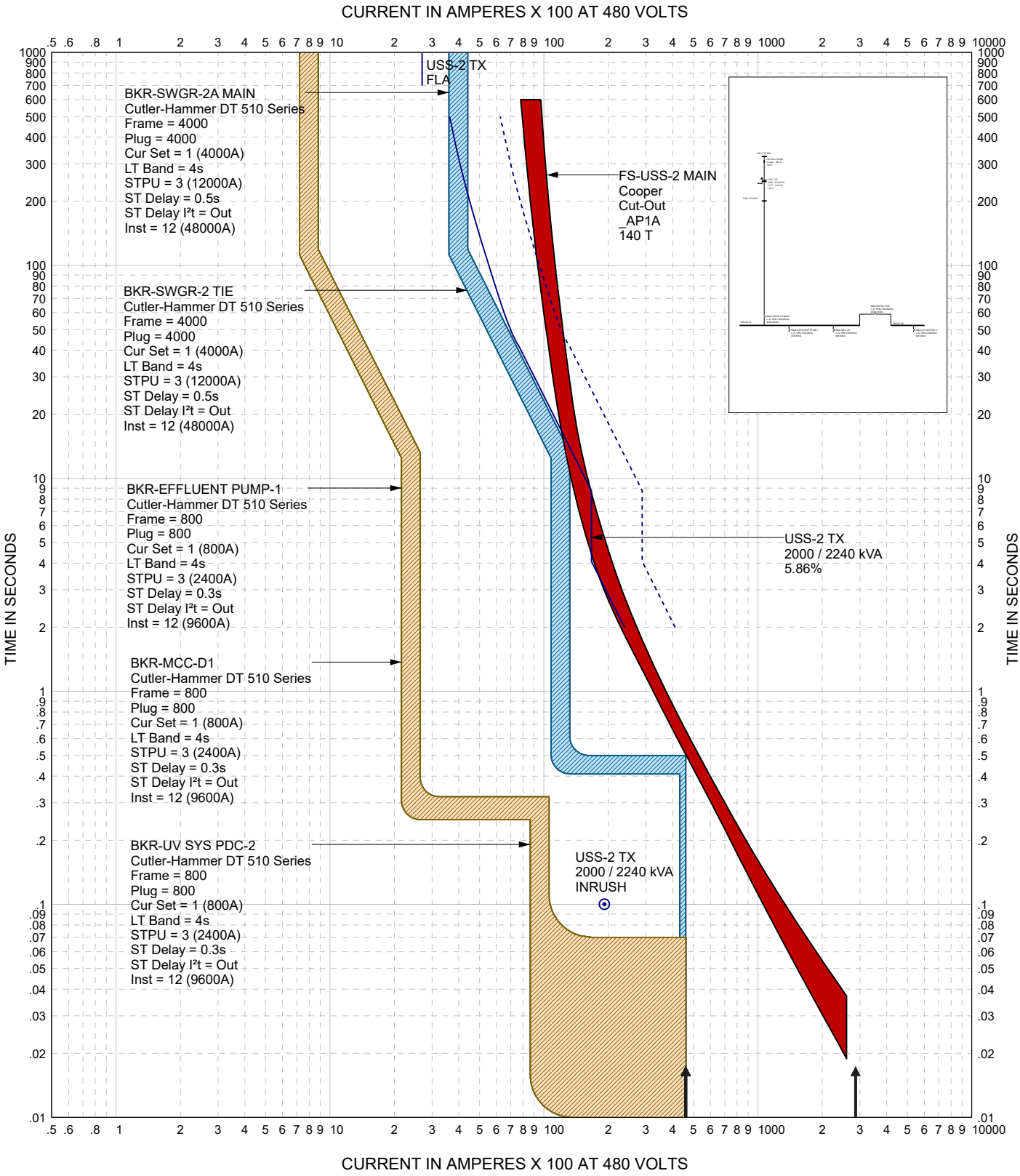
	SWGR-4B	Base Case	3 PHASE	1.00	0.480	Cutler-Hammer		ANSI-SYM	65.000	25.297	-61.1%	
SWGR-BL	BKR-AREATION BL-1	Base Case	3 PHASE	1.00	0.480	GE	SFLA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-AREATION BL-2	Base Case	3 PHASE	1.00	0.480	GE	SFLA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-AREATION BL-3	Base Case	3 PHASE	1.00	0.480	GE	SFLA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-AREATION BL-4	Base Case	3 PHASE	1.00	0.480	GE	SFLA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-MCC-1	Base Case	3 PHASE	1.00	0.480	GE	SELA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-MCC-B	Base Case	3 PHASE	1.00	0.480	GE	SELA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BKR-MCC-BS	Base Case	3 PHASE	1.00	0.480	GE	SELA 3P	ANSI-SYM	65.000	33.621	-48.3%	
	BRK-SWGR-BL MAIN	Base Case	3 PHASE	1.00	0.480	GE	SS-16	ANSI-SYM	65.000	33.621	-48.3%	
	SWGR-BL	Base Case	3 PHASE	1.00	0.480	GE		ANSI-SYM	65.000	33.288	-48.8%	
USS-1 TX PRI	FS-USS-1 MAIN	Base Case	3 PHASE	1.00	12.470	Cooper	_AP1A	ANSI-SYM	10.600	8.204	-22.6%	
USS-2 TX PRI	FS-USS-2 MAIN	Base Case	3 PHASE	1.00	12.470	Cooper	_AP1A	ANSI-SYM	10.600	8.248	-22.2%	
USS-3 TX PRI	FS-USS-3 MAIN	Base Case	3 PHASE	1.00	12.470	Cooper	_AP1A	ANSI-SYM	10.600	8.195	-22.7%	
USS-4 TX PRI	FS-USS-4 MAIN	Base Case	3 PHASE	1.00	12.470	Cooper	_AP1A	ANSI-SYM	10.600	8.080	-23.8%	

3.3 TIME CURRENT CHARACTERISTIC CURVES



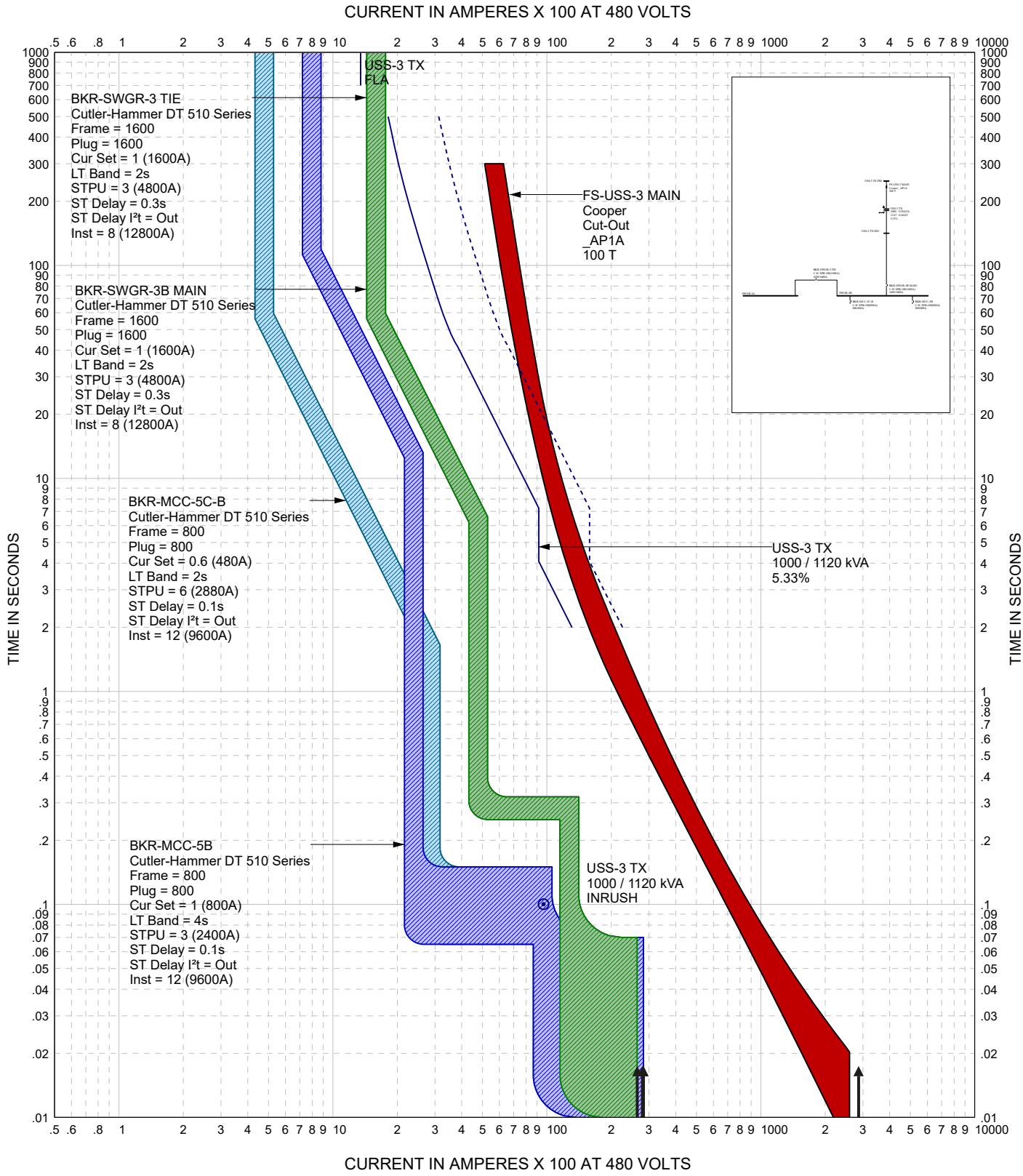
Rockwell Automation	***EasyPower*®** **TIME-CURRENT CURVES**	TCC-1
TCC plot with existing settings.		FAULT: SWGR-1 DATE: 3/10/2021 BY: REVISION: 1

SALMON CREEK-20210309



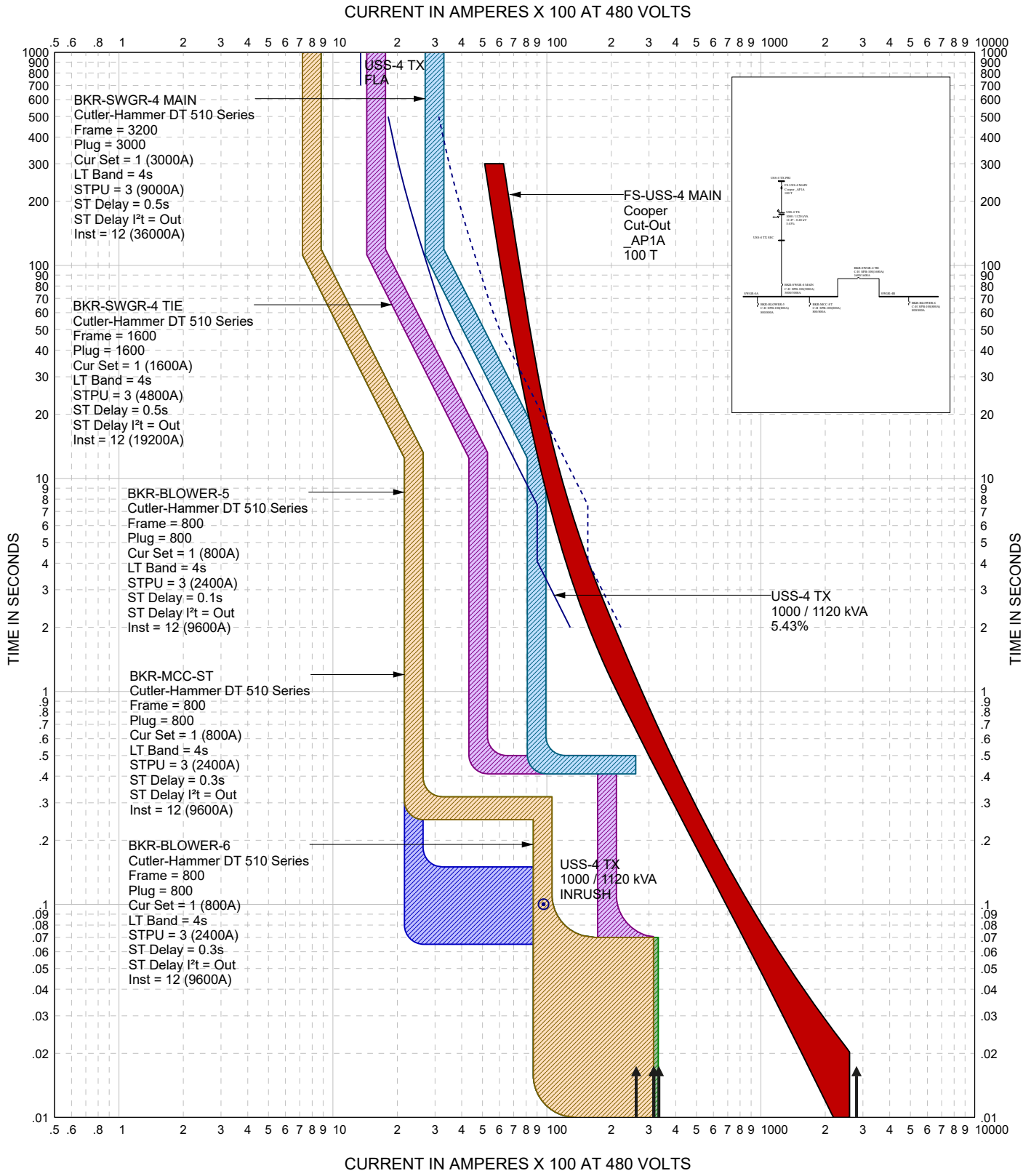
Rockwell Automation	***EasyPower*®** **TIME-CURRENT CURVES**	TCC-2
TCC plot with existing settings.		FAULT: SWGR-2 DATE: 3/10/2021 BY: REVISION: 1

SALMON CREEK-20210309



Rockwell Automation	***EasyPower*®** **TIME-CURRENT CURVES**	TCC-3
TCC plot with existing settings.		FAULT: SWGR-3 DATE: 3/10/2021 BY: REVISION: 1

SALMON CREEK-20210309



Rockwell Automation	***EasyPower*®** **TIME-CURRENT CURVES**	TCC-4
TCC plot with existing settings.		FAULT: SWGR-4 DATE: 3/10/2021 BY: REVISION: 1

SALMON CREEK-20210309

LSI settings of LV breakers

ID Name	On Bus	Base kV	Breaker Mfr	Breaker Type	Breaker Style	Cont Current (A)	SC Int kA	Trip	Trip Mfr	Trip Type	Trip Style	Sensor Frame	Plug/Tap/Trip	LTPU Setting	LTPU Mult	Trip (A)	LT Curve	LTD Band	STPU Setting	STPU Band	STPU I2T	STPU (A)	Inst Setting	Inst (A)	Comment
BKR-AREATION BL-1	SWGR-BL	0.48	GE	Spectra	SFLA 3P	250	65	SST	GE	Spectra RMS	MCCB SF	250	250	1		250		Fixed	Max	Fixed	In	1250	Max	2500	
BKR-AREATION BL-2	SWGR-BL	0.48	GE	Spectra	SFLA 3P	250	65	SST	GE	Spectra RMS	MCCB SF	250	250	1		250		Fixed	Max	Fixed	In	1250	Max	2500	
BKR-AREATION BL-3	SWGR-BL	0.48	GE	Spectra	SFLA 3P	250	65	SST	GE	Spectra RMS	MCCB SF	250	250	1		250		Fixed	Max	Fixed	In	1250	Max	2500	
BKR-AREATION BL-4	SWGR-BL	0.48	GE	Spectra	SFLA 3P	250	65	SST	GE	Spectra RMS	MCCB SF	250	250	1		250		Fixed	Max	Fixed	In	1250	Max	2500	
BKR-BLOWER-5*	SWGR-4	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.1s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-BLOWER-5 MAIN	37-MSO-205	0.48	Cutler Hammer	Series C	HMCP	600	65	SST	Cutler-Hammer	DT RMS 310	L-Frame LSI	600	600	1		600		Fixed	8	Inst	Out	4800	Fixed	5500	
BKR-BLOWER-6*	SWGR-4B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-BLOWER-6 MAIN	37-MSO-206	0.48	<None>	<None>	<None>		50	SST	Schneider	Easypact	ET2I	4000	4000	1		4000		2					3	12000	
BKR-BLOWER-7*	SWGR-4	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.1s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-BLOWER-7 MAIN	37-MSO-207	0.48	Cutler Hammer	Series C	HKD	400	65	TMGN	Cutler Hammer	Series C	HKD	400A(100-400AT)	400			400							10	4000	
BKR-BUS A-LP3	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (60AT)	60			60							Fixed		
BKR-BUS B-LP3	MCC-3 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (60AT)	60			60							Fixed		
BKR-CHILLER	MCC-4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (110AT)	110			110							Fixed		
BKR-DIGESTER PUMP1	MCC-5A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (125AT)	125			125							Fixed		
BKR-DIGESTER PUMP2	MCC-5A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (125AT)	125			125							Fixed		
BKR-EFFLUENT PUMP-1*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-EFFLUENT PUMP-2*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-EFFLUENT PUMP-3*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-EFFLUENT PUMP-4*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-GEN 1*	SWGR-1B	0.48	Cutler-Hammer	SPB	SPB-65	1600	65	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	0.8		1280		12s	6	0.5s	Out	7680	8	12800	Image not clear to obtain exact settings.
BKR-GEN-2*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(4000A)	4000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	4000	2400	1		2400		4s	3	0.5s	Out	7200	12	28800	Image not clear to obtain settings.
BKR-LP4A	PNL-PP4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BKR-LP4B	PNL-PP4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BKR-LP4C	PNL-PP4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BKR-LP4D	PNL-PP4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BKR-LP5B1 MAIN	PNL-LP5B1	0.208	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-LP5B2 MAIN	PNL-LP5B2	0.208	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-LP5B4 MAIN	PNL-LP5B4	0.208	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-LP6-A*	MCC-6 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (60AT)	60			60							Fixed		Image not clear to obtain exact settings.
BKR-LP6-B*	MCC-6 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (60AT)	60			60							Fixed		Image not clear to obtain exact settings.
BKR-MCC-1	SWGR-BL	0.48	GE	Spectra	SELA 3P	150	65	SST	GE	Spectra RMS	MCCB SE	150A (150AT)	150	1	1	150		Fixed	Max	Fixed	In	1110	Max	1991	
BKR-MCC-2 TIE	MCC-2 BUS A	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	
BKR-MCC-2-A MAIN*	MCC-2 BUS A	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	Breaker and Settings Estimated.
BKR-MCC-2-A-PP2A	MCC-2 BUS A	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-2-A-PP2B	MCC-2 BUS A	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-2-A-PP2C	MCC-2 BUS A	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-2-B MAIN	MCC-2 BUS B	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	
BKR-MCC-2-B-PP2A	MCC-2 BUS B	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-2-B-PP2B	MCC-2 BUS B	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-2-B-PP2C	MCC-2 BUS B	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	200			200							10	2000	
BKR-MCC-3-A MAIN	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HND	1200	65	SST	Cutler-Hammer	DT RMS 310	N-Frame	800	800	1		800		Fixed	3	I2T (Fixed)	Out	2400	Fixed	14000	
BKR-MCC-3-B MAIN	MCC-3 BUS B	0.48	Cutler Hammer	Series C	HND	1200	65	SST	Cutler-Hammer	DT RMS 310	N-Frame	800	800	1		800		Fixed	3	I2T (Fixed)	Out	2400	Fixed	14000	
BKR-MCC-4*	SWGR-1A	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-4 MAIN*	MCC-4	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	Breaker Estimated
BKR-MCC-5A*	SWGR-3B	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	4	0.1s	Out	3200	12	9600	Image not clear to obtain exact settings.
BKR-MCC-5A MAIN*	MCC-5A	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	Breaker and Settings estimated
BKR-MCC-5B*	SWGR-3B	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.1s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-5B MAIN*	MCC-5B	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	Breaker and Settings estimated
BKR-MCC-5C MAIN	MCC-5C	0.48	Cutler Hammer	Series C	HKD	400	65	SST	Cutler-Hammer	DT 310+	KD-LSG	400 A	400	400		400		2	4	Fixed	In	1600	Fixed	4400	
BKR-MCC-5C-A	SWGR-3A	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	0.6		480		2s	6	0.1s	Out	2880	12	9600	
BKR-MCC-5C-B	SWGR-3B	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	0.6		480		2s	6	0.1s	Out	2880	12	9600	
BKR-MCC-6 TIE*	MCC-6 BUS A	0.48	Cutler Hammer	Series C	MD	800	35	SST	Cutler-Hammer	DT RMS 310	MES - LS/LSG	800	800	1	1	800		Fixed	8x	Fixed	In	6400	Override	6800	Breaker and settings estimated
BKR-MCC-6-A*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-6-B*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-B	SWGR-BL	0.48	GE	Spectra	SELA 3P	150	65	SST	GE	Spectra RMS	MCCB SE	150A (150AT)	150	1	1	150		Fixed	Max	Fixed	In	1110	Max	1991	
BKR-MCC-B MAIN*	MCC-B	0.48	West	Series C	HLD	600	65	TMGN	West	Series C	HLD	600A(300-600AT)	400			400							8	3200	Setting is not available.
BKR-MCC-BS	SWGR-BL	0.48	GE	Spectra	SELA 3P	150	65	SST	GE	Spectra RMS	MCCB SE	150A (150AT)	150	1	1	150		Fixed	Max	Fixed	In	1110	Max	1991	
BKR-MCC-BS MAIN*	MCC-BS	0.48	West	Series C	HLD	600	65	TMGN	West	Series C	HLD	600A(300-600AT)	400			400							10	4000	Setting is not available.
BKR-MCC-D1*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-D1 MAIN*	MCC-D1	0.48	Allen-Bradley	140G	140G-M6X3	800	65	SST	Allen-Bradley	140G	M-Frame	600	600	1		600		3					5.5	3300	Image not available.
BKR-MCC-D1S*	MCC-D1	0.48	Allen-Bradley	140G	140G-J6H3	250	65	SST	Allen-Bradley	140G	J-Frame	250	250	1		250		3	5.5	0.1	Out	1375	10	2500	Image not available. Breaker and Settings estimated
BKR-MCC-D1S-B*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-D2 M.SHOP*	MCC-D1	0.48	Allen-Bradley	140G	140G-J6H3	250	65	SST	Allen-Bradley	140G	J-Frame	250	250	1		250		3	5.5	0.1	Out	1375	10	2500	Image not available. Breaker and Settings estimated
BKR-MCC-ST*	SWGR-4	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-ST MAIN	MCC-ST	0.48	Cutler Hammer	Series C	HLDB	600	65	SST	Cutler-Hammer	Seltronic	HLC	600A (Oid77)	600	1		600		Fixed	7	Fixed	Out	4200	Fixed	7200	
BKR-MCC-STS*	SWGR-4	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-MCC-STS MAIN	MCC-STS	0.48	Cutler Hammer	Series C	HLDB	600	65	SST	Cutler-Hammer	Seltronic	HLC	600A (Oid77)	600	1		600		Fixed	7	Fixed	Out	4200	Fixed	7200	
BKR-PORTABLE WELDER	MCC-4	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (110AT)	110			110							Fixed		
BKR-PP2A MAIN*	PP2A	0.48	Cutler Hammer	Series C	JD	250	35	TMGN	Cutler Hammer	Series C	JD	250A	200			200							10	2000	Breaker and settings estimated.
BKR-PP2B MAIN*	PP2B	0.48	Cutler Hammer	Series C	JD	250	35	TMGN	Cutler Hammer	Series C	JD	250A	200			200							10	2000	Breaker and settings estimated.
BKR-PP2C MAIN*	PP2C	0.48	Cutler Hammer	Series C	JD	250	35	TMGN	Cutler Hammer	Series C	JD	250A	200			200							10	2000	Breaker and settings estimated.
BKR-PP4	MCC-4	0.48	Cutler Hammer	Series C	HKD	400	65	TMGN	Cutler Hammer	Series C	HKD	400A(100-400AT)	400			400							10	4000	
BKR-PP4 MAIN	PNL-PP4	0.48	Cutler Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	Digitrip RMS	LVPCB	800	800	1		800		2s	3	0.1s	Out	2400	8	6400	
BKR-PP5A1	MCC-5A	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	250			250							10	2500	
BKR-PP5A1 MAIN	PNL-PP5A1	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (200AT)	200			200							Fixed		
BKR-PP5A2	MCC-5A	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	250			250							10	2500	
BKR-PP5A2 MAIN	PNL-PP5A2	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-PP5B1 MAIN	PNL-PP5B1	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-PP5B2 MAIN	PNL-PP5B2	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		
BKR-PPST	MCC-ST	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-1	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-2	MCC-3 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-3	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-4	MCC-3 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-5	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		
BKR-RAS PUMP-6	MCC-3 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (100AT)	100			100							Fixed		

LSI settings of LV breakers

BKR-SWGR-1A MAIN*	SWGR-1A	0.48	Cutler-Hammer	SPB	SPB-100(4000A)	4000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	4000	4000	1		4000		4s	3	0.5s	Out	12000	12	48000	Image not clear to obtain exact settings.
BKR-SWGR-1A TIE*	SWGR-1B	0.48	Cutler-Hammer	SPB	SPB-100(4000A)	4000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	4000	4000	1		4000		4s	3	0.5s	Out	12000	12	48000	Image not clear to obtain exact settings.
BKR-SWGR-2 TIE*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(4000A)	4000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	4000	4000	1		4000		4s	3	0.5s	Out	12000	12	48000	Image not clear to obtain settings.
BKR-SWGR-2A MAIN*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(4000A)	4000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	4000	4000	1		4000		4s	3	0.5s	Out	12000	12	48000	Image not clear to obtain settings.
BKR-SWGR-2B-3A*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		4s	3	0.3s	Out	4800	12	19200	Image not clear to obtain exact settings.
BKR-SWGR-2B-4B*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		4s	3	0.3s	Out	4800	12	19200	Image not clear to obtain exact settings.
BKR-SWGR-3 TIE	SWGR-3A	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		2s	3	0.3s	Out	4800	8	12800	
BKR-SWGR-3A-2B	SWGR-3A	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		2s	3	0.3s	Out	4800	12	19200	
BKR-SWGR-3B MAIN	SWGR-3B	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		2s	3	0.3s	Out	4800	8	12800	
BKR-SWGR-4 MAIN*	SWGR-4	0.48	Cutler-Hammer	SPB	SPB-100(3000A)	3000	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	3200	3000	1		3000		4s	3	0.5s	Out	9000	12	36000	Image not clear to obtain exact settings.
BKR-SWGR-4 TIE*	SWGR-4	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		4s	3	0.5s	Out	4800	12	19200	Image not clear to obtain exact settings.
BKR-SWGR-4B-2B*	SWGR-4B	0.48	Cutler-Hammer	SPB	SPB-100(1600A)	1600	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	1600	1600	1		1600		4s	4	0.3s	Out	6400	12	19200	Image not clear to obtain exact settings.
BKR-SWGR-BL*	SWGR-1A	0.48	Cutler-Hammer	SPB	SPB-65	1600	65	SST	Cutler-Hammer	DT 510	LVPCB	1600	1600	1		1600		4s	4	0.3s	Out	6400	12	19200	Setting not clearly visible.
BKR-UV SYS PDC-1*	SWGR-2A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-UV SYS PDC-2*	SWGR-2B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BKR-WATER PUMP-1*	MCC-6 BUS A	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		Image not clear to obtain exact settings.
BKR-WATER PUMP-2*	MCC-6 BUS B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (150AT)	150			150							Fixed		Image not clear to obtain exact settings.
BRK-ELEVATOR CONTR	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (70AT)	70			70							Fixed		
BRK-FILTRATE PUMP1	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (80AT)	80			80							Fixed		
BRK-FILTRATE PUMP2	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (80AT)	80			80							Fixed		
BRK-FILTRATE PUMP3	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (80AT)	80			80							Fixed		
BRK-LP5B1	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BRK-LP5B2	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (90AT)	90			90							Fixed		
BRK-LP5B4	MCC-5B	0.48	Cutler Hammer	Series C	HFD	225	65	TMGN	Cutler Hammer	Series C	HFD	225A (60AT)	60			60							Fixed		
BRK-MCC-2-BUS A*	SWGR-1A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BRK-MCC-2-BUS B*	SWGR-1B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BRK-MCC-3-BUS A*	SWGR-1A	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BRK-MCC-3-BUS B*	SWGR-1B	0.48	Cutler-Hammer	SPB	SPB-100(800A)	800	100	SST	Cutler-Hammer	DT 510 Series	LVPCB	800	800	1		800		4s	3	0.3s	Out	2400	12	9600	Image not clear to obtain exact settings.
BRK-PP5B1	MCC-5B	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	250			250							10	2500	
BRK-PP5B2	MCC-5B	0.48	Cutler Hammer	Series C	HJD	250	65	TMGN	Cutler Hammer	Series C	HJD	250A	250			250							10	2500	
BRK-SWGR-BL MAIN*	SWGR-BL	0.48	GE	Power Break II	SS-16	1600	65	SST	GE	Entelliguard TU	ICCB	1600	1200	1		1200	Thermal (I^2T)	C-3	4	4		4800	15	18000	LSIG Setting not available.
MCC-3 BUS TIE	MCC-3 BUS A	0.48	Cutler Hammer	Series C	HND	1200	65	SST	Cutler-Hammer	DT RMS 310	N-Frame	800	800	1		800		Fixed	3	I2T (Fixed)	Out	2400	Fixed	14000	

***Breaker make / Breaker settings assumed - Observation provided Comments column.**

3.4 ARC FLASH TABLE FOR MAXIMUM FAULT CURRENTS

Arc Fault Bus Name	Worst Case Scenario	Arc Fault Bus kV	Upstream Trip Device Name	Equip Type	Electrode Configuration	Electrode Gap (mm)	Bus Bolted Fault (kA)	Bus Arc Fault (kA)	Trip Time (sec)	Opening Time (sec)	Arc Time (sec)	Est Arc Flash Boundary (inches)	Working Distance (inches)	Incident Energy (cal/cm2)	Equipment Label Comment
ATS-LP4B	Base Case	0.48	BKR-LP4B	ATS	VCB	32	11.385	8.504	0.013	0	0.013	7.2	18	0.3	
CHILLER	Base Case	0.48	BKR-CHILLER	Other	VCBB	32	10.035	7.918	0.014	0	0.014	8.7	18	0.3	
FILTRATE RECY PUMP1	Base Case	0.48	BRK-FILTRATE PUMP1	VFD	VCBB	32	7.925	6.190	0.015	0	0.015	7.7	18	0.3	
FILTRATE RECY PUMP2	Base Case	0.48	BRK-FILTRATE PUMP2	VFD	VCBB	32	7.925	6.190	0.015	0	0.015	7.7	18	0.3	
FILTRATE RECY PUMP3	Base Case	0.48	BRK-FILTRATE PUMP3	VFD	VCBB	32	7.925	6.190	0.015	0	0.015	7.7	18	0.3	
MCC-D2 M.SHOP	Base Case	0.48	BKR-MCC-D1 MAIN	MCC	VCBB	25	21.620	17.722	0.005	0	0.005	7.8	18	0.3	
PORTABLE WELDER	Base Case	0.48	BKR-PORTABLE WELDER	Other	VCBB	32	9.086	7.138	0.014	0	0.014	8.2	18	0.3	
ATS-LP3	Base Case	0.48	BKR-BUS A-LP3	ATS	VCB	32	17.970	13.453	0.012	0	0.012	9.4	18	0.4	
ELEVATOR CONTROLLER	Base Case	0.48	BRK-ELEVATOR CONTR	Panel	VCBB	25	17.256	14.131	0.013	0	0.013	10.2	18	0.4	
PNL-PP5A1	Base Case	0.48	BKR-PP5A1	Panel	VCBB	25	19.569	16.050	0.011	0	0.011	10.1	18	0.4	
PNL-PP5A2	Base Case	0.48	BKR-PP5A2	Panel	VCBB	25	19.569	16.050	0.011	0	0.011	10.1	18	0.4	
PNL-PP5B1	Base Case	0.48	BRK-PP5B1	Panel	VCBB	25	19.149	15.704	0.011	0	0.011	10	18	0.4	
PNL-PP5B2	Base Case	0.48	BKR-PP5B2	Panel	VCBB	25	19.149	15.704	0.011	0	0.011	10	18	0.4	
PNL-PPST	Base Case	0.48	BKR-PPST	Panel	VCBB	25	14.530	11.841	0.013	0	0.013	9.2	18	0.4	
MTS-LP6	Base Case	0.48	BKR-LP6-A	ATS	VCB	32	19.940	14.873	0.012	0	0.012	9.9	18	0.5	
DIGESTER MIX PUMP1	Base Case	0.48	BKR-DIGESTER PUMP1	VFD	VCBB	32	18.456	14.876	0.013	0	0.013	12.3	18	0.6	
DIGESTER MIX PUMP2	Base Case	0.48	BKR-DIGESTER PUMP2	VFD	VCBB	32	18.456	14.876	0.013	0	0.013	12.3	18	0.6	
PNL-PP4	Base Case	0.48	BKR-MCC-4 MAIN	Panelboard	VCBB	25	19.971	16.380	0.012	0	0.012	12.2	18	0.6	
RAS PUMP-5	Base Case	0.48	BKR-RAS PUMP-5	VFD	VCBB	32	20.135	16.237	0.013	0	0.013	12.8	18	0.6	
RAS PUMP-6	Base Case	0.48	BKR-RAS PUMP-6	VFD	VCBB	32	19.521	15.741	0.013	0	0.013	12.6	18	0.6	
BLOWER-5	Base Case	0.48	BKR-BLOWER-5 MAIN	Other	VCBB	32	19.694	15.882	0.013	0	0.013	12.9	18	0.7	
BLOWER-6	Base Case	0.48	BKR-BLOWER-6 MAIN	Other	VCBB	32	20.498	16.529	0.013	0	0.013	13.2	18	0.7	
BLOWER-7	Base Case	0.48	BKR-BLOWER-7 MAIN	Other	VCBB	32	19.191	15.474	0.014	0	0.014	13.1	18	0.7	
RAS PUMP-1	Base Case	0.48	BKR-RAS PUMP-1	VFD	VCBB	32	20.995	16.927	0.012	0	0.012	13.1	18	0.7	
RAS PUMP-2	Base Case	0.48	BKR-RAS PUMP-2	VFD	VCBB	32	21.443	17.284	0.012	0	0.012	13.3	18	0.7	
RAS PUMP-3	Base Case	0.48	BKR-RAS PUMP-3	VFD	VCBB	32	22.372	18.019	0.012	0	0.012	13.6	18	0.7	
RAS PUMP-4	Base Case	0.48	BKR-RAS PUMP-4	VFD	VCBB	32	21.671	17.465	0.012	0	0.012	13.4	18	0.7	
WATER PUMP-1	Base Case	0.48	BKR-WATER PUMP-1	VFD	VCBB	32	24.996	20.053	0.012	0	0.012	14.4	18	0.8	
WATER PUMP-2	Base Case	0.48	BKR-WATER PUMP-2	VFD	VCBB	32	26.085	20.877	0.012	0	0.012	14.7	18	0.8	
MCC-1	Base Case	0.48	BKR-MCC-1	MCC	VCBB	25	23.005	18.832	0.021	0	0.021	18.2	18	1.2	
MCC-B	Base Case	0.48	BKR-MCC-B	MCC	VCBB	25	24.492	20.003	0.021	0	0.021	18.8	18	1.3	
AREATION BLOWER-2	Base Case	0.48	BKR-AREATION BL-2	VFD	VCBB	32	24.631	19.774	0.021	0	0.021	19.5	18	1.4	
MCC-BS	Base Case	0.48	BKR-MCC-BS	MCC	VCBB	25	26.774	21.755	0.021	0	0.021	19.8	18	1.4	
AREATION BLOWER-1	Base Case	0.48	BKR-AREATION BL-1	VFD	VCBB	32	27.038	21.587	0.021	0	0.021	20.5	18	1.5	
AREATION BLOWER-3	Base Case	0.48	BKR-AREATION BL-3	VFD	VCBB	32	27.703	22.077	0.021	0	0.021	20.8	18	1.6	
AREATION BLOWER-4	Base Case	0.48	BKR-AREATION BL-4	VFD	VCBB	32	27.703	22.077	0.021	0	0.021	20.8	18	1.6	
PNL-UV 55BRK0101	Base Case	0.48	BKR-UV SYS PDC-1	Panel	VCBB	25	4.084	3.176	0.321	0	0.321	23.6	18	2	
37-MSO-205	Base Case	0.48	BKR-BLOWER-5	Panel	VCBB	25	19.625	16.096	0.071	0	0.071	28.9	18	2.8	
PNL-LP5B1	Base Case	0.208	[Manual Time]	Panel	VCBB	25	1.927	0.897	0	0	2	29	18	2.8	MCC-5B, BRK-LP5B1
PNL-LP5B2	Base Case	0.208	[Manual Time]	Panel	VCBB	25	1.919	0.894	0	0	2	28.9	18	2.8	MCC-5B, BRK-LP5B2
PNL-LP6	Base Case	0.208	[Manual Time]	Panel	VCBB	25	1.933	0.900	0	0	2	29	18	2.8	MCC-6 BUS A, BKR-LP6-A
37-MSO-207	Base Case	0.48	BKR-BLOWER-7	Panel	VCBB	25	19.928	16.345	0.071	0	0.071	29.2	18	2.9	
ATS-MCC-5C	Generator	0.48	BKR-MCC-5C-A	ATS	VCB	32	9.664	6.295	0.15	0	0.15	35.4	18	3.5	
MCC-5A	Base Case	0.48	BKR-MCC-5A	MCC	VCBB	25	20.063	16.456	0.07	0	0.07	32.6	18	3.5	
MCC-5B	Base Case	0.48	BKR-MCC-5B	MCC	VCBB	25	20.039	16.436	0.07	0	0.07	32.5	18	3.5	
MCC-4	Base Case	0.48	BKR-MCC-4	MCC	VCBB	25	20.867	17.112	0.07	0	0.07	33.1	18	3.6	
MCC-ST	Base Case	0.48	BKR-MCC-ST	MCC	VCBB	25	20.742	17.010	0.07	0	0.07	33.6	18	3.7	
MCC-STS	Base Case	0.48	BKR-MCC-STS	MCC	VCBB	25	20.722	16.994	0.07	0	0.07	33.5	18	3.7	
MCC-D1	Base Case	0.48	BKR-MCC-D1	MCC	VCBB	25	22.353	18.312	0.07	0	0.07	34.5	18	3.9	
MCC-2 BUS A	Base Case	0.48	BRK-MCC-2-BUS A	MCC	VCBB	25	22.936	18.777	0.07	0	0.07	35.2	18	4	
MCC-5C	Generator	0.48	BKR-MCC-5C-A	MCC	VCBB	25	9.519	6.718	0.15	0	0.15	35.9	18	4.2	
PNL-LP4B	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.696	1.259	0	0	2	35.8	18	4.2	PNL-PP4, BKR-LP4B
PNL-LP4C	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.719	1.270	0	0	2	36	18	4.2	PNL-PP4, BKR-LP4C
PNL-LP4D	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.719	1.270	0	0	2	36	18	4.2	PNL-PP4, BKR-LP4D
PNL-LP4A	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.753	1.286	0	0	2	36.3	18	4.3	PNL-PP4, BKR-LP4A
PNL-LP3	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.831	1.323	0	0	2	36.9	18	4.4	MCC-3 BUS A, BKR-BUS A-LP3
PNL-LP5B4	Base Case	0.208	[Manual Time]	Panel	VCBB	25	2.808	1.312	0	0	2	36.7	18	4.4	MCC-5B, BRK-LP5B4
PNL-GEN-1	Generator	0.48	[Manual Time]	Panel	VCBB	25	1.666	1.287	0	0	2	37.9	18	4.6	Generator Internal OC Protection
MCC-3 BUS A	Base Case	0.48	BRK-MCC-3-BUS A	MCC	VCBB	25	27.694	22.444	0.07	0	0.07	39.3	18	4.9	
MTS-PP2A	Generator	0.48	[Manual Time]	ATS	VCB	32	1.603	1.091	0	0	2	44	18	5	MCC-2 BUS B, BKR-MCC-2-B-PP2A
MTS-PP2B	Generator	0.48	[Manual Time]	ATS	VCB	32	1.603	1.091	0	0	2	44	18	5	MCC-2 BUS B, BKR-MCC-2-B-PP2B
MTS-PP2C	Generator	0.48	[Manual Time]	ATS	VCB	32	1.603	1.091	0	0	2	44	18	5	MCC-2 BUS B, BKR-MCC-2-B-PP2C
PP2A	Generator	0.48	[Manual Time]	Panelboard	VCBB	25	1.585	1.224	0	0	2	41.3	18	5.4	MCC-2 BUS B, BKR-MCC-2-B-PP2A
PP2B	Generator	0.48	[Manual Time]	Panelboard	VCBB	25	1.585	1.224	0	0	2	41.3	18	5.4	MCC-2 BUS B, BKR-MCC-2-B-PP2B
PP2C	Generator	0.48	[Manual Time]	Panelboard	VCBB	25	1.585	1.224	0	0	2	41.3	18	5.4	MCC-2 BUS B, BKR-MCC-2-B-PP2C
MCC-2 BUS B	Generator	0.48	[Manual Time]	MCC	VCBB	25	1.620	1.251	0	0	2	41.9	18	5.5	SWGR-1B, BRK-MCC-2-BUS B
EFFLUENT PUMP-1	Base Case	0.48	BKR-EFFLUENT PUMP-1	VFD	VCBB	32	30.405	24.008	0.07	0	0.07	42.3	18	5.6	
EFFLUENT PUMP-3	Base Case	0.48	BKR-EFFLUENT PUMP-3	VFD	VCBB	32	30.405	24.008	0.07	0	0.07	42.3	18	5.6	
MCC-3 BUS B	Generator	0.48	[Manual Time]	MCC	VCBB	25	1.639	1.266	0	0	2	42.2	18	5.6	SWGR-1B, BRK-MCC-3-BUS B
37-MSO-206	Generator	0.48	BKR-SWGR-2B-4B	Panel	VCBB	25	9.493	6.699	0.32	0	0.32	43	18	5.8	
ATS-MCC-D1S	Generator	0.48	BKR-MCC-D1S-B	ATS	VCB	32	8.438	6.235	0.32	0	0.32	48	18	5.8	
MCC-6 BUS A	Base Case	0.48	BKR-MCC-6-B	MCC	VCBB	25	31.696	25.316	0.075	0	0.075	44.8	18	6.2	
MCC-6 BUS B	Base Case	0.48	BKR-MCC-6-B	MCC	VCBB	25	32.869	26.118	0.075	0	0.075	44.8	18	6.2	
SWGR-BL	Base Case	0.48	BKR-SWGR-BL	Switchgear	VCBB	32	32.319	25.319	0.077	0	0.077	46.2	18	6.6	
MCC-D1S	Generator	0.48	BKR-MCC-D1S-B	MCC	VCBB	25	8.310	6.613	0.32	0	0.32	46.9	18	6.8	
TX-LP5B2 SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	1.954	0.735	0	0	2	43	18	7	MCC-5B, BRK-LP5B2
TX-LP5B1 SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	1.962	0.738	0	0	2	43.1	18	7.1	MCC-5B, BRK-LP5B1
TX-LP6 SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	1.995	0.751	0	0	2	43.5	18	7.2	MCC-6 BUS A, BKR-LP6-A

EFFLUENT PUMP-2	Generator	0.48	BKR-EFFLUENT PUMP-2	VFD	VCBB	32	9.649	6.701	0.32	0	0.32	50.3	18	7.7	
EFFLUENT PUMP-4	Generator	0.48	BKR-EFFLUENT PUMP-4	VFD	VCBB	32	9.715	6.749	0.32	0	0.32	50.6	18	7.8	
PNL-UV 55BRK0102	Generator	0.48	[Manual Time]	Panel	VCBB	25	3.218	2.492	0	0	2	56.1	18	9.4	SWGR-2B, BKR-UV SYS PDC-2
SWGR-3A	Generator	0.48	BKR-SWGR-2B-3A	Switchgear	VCBB	32	9.959	7.856	0.32	0	0.32	56.1	18	9.4	
TX-LP4B SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.780	1.051	0	0	2	51.7	18	10.2	PNL-PP4, BKR-LP4B
TX-LP4C SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.804	1.060	0	0	2	51.9	18	10.3	PNL-PP4, BKR-LP4C
TX-LP4D SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.804	1.060	0	0	2	51.9	18	10.3	PNL-PP4, BKR-LP4D
TX-LP4A SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.839	1.073	0	0	2	52.3	18	10.5	PNL-PP4, BKR-LP4A
TX-LP5B4 SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.882	1.090	0	0	2	52.7	18	10.6	MCC-5B, BRK-LP5B4
TX-LP3 SEC	Base Case	0.208	[Manual Time]	Transformer Terminal	HCB	32	2.908	1.100	0	0	2	52.9	18	10.7	MCC-3 BUS A, BKR-BUS A-LP3
TX-UV SYS PDC-1SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	4.245	2.526	0	0	2	81	18	25.4	SWGR-2A, BKR-UV SYS PDC-1
TX-UV SYS PDC-2 SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	4.259	2.535	0	0	2	81.2	18	25.5	SWGR-2B, BKR-UV SYS PDC-2
SWGR-4B	Base Case	0.48	BKR-SWGR-4 MAIN	Switchgear	VCBB	32	19.938	16.078	0.5	0	0.5	99.7	18	26.5	
PNL-GEN-2	Generator	0.48	[Manual Time]	Panel	VCBB	25	10.015	8.035	0	0	2	119.3	18	36.7	Generator Internal OC Protection
SWGR-1B	Base Case	0.48	BKR-SWGR-1A MAIN	Switchgear	VCBB	32	34.693	26.874	0.5	0	0.5	134.8	18	45.8	
SWGR-2B	Generator	0.48	[Manual Time]	Switchgear	VCBB	32	9.987	7.879	0	0	2	137.8	18	47.6	Generator Internal OC Protection
PPSS-1	Base Case	12.47	[Manual Time]	Switchgear	VCBB	152	7.995	7.462	0	0	2	238.8	18	93.7	Unknown Upstream Protection Device
SWGR-4A	Base Case	0.48	[Manual Time]	Switchgear	VCBB	32	19.938	16.078	0	0	2	211.2	18	103.2	USS-4 TX PRI, FS-USS-4 MAIN
SWGR-3B	Base Case	0.48	[Manual Time]	Switchgear	VCBB	32	20.228	16.312	0	0	2	212.2	18	104.1	USS-3 TX PRI, FS-USS-3 MAIN
USS-2 TX PRI	Base Case	12.47	[Manual Time]	Transformer Terminal	HCB	152	7.981	7.170	0	0	2	288.6	18	121.5	Unknown Upstream Protection Device
USS-3 TX PRI	Base Case	12.47	[Manual Time]	Transformer Terminal	HCB	152	7.976	7.166	0	0	2	288.5	18	121.5	Unknown Upstream Protection Device
USS-4 TX PRI	Base Case	12.47	[Manual Time]	Transformer Terminal	HCB	152	7.976	7.166	0	0	2	288.5	18	121.5	Unknown Upstream Protection Device
USS-1 TX PRI	Base Case	12.47	[Manual Time]	Transformer Terminal	HCB	152	7.986	7.174	0	0	2	288.7	18	121.6	Unknown Upstream Protection Device
USS-4 TX SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	20.012	14.273	0	0	2	198.1	18	156.2	USS-4 TX PRI, FS-USS-4 MAIN
USS-3 TX SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	20.351	14.508	0	0	2	199.1	18	157.8	USS-3 TX PRI, FS-USS-3 MAIN
SWGR-2A	Base Case	0.48	[Manual Time]	Switchgear	VCBB	32	34.051	26.461	0	0	2	286.8	18	179.5	USS-2 TX PRI, FS-USS-2 MAIN
SWGR-1A	Base Case	0.48	[Manual Time]	Switchgear	VCBB	32	34.693	26.874	0	0	2	289.7	18	182.8	USS-1 TX PRI, FS-USS-1 MAIN
USS-2 TX SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	34.267	23.193	0	0	2	253.3	18	257.2	USS-2 TX PRI, FS-USS-2 MAIN
USS-1 TX SEC	Base Case	0.48	[Manual Time]	Transformer Terminal	HCB	32	34.917	23.544	0	0	2	255.3	18	261.4	USS-1 TX PRI, FS-USS-1 MAIN

3.5 ONE-LINES – INCIDENT ENERGY AND HAZARD BOUNDARY DATA

SERVICE UTIL

Service Utility 3ph and SLG Fault current data Not Available - Engineering Best Guess.

SERVICE UTIL

239.9° AFB
93.7 cal / cm² @ 18"
PNL-1

CB-PPSS-1 MAIN

CB-PPSS-1 L1

CB-PPSS-1 L2

USS-1 DISC-1

USS-1 DISC-2

268.7° AFB
323.4 cal / cm² @ 18"
USS-1 TX PRI

PS-USS-1 MAIN

USS-1 TX

253.3° AFB
293.4 cal / cm² @ 18"
USS-1 TX SEC

BKR-SWGR-1A MAIN

USS-2 DISC-1

USS-2 DISC-2

268.6° AFB
323.1 cal / cm² @ 18"
USS-2 TX PRI

USS-3 DISC-1

USS-3 DISC-2

288.5° AFB
323.5 cal / cm² @ 18"
USS-3 TX PRI

PS-USS-3 MAIN

USS-4 DISC-1

USS-4 DISC-2

288.5° AFB
323.5 cal / cm² @ 18"
USS-4 TX PRI

PS-USS-4 MAIN

USS-2 TX

253.5° AFB
257.2 cal / cm² @ 18"
USS-2 TX SEC

USS-3 TX

199.1° AFB
157.8 cal / cm² @ 18"
USS-3 TX SEC

USS-4 TX

199.1° AFB
156.2 cal / cm² @ 18"
USS-4 TX SEC

GEN-1

37.7° AFB
4.6 cal / cm² @ 18"
PNL-GEN-1

BKR-GEN-1

BKR-SWGR-1A TIE

134.8° AFB
45.9 cal / cm² @ 18"
SWGR-1B

BKR-SWGR-4 TIE

99.7° AFB
28.6 cal / cm² @ 18"
SWGR-4B

BKR-SWGR-4B-2B

BKR-SWGR-4A MAIN

BKR-SWGR-4B MAIN

BKR-BLOWER-5

BKR-BLOWER-7

BKR-BLOWER-8

BKR-BLOWER-6

BKR-MCC-ST

BKR-MCC-ST MAIN

BKR-MCC-STS

BKR-MCC-STS MAIN

BKR-PPFT

BKR-MCC-ST MAIN

BKR-MCC-STS MAIN

BKR-MCC-4

BKR-MCC-4 MAIN

BKR-SWGR-8L

BKR-SWGR-8L MAIN

BKR-AERATION BL-3

BKR-AERATION BL-1

BKR-AERATION BL-2

BKR-AERATION BL-4

BKR-MCC-8S

BKR-MCC-8

BKR-MCC-1

BKR-MCC-8S MAIN

BKR-MCC-8 MAIN

BKR-PPH

BKR-PPH MAIN

BKR-LPAA

BKR-LPAC

BKR-LPAD

BKR-LPAB

BKR-MCC-2-BUS A

BKR-MCC-2-BUS B

BKR-MCC-2-A MAIN

BKR-MCC-2-A-PPTA

BKR-MCC-2-A-PPTB

BKR-MCC-2-A-PPTC

BKR-MCC-2-B-PPTC

BKR-MCC-2-B-PPTB

BKR-MCC-2-B MAIN

BKR-MCC-2-B-PPTA

BKR-MCC-3-BUS A

BKR-MCC-3-BUS B

BKR-MCC-3-A MAIN

BKR-MCC-3-B MAIN

BKR-RAS PUMP-1

BKR-RAS PUMP-3

BKR-RAS PUMP-5

BKR-BUS A-LP3

BKR-BUS B-LP3

BKR-RAS PUMP-2

BKR-RAS PUMP-4

BKR-RAS PUMP-6

BKR-SWGR-2 TIE

BKR-SWGR-2B-3A

BKR-SWGR-3A-2B

BKR-SWGR-3 TIE

BKR-GEN-2

BKR-SWGR-2B-4B

BKR-SWGR-3A

BKR-SWGR-3B MAIN

BKR-MCC-5A

BKR-MCC-5B

BKR-EFFLUENT PUMP-1

BKR-EFFLUENT PUMP-3

BKR-UV SYS PDC-1

BKR-MCC-D1

BKR-MCC-4-A

BKR-MCC-4-B

BKR-MCC-D1/5-B

BKR-UV SYS PDC-2

BKR-EFFLUENT PUMP-2

BKR-EFFLUENT PUMP-4

BKR-MCC-5C-A

BKR-MCC-5C-B

BKR-MCC-5A MAIN

BKR-MCC-D1 MAIN

BKR-MCC-D2 M SHOP

BKR-WATER PUMP-1

BKR-LPA-A

BKR-LPA-B

BKR-WATER PUMP-2

BKR-MCC-5C MAIN

BKR-MCC-5B MAIN

BKR-LPB1

BKR-LPB2

BKR-LPB4

BKR-PPB1

BKR-PPB2

BKR-FILTRATE PUMP1

BKR-FILTRATE PUMP2

BKR-FILTRATE PUMP3

BKR-ELEVATOR CONTR

BKR-DIGESTER PUMP1

BKR-DIGESTER PUMP2

BKR-PPSA2

BKR-PPSA1

BKR-PPSA2 MAIN

BKR-PPSA1 MAIN

BKR-LPB1 MAIN

BKR-LPB2 MAIN

BKR-LPB4 MAIN

BKR-PPB1 MAIN

BKR-PPB2 MAIN

MCC-2-A LUMPED MTR-1

MCC-2-B LUMPED MTR-1

MCC-4 LUMPED MOTOR

MCC-3 LUMPED MTR-1

MCC-3 LUMPED MTR-2

MCC-3-B LUMPED MTR-2

MCC-3-B LUMPED MTR-1

MCC-ST LUMPED MTR

MCC-5A LUMPED MTR

MCC-D1 LUMPED MTR-1

MCC-D1 LUMPED MTR-2

MCC-5C LUMPED MTR

CHILLER
8.7° AFB
0.3 cal / cm² @ 18"

PORTABLE WELDER
8.2° AFB
0.3 cal / cm² @ 18"

MCC-4
11.1° AFB
3.6 cal / cm² @ 18"

MCC-D1
7.4° AFB
0.3 cal / cm² @ 18"

MCC-D2 M SHOP
7.8° AFB
0.3 cal / cm² @ 18"

MCC-D2
7.7° AFB
0.3 cal / cm² @ 18"

MCC-D3
7.4° AFB
0.3 cal / cm² @ 18"

MCC-D3/5
7.9° AFB
0.3 cal / cm² @ 18"

MCC-5A
12.4° AFB
3.5 cal / cm² @ 18"

MCC-5B
12.4° AFB
3.5 cal / cm² @ 18"

MCC-5C
12.4° AFB
3.5 cal / cm² @ 18"

MCC-ST
11.6° AFB
3.3 cal / cm² @ 18"

MCC-STS
11.7° AFB
3.3 cal / cm² @ 18"

MCC-8
11.7° AFB
3.2 cal / cm² @ 18"

MCC-8S
11.8° AFB
3.2 cal / cm² @ 18"

MCC-1
11.7° AFB
3.2 cal / cm² @ 18"

MCC-5C
36.8° AFB
3.2 cal / cm² @ 18"

MCC-5B
32.7° AFB
3.1 cal / cm² @ 18"

MCC-5B MAIN

BKR-AERATION BLOWER-3

BKR-AERATION BLOWER-1

BKR-AERATION BLOWER-2

BKR-AERATION BLOWER-4

AERATION BLOWER-3

AERATION BLOWER-1

AERATION BLOWER-2

AERATION BLOWER-4

BLOWER-5

BLOWER-7

BLOWER-8

BLOWER-6

DIGESTER MIX PUMP1

DIGESTER MIX PUMP2

RAS PUMP-1

RAS PUMP-3

RAS PUMP-5

RAS PUMP-2

RAS PUMP-4

RAS PUMP-6

FILTRATE RECY PUMP1

FILTRATE RECY PUMP2

FILTRATE RECY PUMP3

WATER PUMP-1

WATER PUMP-2

PNL-PPSA2
10.1° AFB
0.6 cal / cm² @ 18"

PNL-PPSA1
10.1° AFB
0.6 cal / cm² @ 18"

PNL-PPB1
10° AFB
0.4 cal / cm² @ 18"

PNL-PPB2
10° AFB
0.4 cal / cm² @ 18"

PNL-LPB1
2.9° AFB
2.8 cal / cm² @ 18"

PNL-LPB2
16.9° AFB
2.8 cal / cm² @ 18"

PNL-LPB4
16.7° AFB
4.4 cal / cm² @ 18"

PNL-PPFST
9.2° AFB
0.4 cal / cm² @ 18"

ELEVATOR CONTROLLER
10.3° AFB
0.4 cal / cm² @ 18"

PNL-LPA
30.3° AFB
4.4 cal / cm² @ 18"

PNL-LPC
30° AFB
4.2 cal / cm² @ 18"

PNL-LPD
30° AFB
4.1 cal / cm² @ 18"

PNL-LPH
11.5° AFB
4.2 cal / cm² @ 18"

PNL-LPS
2.9° AFB
2.8 cal / cm² @ 18"

PNL-GEN-2
10.9° AFB
36.3 cal / cm² @ 18"

PNL-LPT
36.9° AFB
4.4 cal / cm² @ 18"

PNL-UV TSHRK0101
23.6° AFB
2.0 cal / cm² @ 18"

PNL-UV TSHRK0102
23.5° AFB
2.0 cal / cm² @ 18"

TX-LPA

TX-LPC

TX-LPD

TX-LPH

TX-LPS

TX-LPT

TX-LPA1
12.7° AFB
10.5 cal / cm² @ 18"

TX-LPA2
12.7° AFB
10.5 cal / cm² @ 18"

TX-LPC
51.9° AFB
10.5 cal / cm² @ 18"

TX-LPD
51.9° AFB
10.5 cal / cm² @ 18"

TX-LPH
51.7° AFB
10.2 cal / cm² @ 18"

TX-LPS
43.5° AFB
7.2 cal / cm² @ 18"

TX-LPT
52.9° AFB
10.7 cal / cm² @ 18"

TX-LPT1
52.9° AFB
10.7 cal / cm² @ 18"

TX-LPS1
43.5° AFB
7.2 cal / cm² @ 18"

TX-LPS2
43.5° AFB
7.2 cal / cm² @ 18"

TX-LPH1
51.7° AFB
10.2 cal / cm² @ 18"

TX-LPH2
51.7° AFB
10.2 cal / cm² @ 18"

TX-LPH4
51.7° AFB
10.2 cal / cm² @ 18"

TX-LPA1

TX-LPA2

TX-LPC

TX-LPD

TX-LPH

TX-LPS

TX-LPT

TX-LPS1

TX-LPS2

TX-LPH1

TX-LPH2

TX-LPH4

Rockwell Automation

Salmon Creek WWTP Clark County
Vancouver, Washington

Arc Flash Study - March 2021
Incident Energy - Base case

Printed by EasyPower

3.6 ONE-LINES – ANSI SHORT CIRCUIT DATA

SERVICE UTIL

Service Utility 3ph and SLG Fault contribution data Not Available - Engineering Best Guess.

CB-PPSS-1 MAIN

CB-PPSS-1 L1

CB-PPSS-1 L2

PPSS-1

USS-1 DISC-1

USS-1 DISC-2

USS-1 TX PRI

FA-USS-1 MAIN

USS-1 TX

USS-1 TX SEC

BKR-SWGR-1A MAIN

SWGR-1A

BKR-MCC-4

BKR-MCC-4 MAIN

MCC-4

MCC-4 LUMPED MOTOR

BKR-CHILLER

CHILLER

BKR-PORTABLE WELDER

PORTABLE WELDER

BKR-PP4

BKR-PP4 MAIN

PNL-PP4

BKR-LPNA

BKR-LPNC

BKR-LPND

BKR-LPNB

TX-LPNA

TX-LPNC

TX-LPND

ATS-LPNB

TX-LPNB

TX-LPNA SEC

TX-LPNC SEC

TX-LPND SEC

TX-LPNB SEC

PNL-LPNA

PNL-LPNC

PNL-LPND

PNL-LPNB

BKR-SWGR-8L

SWGR-8L

BKR-SWGR-8L MAIN

BKR-AERATION BL-1

BKR-AERATION BL-3

BKR-AERATION BL-2

BKR-AERATION BL-4

AERATION BLOWER-3

AERATION BLOWER-1

AERATION BLOWER-2

AERATION BLOWER-4

BKR-MCC-8S

BKR-MCC-8S MAIN

MCC-8S

BKR-MCC-8

BKR-MCC-8 MAIN

MCC-8

BKR-MCC-1

MCC-1

BKR-SWGR-1A TIE

BKR-SWGR-1B

BKR-GEN-1

PNL-GEN-1

GEN-1

BRK-MCC-1-BUS-A

BRK-MCC-1-BUS-B

BKR-MCC-2-BUS-A

BKR-MCC-2-A MAIN

BKR-MCC-2-B MAIN

BKR-MCC-2 TIE

MCC-2 BUS-A

MCC-2 BUS-B

BKR-MCC-2-A-PP3A

BKR-MCC-2-A-PP2B

BKR-MCC-2-A-PP2C

BKR-MCC-2-B-PP2C

BKR-MCC-2-B-PP2B

BKR-MCC-2-B-PP3A

MCC-2-A LUMPED MTR-1

MCC-2-B LUMPED MTR-1

MTS-PP3A

MTS-PP2B

MTS-PP2C

BKR-PP3A MAIN

BKR-PP2B MAIN

BKR-PP2C MAIN

PP3A

PP2B

PP2C

BKR-MCC-3-A MAIN

BKR-MCC-3-B MAIN

MCC-3 BUS TIE

MCC-3 BUS-A

MCC-3 BUS-B

BKR-RAS PUMP-1

BKR-RAS PUMP-3

BKR-RAS PUMP-5

BKR-BUS A-LP3

BKR-BUS B-LP3

BKR-RAS PUMP-2

BKR-RAS PUMP-4

BKR-RAS PUMP-6

MCC-3-A LUMPED MTR-1

MCC-3-A LUMPED MTR-2

MCC-3-B LUMPED MTR-2

MCC-3-B LUMPED MTR-1

RAS PUMP-1

RAS PUMP-3

RAS PUMP-5

RAS PUMP-2

RAS PUMP-4

RAS PUMP-6

ATS-LP3

TX-LP3

TX-LP3 SEC

PNL-LP3

USS-2 DISC-1

USS-2 DISC-2

USS-2 TX PRI

FA-USS-2 MAIN

USS-2 TX

USS-2 TX SEC

USS-3 DISC-1

USS-3 DISC-2

USS-3 TX PRI

FA-USS-3 MAIN

USS-3 TX

USS-3 TX SEC

USS-4 DISC-1

USS-4 DISC-2

USS-4 TX PRI

FA-USS-4 MAIN

USS-4 TX

USS-4 TX SEC

BKR-SWGR-4 MAIN

SWGR-4A

SWGR-4B

BKR-SWGR-4 TIE

BKR-BLOWER-5

BKR-BLOWER-7

BKR-BLOWER-5 MAIN

BKR-BLOWER-7 MAIN

37-MSO-207

37-MSO-205

BLOWER-5

BLOWER-7

BKR-MCC-ST

BKR-MCC-ST MAIN

MCC-ST

MCC-ST LUMPED MTR

BKR-PPST

PNL-PPST

BKR-MCC-STS

BKR-MCC-STS MAIN

MCC-STS

BKR-BLOWER-6

BKR-BLOWER-6 MAIN

BKR-SWGR-4B-2B

37-MSO-206

BLOWER-6

BKR-SWGR-2A MAIN

SWGR-2A

BKR-EFFLUENT PUMP-1

BKR-EFFLUENT PUMP-3

BKR-UV SYS PDC-1

BKR-MCC-D1

EFFLUENT PUMP-1

EFFLUENT PUMP-3

TX-UV SYS PDC-1

TX-UV SYS PDC-1SEC

PNL-UV 3308BK0101

BKR-MCC-D2 M.SHOP

MCC-D2 M.SHOP

BKR-MCC-D1 MAIN

MCC-D1

MCC-D1 LUMPED MTR-1

MCC-D1 LUMPED MTR-2

BKR-MCC-D1S

ATS-MCC-D1S

MCC-D1S

BKR-SWGR-2 TIE

BKR-SWGR-2B

BKR-MCC-A-A

BKR-MCC-A-B

BKR-MCC-D1S-B

MCC-A BUS-A

MCC-A BUS-B

BKR-WATER PUMP-1

BKR-LPS-A

BKR-LPS-B

BKR-WATER PUMP-2

WATER PUMP-1

WATER PUMP-2

ATS-LPS

TX-LPS

TX-LPS SEC

PNL-LPS

BKR-GEN-2

PNL-GEN-2

BKR-SWGR-2B-4B

BKR-SWGR-3A-2B

BKR-EFFLUENT PUMP-2

BKR-EFFLUENT PUMP-4

EFFLUENT PUMP-2

EFFLUENT PUMP-4

BKR-UV SYS PDC-2

TX-UV SYS PDC-2

TX-UV SYS PDC-2 SEC

PNL-UV 3308BK0102

SWGR-3A

BKR-SWGR-3 TIE

BKR-SWGR-3B

BKR-MCC-3C-A

BKR-MCC-3C-B

ATS-MCC-3C

BKR-MCC-3C MAIN

MCC-3C

MCC-3C LUMPED MTR

BKR-SWGR-3B MAIN

BKR-MCC-5A

BKR-MCC-5B

BKR-MCC-5A MAIN

MCC-5A

BKR-PPSA2

BKR-PPSA1

BKR-DIGESTER PUMP1

BKR-DIGESTER PUMP2

BKR-PPSA2 MAIN

BKR-PPSA1 MAIN

PNL-PPSA2

PNL-PPSA1

DIGESTER MIX PUMP1

DIGESTER MIX PUMP2

DIGESTER MIX PUMP1

DIGESTER MIX PUMP2

MCC-5A LUMPED MTR

BKR-MCC-5B MAIN

MCC-5B

BRK-LPT01

BRK-LPT02

BRK-LPT04

BRK-PPT01

BRK-PPT02

BRK-FILTRATE PUMP1

BRK-FILTRATE PUMP2

BRK-FILTRATE PUMP3

BRK-ELEVATOR CONTR

TX-LPT01

TX-LPT02

TX-LPT04

BKR-PPT01 MAIN

BKR-PPT02 MAIN

FILTRATE RECY PUMP1

FILTRATE RECY PUMP2

FILTRATE RECY PUMP3

ELEVATOR CONTROLLER

TX-LPT01 SEC

TX-LPT02 SEC

TX-LPT04 SEC

BKR-LPT01 MAIN

BKR-LPT02 MAIN

BKR-LPT04 MAIN

PNL-LPT01

PNL-LPT02

PNL-LPT04

PNL-PPT01

PNL-PPT02

FILTRATE RECY PUMP1

FILTRATE RECY PUMP2

FILTRATE RECY PUMP3

Rockwell Automation

Salmon Creek WWTP Clark County

Vancouver, Washington

Arc Flash Study - March 2021

ANSI Short Circuit - Base case

Printed by EasyPower

3.7 ONE-LINES – INPUT DATA

SERVICE UTIL
SUS
8.5 kA 3Φ
8.5 kA SG
13.8 kV

Service Utility 3ph and SLG Fault contribution data Not Available - Engineering Best Guess.

SERVICE UTIL
13.8 kV, 3Ø, 3 wire(s)
CB-PPSS-1 MAIN
PPSS-1
CB-PPSS-1 L1
CB-PPSS-1 L2
13.8 kV, 3Ø, 3 wire(s)
13.8 kV, 3Ø, 3 wire(s)
USS-1 DISC-1
USS-1 DISC-2
USS-1 TX PRI
FA-USS-1 MAIN Coupar_APLA 100 T
USS-1 TX
2000 - 2240 kVA
12.47 - 0.48 kV
5.77%
USS-1 TX SEC
0.48 kV
0.48 kV, 3Ø, 4 wire(s)
SWGR-1A
BKR-SWGR-1A MAIN
C-H SPS-1063000A)
4000/4000A

USS-2 DISC-1
USS-2 DISC-2
USS-2 TX PRI
FA-USS-2 MAIN Coupar_APLA 100 T
USS-2 TX
2000 - 2240 kVA
12.47 - 0.48 kV
5.90%
USS-2 TX SEC
0.48 kV

USS-3 DISC-1
USS-3 DISC-2
USS-3 TX PRI
FA-USS-3 MAIN Coupar_APLA 100 T
USS-3 TX
1000 - 1120 kVA
12.47 - 0.48 kV
5.17%
USS-3 TX SEC
0.48 kV

USS-4 DISC-1
USS-4 DISC-2
USS-4 TX PRI
FA-USS-4 MAIN Coupar_APLA 100 T
USS-4 TX
1000 - 1120 kVA
12.47 - 0.48 kV
5.43%
USS-4 TX SEC
0.48 kV
0.48 kV, 3Ø, 4 wire(s)
BKR-SWGR-4 MAIN
C-H SPS-1063000A)
3000/3000A
SWGR-4A

BKR-SWGR-4 TIE
C-H SPS-1063000A)
4000/4000A
SWGR-4B

GEN-1
1750 kVA
12%
10%
0.8 PF
PNL-GEN
0.48 kV
0.48 kV, 3Ø, 4 wire(s)
BKR-GEN 1
C-H SPS-65
1600/1200A

BKR-SWGR-1A TIE
C-H SPS-1063000A)
4000/4000A
SWGR-1B

BKR-SWGR-1B MAIN
C-H SPS-1063000A)
4000/4000A
SWGR-1B

BKR-MCC-4
C-H SPS-1063000A)
800/800A
2-1 C/#8 bond
CU, 2Ø, [Conduit]
BKR-MCC-4 MAIN
C-H MD
800/800A
24.75 HP
Induction
94.7%
MCC-4 LUMPED MOTOR
BKR-CHILLER
C-H HFD
225/110A
2-1 C/#1/0
CU, 3Ø, [Conduit]
CHILLER
BKR-PORTABLE WELDER
C-H HFD
225/110A
2-1 C/#1/0
CU, 3Ø, [Conduit]
PORTABLE WELDER
BKR-PP4
C-H HKD
400/400A
2-1 C/#2
CU, 3Ø, [Conduit]
BKR-PP4 MAIN
C-H SPS-1063000A)
800/800A
PNL-PP4
BKR-LPAA
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3Ø, [Conduit]
TX-LPAA
75 kVA
0.48 - 0.208 kV
4%
TX-LPAA SEC
0.208 kV
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
PNL-LPAA
BKR-LPAC
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3Ø, [Conduit]
TX-LPAC
75 kVA
0.48 - 0.208 kV
4%
TX-LPAC SEC
0.208 kV
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
PNL-LPAC
BKR-LPAD
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3Ø, [Conduit]
TX-LPAD
75 kVA
0.48 - 0.208 kV
4%
TX-LPAD SEC
0.208 kV
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
PNL-LPAD
BKR-LPAB
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3Ø, [Conduit]
ATS-LPAB
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
TX-LPAB
45 kVA
0.48 - 0.208 kV
4%
TX-LPAB SEC
0.208 kV
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
PNL-LPAB

BKR-SWGR-3L
C-H SPS-65
1600/1600A
2-4 C/#8 bond
CU, 4C, [Conduit]
BKR-SWGR-3L MAIN
GE SLSA
1600/1200A
SWGR-3L
BKR-AERATION 3L-3
GE SFLA 3P
250/250A
2-1 C/#8 bond
CU, 3C, [Conduit]
AERATION BLOWER-3
150 HP
Induction
94.7%
AERATION BLOWER-3
BKR-AERATION 3L-1
GE SFLA 3P
250/250A
2-1 C/#8 bond
CU, 3C, [Conduit]
AERATION BLOWER-1
150 HP
Induction
94.7%
AERATION BLOWER-1
BKR-AERATION 3L-2
GE SFLA 3P
250/250A
2-1 C/#8 bond
CU, 3C, [Conduit]
AERATION BLOWER-2
150 HP
Induction
94.7%
AERATION BLOWER-2
BKR-AERATION 3L-4
GE SFLA 3P
250/250A
2-1 C/#8 bond
CU, 3C, [Conduit]
AERATION BLOWER-4
150 HP
Induction
94.7%
AERATION BLOWER-4
BKR-MCC-3S
GE SELA 3P
150/150A
2-1 C/#3 AWG
CU, 3C, [Conduit]
MCC-3PS
BKR-MCC-3S MAIN
Wire HLD
600/600A
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-MCC-8
GE SELA 3P
150/150A
2-1 C/#3 AWG
CU, 3C, [Conduit]
MCC-8R
BKR-MCC-1
GE SELA 3P
150/150A
2-1 C/#3 AWG
CU, 3C, [Conduit]
MCC-1
BKR-MCC-3-HUS-A
C-H SPS-1063000A)
800/800A
BKR-MCC-2-HUS-A
C-H SPS-1063000A)
800/800A
BKR-MCC-2-HUS-B
C-H SPS-1063000A)
800/800A
BKR-MCC-3-HUS-B
C-H SPS-1063000A)
800/800A
MCC-2 BUS A
MCC-2 BUS B
BKR-MCC-2-A-PP2A
C-H HJD
250/200A
BKR-MCC-2-A-PP2B
C-H HJD
250/200A
BKR-MCC-2-A-PP2C
C-H HJD
250/200A
BKR-MCC-2-B-PP2C
C-H HJD
250/200A
BKR-MCC-2-B-PP2B
C-H HJD
250/200A
BKR-MCC-2-B-PP2A
C-H HJD
250/200A
BKR-MCC-2-A MAIN
C-H MD
800/600A
BKR-MCC-2-B MAIN
C-H MD
800/600A
BKR-MCC-2 TIE
C-H MD
800/600A
99.3 HP
Induction
25%
MCC-2-A LUMPED MTR-1
64 HP
Induction
25%
MCC-2-B LUMPED MTR-1
1-1 C/#3 AWG
CU, 4C, [Conduit]
MTS-PP2A
1-1 C/#3 AWG
CU, 4C, [Conduit]
MTS-PP2B
1-1 C/#3 AWG
CU, 4C, [Conduit]
MTS-PP2C
2-1 C/#4 bond
CU, 4C, [Conduit]
BKR-PP2A MAIN
C-H HFD
250/200A
PP2A
2-1 C/#4 bond
CU, 4C, [Conduit]
BKR-PP2B MAIN
C-H HFD
250/200A
PP2B
2-1 C/#4 bond
CU, 4C, [Conduit]
BKR-PP2C MAIN
C-H HFD
250/200A
PP2C

BKR-MCC-3-HUS-TIE
C-H HND
1200/800A
MCC-3 BUS A
MCC-3 BUS B
BKR-MCC-3-A MAIN
C-H HND
1200/800A
BKR-RAS PUMP-1
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-1
50 HP
Induction
94.7%
RAS PUMP-1
BKR-RAS PUMP-3
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-3
50 HP
Induction
94.7%
RAS PUMP-3
BKR-RAS PUMP-5
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-5
50 HP
Induction
94.7%
RAS PUMP-5
15 HP
Induction
94.7%
MCC-3-A LUMPED MTR-1
27.5 HP
Induction
94.7%
MCC-3-A LUMPED MTR-2
BKR-HUS A-LP3
C-H HFD
225/60A
1-1 C/#2 AWG
CU, 3Ø, [Conduit]
ATS-LP3
TX-LP3
45 kVA
0.48 - 0.208 kV
4%
TX-LP3 SEC
0.208 kV
1-1 C/#2 AWG
CU, 3Ø, [Conduit]
PNL-LP3
BKR-HUS B-LP3
C-H HFD
225/60A
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
2-1 C/#2 AWG
CU, 3Ø, [Conduit]
40.5 HP
Induction
94.7%
MCC-3-B LUMPED MTR-2
15 HP
Induction
94.7%
MCC-3-B LUMPED MTR-1
BKR-MCC-3-B MAIN
C-H HND
1200/800A
BKR-RAS PUMP-2
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-2
50 HP
Induction
94.7%
RAS PUMP-2
BKR-RAS PUMP-4
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-4
50 HP
Induction
94.7%
RAS PUMP-4
BKR-RAS PUMP-6
C-H HFD
225/100A
2-1 C/#1
CU, 3C, [Conduit]
RAS PUMP-6
50 HP
Induction
94.7%
RAS PUMP-6

BKR-BLOWER-5
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
37-MSO-205
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-BLOWER-5 MAIN
C-H HKD
600/600A
2-1 C/#3/0
CU, 3C, [Conduit]
BLOWER-5
250 HP
Induction
94.7%
BLOWER-5
BKR-BLOWER-7
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
37-MSO-207
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-BLOWER-7 MAIN
C-H HKD
600/600A
2-1 C/#3/0
CU, 3C, [Conduit]
BLOWER-7
300 HP
Induction
94.7%
BLOWER-7
BKR-MCC-ST
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
MCC-ST
64 HP
Induction
25%
MCC-ST LUMPED MTR
BKR-MCC-ST MAIN
C-H HLSD
600/600A
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-PPST
C-H HFD
225/100A
2-1 C/#2 AWG
CU, 3C, [Conduit]
PNL-PPST
BKR-MCC-STS
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
MCC-STS
BKR-MCC-STS MAIN
C-H HLSD
600/600A
2-1 C/#3/0
CU, 3C, [Conduit]
MCC-STS
BKR-BLOWER-6
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
37-MSO-206
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-BLOWER-6 MAIN
C-H 1000 P
600/600A
2-1 C/#3/0
CU, 3C, [Conduit]
BLOWER-6
250 HP
Induction
94.7%
BLOWER-6
BKR-SWGR-4B-2B
C-H SPS-1063/1600A
1600/1600A

BKR-SWGR-2B TIE
C-H SPS-1063/1600A
1600/1600A
SWGR-2B

BKR-MCC-5A
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-MCC-5A MAIN
C-H MD
800/800A
MCC-5A
BKR-PPSA2
C-H HJD
250/250A
BKR-PPSA2 MAIN
C-H HFD
225/150A
PNL-PPSA2
BKR-PPSA1
C-H HJD
250/250A
BKR-PPSA1 MAIN
C-H HFD
225/200A
PNL-PPSA1
BKR-DIGESTER PUMP1
C-H HFD
225/125A
60 HP
Induction
94.7%
DIGESTER MIX PUMP1
BKR-DIGESTER PUMP2
C-H HFD
225/125A
60 HP
Induction
94.7%
DIGESTER MIX PUMP2
227 HP
Induction
25%
MCC-5A LUMPED MTR

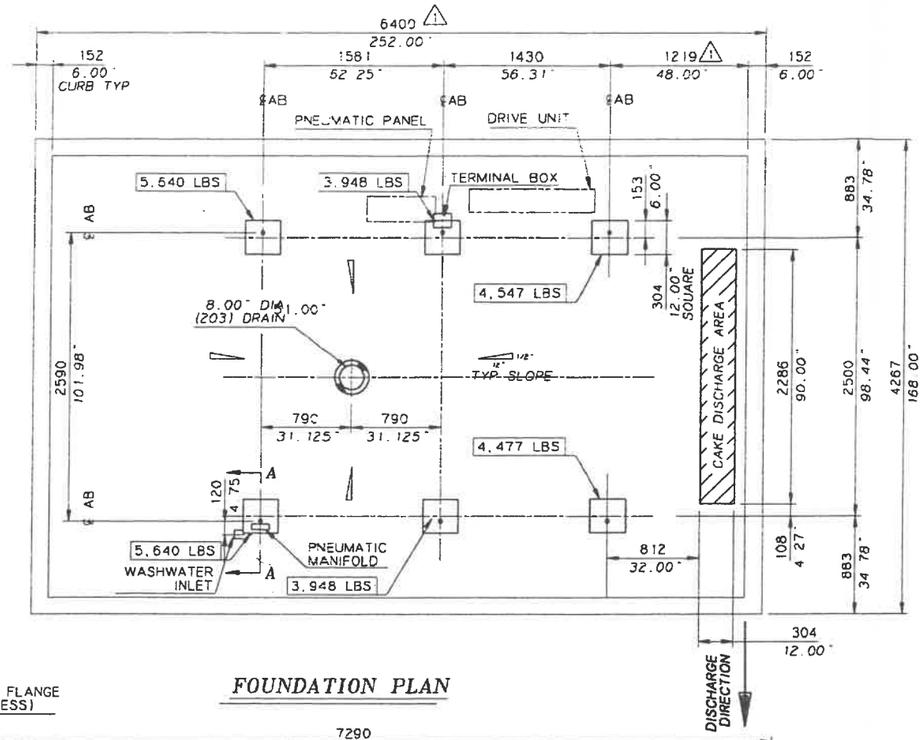
BKR-MCC-5B
C-H SPS-1063000A)
800/800A
2-1 C/#3/0
CU, 3C, [Conduit]
BKR-MCC-5B MAIN
C-H MD
800/800A
MCC-5B
BRK-LPS81
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3C, [Conduit]
TX-LPS81
0.48 - 0.208 kV
4%
TX-LPS81 SEC
0.208 kV
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-LPS81 MAIN
C-H HFD
225/150A
PNL-LPS81
BRK-LPS82
C-H HFD
225/90A
2-1 C/#3 AWG
CU, 3C, [Conduit]
TX-LPS82
75 kVA
0.48 - 0.208 kV
4%
TX-LPS82 SEC
0.208 kV
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-LPS82 MAIN
C-H HFD
225/150A
PNL-LPS82
BRK-LPS84
C-H HFD
225/60A
2-1 C/#3 AWG
CU, 3C, [Conduit]
TX-LPS84
45 kVA
0.48 - 0.208 kV
4%
TX-LPS84 SEC
0.208 kV
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-LPS84 MAIN
C-H HFD
225/150A
PNL-LPS84
BRK-PPS81
C-H HJD
250/250A
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-PPS81 MAIN
C-H HFD
225/150A
PNL-PPS81
BRK-PPS82
C-H HJD
250/250A
2-1 C/#3 AWG
CU, 3C, [Conduit]
BKR-PPS82 MAIN
C-H HFD
225/150A
PNL-PPS82
BRK-FILTRATE PUMP1
C-H HFD
225/80A
2-1 C/#4 AWG
CU, 3C, [Conduit]
FILTRATE RECY PUMP1
40 HP
Induction
94.7%
FILTRATE RECY PUMP1
BRK-FILTRATE PUMP2
C-H HFD
225/80A
2-1 C/#4 AWG
CU, 3C, [Conduit]
FILTRATE RECY PUMP2
40 HP
Induction
94.7%
FILTRATE RECY PUMP2
BRK-FILTRATE PUMP3
C-H HFD
225/80A
2-1 C/#4 AWG
CU, 3C, [Conduit]
FILTRATE RECY PUMP3
40 HP
Induction
94.7%
FILTRATE RECY PUMP3
BRK-ELEVATOR CONTR
C-H HFD
225/70A
2-1 C/#4 AWG
CU, 3C, [Conduit]
ELEVATOR CONTROLLER

Rockwell Automation

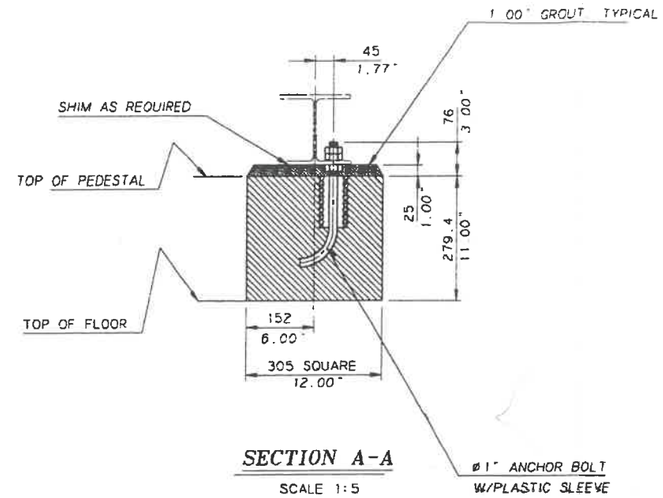
Salmon Creek WWTP Clark County
Vancouver, Washington

Arc Flash Study - March 2021
Input Data SLD - Base case

Printed by EasyPower



FOUNDATION PLAN

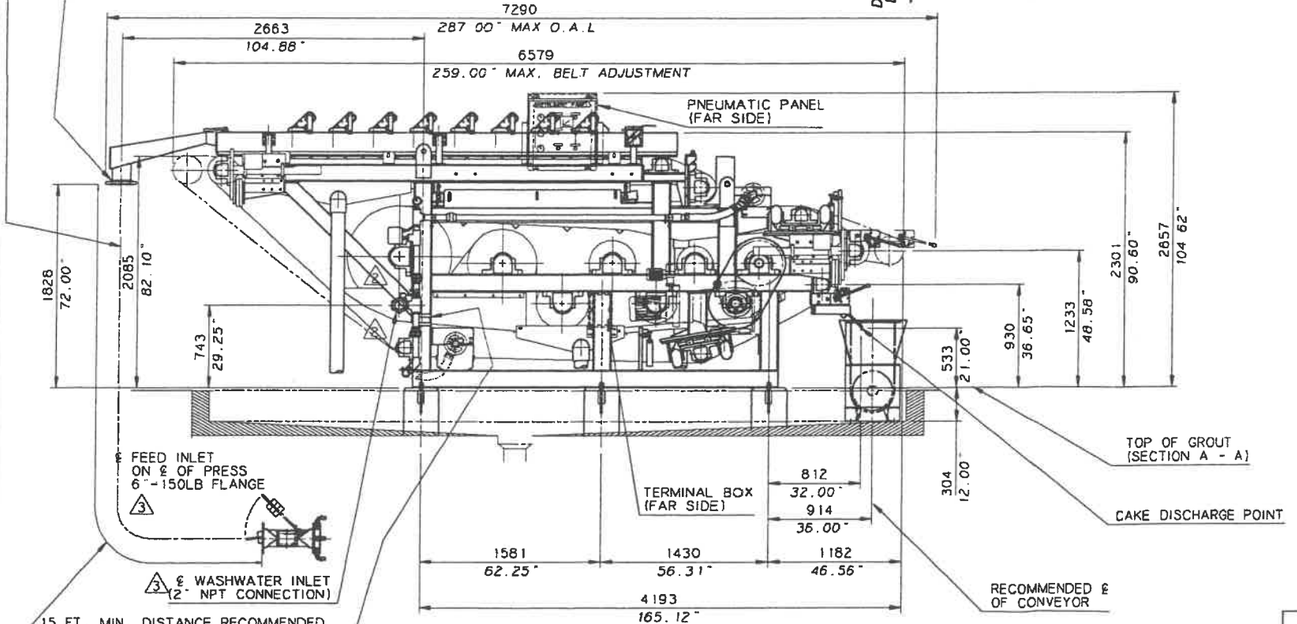


SECTION A-A

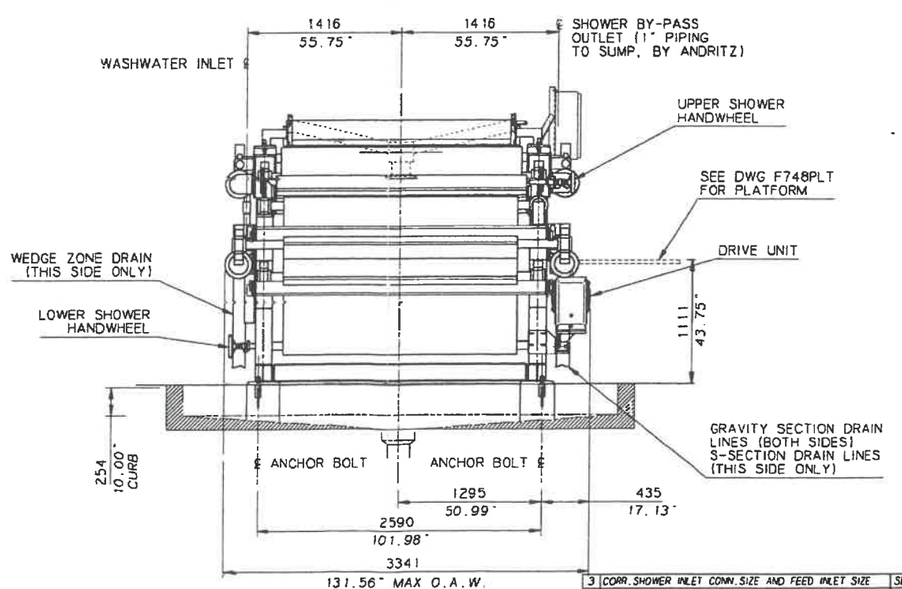
SCALE 1:5

GENERAL NOTES & INFORMATION

1. THE LOADINGS INDICATED INCLUDE VIBRATION EFFECTS.
2. THE FOUNDATION DESIGN SHOWN INDICATES MINIMUM REQUIREMENTS FOR CLEARANCE AND DRAINAGE. ACTUAL FOUNDATION DESIGN AND CONSTRUCTION TO BE FURNISHED BY OTHERS.
3. MINIMUM UTILITIES REQUIRED TO BE FURNISHED BY THE OPERATOR. THE FIGURES BELOW ARE FOR THE MACHINE ONLY. ANY ANCILLARY EQUIPMENT WILL REQUIRE ADDITIONAL UTILITIES.
   a. AIR - FOUR (4) CUBIC FEET PER MINUTE OF CLEAN AIR @ 90 P.S.I.G.
   b. WATER - 90 GALLONS PER MINUTE AT AMBIENT TEMPERATURE AND 120 PSIG.
4. DRY WEIGHT OF THE MACHINE: 25,000 LBS
   WET WEIGHT: 28,200 LBS
5. LEFT HAND MACHINE - AS SHOWN
   RIGHT HAND MACHINE - OPPOSITE AS SHOWN



SIDE ELEVATION



END ELEVATION

FOR SIDE ELEVATION
SEE DWG M691748

ANDRITZ
1010 COMMERCIAL BLVD SOUTH
ARLINGTON, TEXAS 76017
Phone: (817)465-5611
Telefax: (817)472-2566

CERTIFIED PROJECT FOR INSTALLATION
BY: DATE 1/27/96
PROJECT No 691-748
THESE DWGS. REFLECT CUSTOMER'S CHANGES AND APPROVAL ON PREVIOUS DWG. SUBMITTALS

NO	REVISION	BY	DATE
3	CORR. SHOWER INLET CONN. SIZE AND FEED INLET SIZE	SDW	02-06-96
2	ADDED GATE VALVES TO SHOWER INLET PIPING	SLH	01-29-96
1	REVISED PER CUSTOMER COMMENTS	SLH	12-20-95

Drawn by: STAN H 11/21/95
Appr. by:
THIRD ANGLE PROJECTION
Scale: 1 20
Group:
Date:
Drawing No.: -
ANDRITZ AUTOMATION, INC. CAD
1010 COMMERCIAL BLVD. SOUTH
ARLINGTON, TEXAS 76017
Phone: (817)465-5611
Customer: SALMON CREEK WWTP
Nom. CAF 2.0m SMX-SB-LP
File name: F748
P. O. No.:
Item No.:
Drawing No.: 691-748
LH FOUNDATION PLAN
F691748
Rev. 3

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