

## **Part 1 Summary of Work**

### **1.1 GENERAL**

- .1 The scope of work includes the provision of all materials, labour, tools and equipment to perform replacement of Flushing Water (FW) piping at the WEWPCC, as shown on the drawings and as specified herein.

### **1.2 DEMOLITION, SALVAGE AND RE-USE**

- .1 Demolish existing FW piping as shown on the drawings, and dispose of all demolished piping unless indicated otherwise.
- .2 All valves in demolished piping shall be turned over to the City.
- .3 All leakage repair clamps in existing piping shall be removed to allow for re-use, and turned over to the City.
- .4 Flowmeter S235-FE in existing piping shall be removed and turned over to the City.
- .5 Pressure transmitter S235-PIT and Emergency Water Pump pressure switch S240-PS in existing piping shall be removed and re-installed in new piping.
- .6 Effluent Filter S235-FIL shall be removed and disposed.
- .7 Existing pipe supports shall remain in place unless indicated otherwise, for use with new piping. Visually examine the condition of all existing pipe supports for signs of damage and deterioration and report all findings to the Contract Administrator. Existing pipe supports that are not deemed by the Contract Administrator to be in suitable condition for re-use shall be replaced.
- .8 Salvage sections of existing FW piping as indicated by the Contract Administrator, for forensic analysis by others. Salvaged sections of piping shall not be damaged, altered or cleaned. Deliver salvaged sections of piping, with ends capped and sealed, to Testlabs International Ltd., 1797 Logan Avenue, Winnipeg, within 24 hours of removal.

### **1.3 NEW CONSTRUCTION**

- .1 Supply and install new FW piping, including valves, as shown on the drawings.
- .2 Supply and install new FW flowmeter S235-FE and transmitter S235-FIT, to replace existing.
- .3 Re-install existing FW pressure transmitter S235-PIT on new piping. Provide instrumentation wiring to re-connect transmitter.
- .4 Re-install existing Emergency Water Pump pressure switch S240-PS in new piping. Provide 316 stainless steel instrument tubing to reconnect pressure switch.
- .5 Supply and install new Effluent Water Filter S235-FIL in place of existing filter. Supply and install electrical power and instrument air connections to new filter. Supply and install new filter drain line isolation valve S237-HV1.

### **1.4 TEMPORARY CONSTRUCTION**

- .1 Supply and install temporary FW piping as shown on the drawings, to maintain FW supply during FW piping replacement. Following installation and pressure testing of new permanent piping and upon approval of the Contractor Administrator, remove all temporary piping and supports from site.

## **1.5 MANAGEMENT OF SYSTEM IMPAIRMENT**

- .1 Replacement of FW piping must be coordinated around the operational constraints of the WEWPCC. Flushing Water is used on a continuous basis for plant processes, and also as an emergency water supply to exterior hydrants for fire protection.
- .2 For any work that impairs the operation of the FW system, the Contractor shall develop and implement a FW System Impairment Plan in accordance with the requirements of NFPA 24, 25 and 820, and supply all necessary resources to manage the risk associated with the system impairment. The FW system impairment plan will be subject to review by the Contract Administrator. No work shall begin on site until the plan is approved by the Contract Administrator.
- .3 The FW system impairment plan must include, as a minimum, the following elements:
  - .1 Expected duration of impairment.
  - .2 Areas of WEWPCC plant affected by impairment have been identified and increased risks determined.
  - .3 Where fire protection water supply is out of service, the Fire Department and other Authorities Having Jurisdiction have been notified.
  - .4 WEWPCC plant supervisor has been notified.
  - .5 Tagging system implemented to indicate that a system, or part thereof, has been removed from service.
  - .6 All necessary tools and equipment have been assembled at the impairment site.
  - .7 Where a fire protection system is out of service for more than 10 hours in a 24 hour period, arrangements shall be made by the contractor for all of the following:
    - .1 An approved fire watch.
      - .1 City of Winnipeg staff will provide a fire watch, in the case of an outage, for a maximum of 48 consecutive hours in a 7 day period. The Contractor is to give a minimum of 1 week notice when a fire watch is required.
      - .2 Establishment of a temporary water supply.
        - .1 The Contractor shall submit a fire plan to the Fire Department.
        - .2 The Fire Department shall provide a water tanker for use as the temporary water supply. The Contractor shall notify the Fire Department 1 week prior to system impairment to ensure the tanker is available. In the event of a fire the Fire Department will respond by mobilizing the tanker.

## **1.6 CONSTRUCTION SEQUENCING**

- .1 The following proposed construction sequence and the attached FW Pipe Replacement Shutdown and Tie-In Procedure are presented as a guideline to minimize impairment of the FW system operation. The Contractor shall provide a detailed construction sequence as part of the FW system impairment plan.
  - .1 Phase 1: Replacement of the 250 mm FW header from valve S250-HV1 in the Secondary Clarifiers area to valves S254-HV1 and S255-HV1 in the Headworks area.

- .1 Provide temporary piping, as shown on the drawings, to maintain filtered FW supply to plant processes during FW header replacement.
- .2 Connect temporary piping to branch lines that supply FW to plant processes. Each connection shall be performed in a manner that minimizes branch line outage duration. Maximum allowable outage duration of each branch line is 1 hour.
- .2 Phase 2: Replacement of the 250 mm piping from the Emergency Water Pump discharge isolation valve S240-HV3, and replacement of exterior fire loop isolation valves S256-HV1 (Secondary Clarifiers Area), S254-HV1 and S255-HV1 (Headworks Area).
  - .1 Maintain filtered FW supply to plant processes through the temporary piping installed in Phase 1.
  - .2 Replace 250 mm piping from Emergency Water Pump discharge isolation valve S240-HV3, up to and including 250 mm valves S250-HV1 and S256-HV1 in the Secondary Clarifiers Area, and new 150 mm valve S235-HV1 in the FW supply branch from the FW distribution pumps.
  - .3 Replace 250 mm valves S254-HV1 and S55-HV1 in the Headworks Area.
  - .4 Replacement piping for this phase should be pre-fabricated and pre-tested to the fullest extent possible, to minimize outage of the emergency water supply for fire protection.
- .3 Phase 3: Replacement of the 150 mm piping from the FW pump discharge isolation valves S210-HV2, S220-HV2 and S230-HV2, including provision of temporary piping, as shown on the drawings.
  - .1 Provide temporary piping and inline strainers, as shown on the drawings, to maintain FW supply to plant processes during this phase. Duty pump 1 (S220-FWP) and duty pump 2 (S230-FWP) will need to be taken offline in sequence to perform the temporary supply tie-ins, and the pumps will need to be operated in manual mode to provide the temporary FW supply during this phase.
- .4 Phase 4: Replacement of the Effluent Water Filter S235-FIL, including provision of temporary piping, as shown on the drawings.
  - .1 Provide temporary piping and inline strainer, as shown on the drawings, to maintain FW supply to plant processes during this phase.

**Part 2 Products**

**NOT USED**

**Part 3 Execution**

**NOT USED**

**END OF SECTION**

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**Part 1            General Conditions**

**1.1                RELATED REQUIREMENTS**

- .1        Section 22 11 17 – Process Piping and Valves
- .2        Section 22 11 17.01 – Process Piping Filters

**1.2                ADMINISTRATIVE**

- .1        Submit to Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2        Do not proceed with Work affected by submittal until review is complete.
- .3        Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4        Where items or information is not produced in SI Metric units converted values are acceptable.
- .5        Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6        Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7        Verify field measurements and affected adjacent Work is co-ordinated.
- .8        Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator review of submittals.
- .9        Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review.
- .10      Keep one reviewed copy of each submission on site.

**1.3                SHOP DRAWINGS AND PRODUCT DATA**

- .1        The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2        Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3        Allow 10 days for Contract Administrator review of each submission.
- .4        Adjustments made on shop drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

- .5 Make changes in shop drawings as Contract Administrator may require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .7 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .8 After Contract Administrator's review, distribute copies.
- .9 Submit electronic copy of shop drawings for each product specified in Div 22.
- .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Contract Administrator.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

- .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Contract Administrator.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Contract Administrator.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Contract Administrator.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Contract Administrator.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: submit operation and maintenance data in binders for all equipment specified in Div 22.
  - .1 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.
  - .2 Operation data to include:
    - .1 Control schematics for systems including environmental controls.
    - .2 Description of systems and their controls.
    - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
    - .4 Operation instruction for systems and components.
    - .5 Description of actions to be taken in event of equipment failure.
    - .6 Valves schedule and flow diagrams.
    - .7 Colour coding chart.
  - .3 Maintenance data to include:

- .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
- .2 Data to include schedules of tasks, frequency, tools required, and task time.
- .4 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
- .5 Approvals:
  - .1 Submit 3 copies of draft Operation and Maintenance Manual to Contract Administrator for review. Submission of individual data will not be accepted unless directed by Contract Administrator.
  - .2 Make changes as required and re-submit 6 copies of final Operation and Maintenance Manual to Contract Administrator.
- .6 Additional data:
  - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .7 As-built drawings:
  - .1 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW FLUSHING WATER PIPING SYSTEM REPLACEMENT AS INSTALLED" (Signature of Contractor) (Date).
  - .2 Submit to Contract Administrator for approval and make corrections as directed.
- .2 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used

**END OF SECTION**

**Part 1            General Conditions**

**1.1                COMMON**

- .1        Specification covers the requirements for materials, fabrication and erection of piping and components. Erection shall consist of complete installation of piping systems as defined by the piping drawings and documents. It includes installation of all piping, piping components, and related examination, inspection and testing. It includes fabrication in place or in the field fabrication shop for all piping not furnished as pipe spools.
- .2        Fabrication and erection of piping shall be in accordance with the applicable requirements of Process Piping ASME B31.3, and Canadian and Provincial Acts and Regulations.
- .3        Contractor shall be responsible for obtaining and providing registrations, data reports, certifications, permits and other authorizations required for compliance with codes and regulations. Contractor shall provide such assistance as may be required to enable Owner to obtain certification and acceptance of piping systems by the Authority having Jurisdiction.
- .4        Contractor is to have a current Certificate of Authorization for pressure piping installation registered with the Authority having Jurisdiction. Provide proof of registration to the Contract Administrator.

**1.2                REFERENCED STANDARDS**

- .1        ANSI/ASME B1.20.1, Pipe Threads, General Purpose
- .2        ANSI/ASME B16.5, Pipe Flanges and Flanged Fittings
- .3        ANSI/ASME B16.9, Factory-Made Wrought Steel Butt Welding Fittings
- .4        ANSI/ASME B16.11, Forged Steel Fittings, Socket Welding and Threaded
- .5        ANSI/ASME B31.3, Process Piping
- .6        ANSI/ASME B36.10M, Welded and Seamless Wrought Steel Pipe
- .7        ASME Section IX, Boiler and Pressure Vessel Code, Welding and Brazing Requirements
- .8        ASTM A53, Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless
- .9        ASTM A105/A105M, Forgings, Carbon Steel, for Piping Components
- .10       ASTM A234/A234M, Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
- .11       ASTM A307, Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
- .12       ASTM A536, Ductile Iron Castings
- .13       AWWA C210, Liquid Epoxy Coating System for the Interior and Exterior of Steel Water Pipe
- .14       AWWA C606, Grooved and Shouldered Joints
- .15       CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code
- .16       MSS SP58, Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation



## Part 2 Products

### 2.1 FLUSHING WATER PIPING

- .1 Pipe
  - .1 50mm (2") and under: Carbon steel, galvanized, sch 80, threaded, A53-B seamless
  - .2 75mm (3") and over:
    - .1 Carbon steel, sch 40, bevelled-end or roll-grooved, A53-B seamless
    - .2 Temporary piping: Carbon steel, sch 10, bevelled-end or roll-grooved, A53-B seamless
- .2 Fittings and joints
  - .1 Fittings
    - .1 50mm (2") and under: Carbon steel, galvanized, 3000 lb, threaded, A105N
    - .2 75mm (3") and over:
      - .1 Carbon steel, sch 40, bevelled-end, A234-WPB seamless
      - .2 Temporary piping: Carbon steel, sch 10, bevelled-end, A234-WPB seamless
      - .3 Grooved joint fittings may be used as an alternative to welded fittings. Grooved joint fittings shall be FM approved, A536 ductile iron, Victaulic. The lining and coating of the fitting shall match the lining and coating of the steel piping system.
    - .3 Use long radius elbows (1.5 diameter radius) unless shown otherwise on drawings.
    - .4 Branch connections:
      - .1 Equal to main size: tee fitting
      - .2 Down to half of main pipe size: reducing tee fitting
      - .3 Less than half of main pipe size: olet fitting
  - .2 Joints: roll-grooved couplings or flanges, as shown on drawings
    - .1 Roll-grooved coupling
      - .1 FM approved, rigid type, Victaulic Style 07, c/w Flush seal gaskets
    - .2 Flanges, provide at valve connections only
      - .1 Carbon steel, ANSI B16.5 150 lb, flat-face, weld-neck or slip-on, A105
        - .1 Flange facing shall match connecting valve. Use raised-face flanges at wafer or lug-type valves.
      - .2 Flange Gaskets: Full-face gasket, neoprene elastomer, 3mm (1/8") thick, suitable for B16.1 125 lb and B16.5 150 lb flanges
      - .3 Flange Bolting: A307 Grade B zinc coated bolts, A563 Grade A zinc coated heavy hex nuts
- .3 Pipe interior finish

- .1 Carbon steel piping, spools, and fittings shall be lined with shop-applied epoxy coating in accordance with AWWA C210. Holiday testing required.
  - .2 Conform to manufacturer requirements regarding:
    - .1 Surface preparation including sand blasting.
    - .2 Conditions under which painting system can be applied.
    - .3 Prime and final coat thicknesses.
  - .3 Acceptable Products: Two (2) prime coats Devoe Bar Rust 236, 6 mil DFT per coat, with Devoe Devgrip 238 abrasion resistant finish coat, 6 mil DFT. Total lining 18 mil DFT.
  - .4 On roll-grooved pipe and fittings, interior finish shall continue over end of pipe and exterior of pipe up to and including groove.
  - .5 Interior finish not required on temporary flushing water piping.
- .4 Pipe exterior finish
- .1 Apply epoxy finish to the exterior of all carbon steel piping in accordance with AWWA C210.
  - .2 Provide a 3 year warranty from project substantial performance date for entire painting system.
  - .3 Conform to manufacturer requirements regarding:
    - .1 Surface preparation including sand blasting.
    - .2 Conditions under which painting system can be applied.
    - .3 Prime and final coat thicknesses.
  - .4 Acceptable Products: Two (2) coats Devoe Bar Rust 235, 6 mil DFT per coat or approved equal.
  - .5 Exterior finish coat colour to be as per the following:

System	Colour Name	Sherwin Williams Paint Code
Flushing Water (FW)	Safety Blue	SW 4086
  - .6 Exterior finish not required on temporary flushing water piping.

## 2.2 PIPE SUPPORTS

- .1 Re-use existing pipe supports unless indicated otherwise, and provide additional new pipe supports as shown on drawings. Visually examine the condition of all existing pipe supports for signs of damage and deterioration and report all findings to the Contract Administrator. Replace existing pipe supports that are not deemed by the Contract Administrator to be in suitable condition for re-use.
- .2 New pipe supports shall conform to MSS SP-58.
- .3 New pipe support hangers, structural attachments, saddles and accessories shall be hot-dipped galvanized following fabrication. Support attachments welded to pipe, such as elbow base supports, shall be painted to match pipe.

## 2.3 VALVES

- .1 Gate Valves, 250mm (10”):

- .1 OS&Y, ductile iron body, resilient wedge, epoxy coated interior and exterior, pre-grooved stem for supervisory switch, and drilled, tapped, and plugged in valve body, flanged connections.
  - .2 2068 kPa (300 psi) non-shock cold working pressure
  - .3 Coating: electrostatically applied fusion-bonded epoxy 8-20 mil inside and outside, to AWWA C550, holiday testing required.
  - .4 FM approved valve, cUL listed
  - .5 Provide supervisory switch where indicated on the drawings.
  - .6 Acceptable Product: Nibco F-607-RWS c/w Potter Electric OSYSU-A1 supervisory switch, or approved equal
- .2 Ball Valves, 50mm (2") and under:
- .1 6895 kPa (1000 psi) minimum working pressure, carbon steel body, stainless steel ball, 2-piece body, full port, NPT connections, PTFE seat
  - .2 Acceptable Products: Flow-Tek, MAS, Apollo, or approved equal
- .3 Butterfly Valves, 75mm (3") to 150mm (6"):
- .1 1724 kPa (250 psi) minimum pressure rating, lug style, quarter-turn handle, bidirectional bubble-tight shutoff, ductile iron body, stainless steel disc and stem, resilient seated, Buna-N seat
  - .2 Acceptable Product: Bray Controls Series 31H, Keystone Figure 222, or approved equal
- .4 Check Valves:
- .1 ASME class 150 rating, non-slam spring-assisted, center-guided wafer check valve c/w carbon steel body, stainless steel seat, disc & bushing, Inconel spring, RF wafer ends, tapped holes in body for lifting lugs
  - .2 Acceptable Product: DFT Inc. ALC check valve or approved equal
- .5 Valves shall be cleaned and field painted by the Contractor with epoxy finish to match piping.
- .6 Provide stainless steel tags for all valves and fasten to equipment with a twisted stainless steel wire.

#### **2.4 FLOWMETER (S235-FE & S235-FT)**

- .1 Replace existing S235-FE flow meter with new as follows:
  - .1 Inline magnetic type flow meter c/w ANSI Class 150 / ASME B16.5 flanged connections, ebonite liner, and remote mounted display and transmitter (see paragraph 2.4.2 below).
  - .2 Carbon steel, with corrosion resistant two-component epoxy coating.
  - .3 0 to 10 m/s (0 to 32.8 fps) measurement range with 0.2 %  $\pm$ 2.5 mm/s (0.5 fpm) accuracy
  - .4 Medium temperature: -10°C to 70°C (14°F to 158°F)
  - .5 Max operating pressure: 1034 kPa (150 psi)
  - .6 Hastelloy C-276 electrodes
  - .7 IP67 (NEMA 4X/6) fibreglass terminal box with two (2) 16mm (1/2") NPT conduit connections

- .2 Replace existing S235-FT flow transmitter with new as follows:
  - .1 IP67 (NEMA 4X/6) enclosure with display, and four (4) 16mm (½”) NPT conduit connections
  - .2 115 to 230VAC power supply at 50/60 Hz
  - .3 4-20mA output ranged 0 – 55 L/s, with HART communication interface
  - .4 Maximum error shall be less than 1% of flow rate with flow rate between 5 L/s and 55 L/s
  - .5 Contractor to confirm length of cable required between flow meter and flow transmitter. Assume cable length of 15 metres for bid purposes.
- .3 Provide stainless steel instrument tags for S235-FE and S235-FT and fasten to equipment with a twisted stainless steel wire.
- .4 Acceptable Product: Siemens MAG5100W series flow meter, MAG6000 series transmitter, remote wall mount kit, and cable kit.

## **2.5 TEMPORARY STRAINER**

- .1 Temporary inline basket type strainer used for new/modified pipeline start-up service, suitable for installation between ANSI Class 150 flanges.
- .2 Stainless steel construction, 20 mesh SS liner.
- .3 Acceptable Product: Eaton Temporary Strainer Model 92 Basket Type or approved equal

## **Part 3 Execution**

### **3.1 MATERIAL CONTROL, HANDLING, AND STORAGE**

- .1 Precautions shall be taken during handling, fabrication, storage, loading, and installation to protect flange surface finishes and all ends from damage. All ends shall be capped when delivered.
- .2 Piping which has been coated with paint prior to erection shall be handled with care to avoid damage to coatings. Slings protected with fabric or hose sleeves shall be used for lifting.
- .3 Shipping protection provided for pipe, pipe spools, and piping components shall be visually inspected by Contractor when material is received at the site before unloading from truck. Any damaged or deficient protection shall be brought to the attention of Owner for resolution.
- .4 Raw materials, equipment and components shall be protected at all times against exposure to salt water or spray, rain, and moisture from an industrial atmosphere.
- .5 Raw materials and fabricated components shall preferably be stored inside a warehouse. Where this is not possible, storage shall be such that it is out of contact with the ground and has adequate moisture proof coverage. All fabricated items shall have all openings blanked or otherwise sealed with water and moisture tight covers.

### **3.2 WELDING**

- .1 Welding shall be in accordance with approved welding procedures registered by or acceptable to the Authority having Jurisdiction.

- .2 Welding shall be performed by certified welders or welding machine operators holding a current pressure welders' authorization issued by or acceptable to the Authority having Jurisdiction. The welder or welding machine operator shall not perform welding utilizing procedure for which he has not been duly authorized.

### **3.3 FABRICATION AND ERECTION**

- .1 Flange bolt holes shall straddle the vertical centerlines or horizontal north-south, east-west centerlines defined on the piping drawings.
- .2 Pipe spool tolerances shall be as defined in PFI Standard ES-3.
- .3 Longitudinal seams in adjoining lengths of welded pipe shall be staggered and located to clear branch connections and external attachments
- .4 Slip-on flanges shall be seal welded inside, and the weld ground smooth
- .5 The use of backing rings is prohibited.
- .6 Threaded joints shall be tapered pipe threads in accordance with ANSI B2.1
- .7 Threads shall be clean cut with no burrs or stripping
- .8 All threads on piping and fittings shall be thoroughly cleaned of cuttings, dirt and oil before applying pipe dope or tape
- .9 Welding and post-weld heat treatment shall satisfy requirements of the codes and regulatory agencies having jurisdiction over the work. Welding shall be in accordance with approved welding procedures registered by or acceptable to the Authority having Jurisdiction
- .10 Welding shall be performed by certified welders or welding machine operators holding a current pressure welders' authorization issued by or acceptable to the Authority having Jurisdiction. The welder or welding machine operator shall not perform welding utilizing procedure for which he has not been duly authorized
- .11 Submit Welding Procedure Specifications (WPS), and matching Procedure Qualification Records (PQR), to Contract Administrator for approval. Procedures shall not be submitted for approval until they have been registered with or accepted by the Authority having Jurisdiction. Evidence of this registration or acceptance shall accompany each WPS and PQR submitted to Contract Administrator
- .12 Pipe, pipe spools, and in-line components shall be inspected internally during final installation to ensure they are free of any foreign material. Material shall be removed prior to installation and bolting or welding in place
- .13 Monitor alignment of driver and driven machine shaft coupling with the piping connected and disconnected. Any variation in alignment caused by the piping shall be corrected by modifying the piping until the alignment is within the tolerances specified by the driven equipment manufacturer. Contractor's plan for any corrective work shall be approved by Contract Administrator who will monitor the corrective work
- .14 End protectors shall not be removed from piping and equipment until ready for final connection. Weld end and gasket surfaces shall be inspected for damage when covers are removed. Contract Administrator shall be informed of any damage. Repairs shall not be made without approval of Contract Administrator

- .15 Bolting - The use of washers or other packing to use up excessive length of flange bolts is not acceptable. The length of machine and stud bolts shall be such that nuts are fully engaged with a minimum of two full threads protruding and that studs are centered
- .16 Control valves and other components removed from piping during pressure testing and line flushing shall be replaced with spool pieces or blanks, as appropriate
- .17 Valve handwheels shall be installed at the orientation indicated on the piping drawings. They shall not be installed with the stem below the horizontal position
- .18 Lines containing butterfly valves shall be checked to ensure that the interior of mating pipe and flanges are free of any obstructions such as internal weld protrusions before installing the valves. The mating flanges at resilient seat butterfly valves shall be sufficiently separated for ease of installation. The valve shall not be forced or wedged into position which could damage the resilient surfaces. Butterfly valves shall be installed and the disk set in the open position prior to tightening the bolts. After the bolts are tight, the operation of the valve shall be checked through a complete open and shut cycle to ensure that the disk has not been jammed during installation.
- .19 Field-routed piping shall be located such that it does not obstruct operating aisles, walkways, or equipment operation, maintenance, or removal.
- .20 All grooved products shall be installed according to manufacturer's installation instructions.
- .21 Carbon steel pipe shall be roll grooved according to grooved coupling manufacturer's instructions
- .22 The Contractor shall inspect all roll-grooved pipe and fitting ends for conformance to grooved coupling manufacturer's required dimensional tolerance. Provide inspection test records for all roll-grooved pipe and fittings ends.
- .23 Roll grooving of piping shall be performed prior to application of linings and coatings

### **3.4 PIPE LINING AND COATING**

- .1 Perform surface preparation and painting off site. Then deliver finished products to the Site for final assembly. Only touch-up surface preparation and painting will be permitted on-site.
- .2 Handle piping with care during delivery to Site, storage and installation so as to minimize touch-up required.
- .3 After piping system installation is complete, touch up paint to original condition.
- .4 Do not paint on flange faces where gaskets will be applied.
- .5 Field touch-up painting shall not be applied in conditions where pipe surface condensation (sweating) may occur during the paint curing period.
- .6 Prime and touch up marred finished paintwork/coatings to match specifications.
- .7 Restore to new condition, finishes which have been damaged.
- .8 Valves shall be cleaned and field painted by the Contractor with epoxy finish to match piping.

### **3.5 INSTALLATION**

- .1 Install valves, flow meters, and all equipment as per manufacturer's instructions and recommendations.
- .2 Pipe, pipe spools, and in-line components shall be inspected internally for foreign material during final installation. Material shall be removed prior to installation and bolting or welding in place.
- .3 End protectors shall not be removed from piping and equipment until ready for final connection. Weld end and gasket surfaces shall be inspected for damage when covers are removed. Contract Administrator shall be informed of any damage. Repairs shall not be made without approval of Contract Administrator.
- .4 Piping shall be properly supported to prevent excessive deflection during handling and installation.
- .5 Bolting - The use of washers or other packing to use up excessive length of flange bolts is not acceptable. The length of machine and stud bolts shall be such that nuts are fully engaged with a minimum of two full threads protruding and that studs are centered.
- .6 Valve actuators shall be installed at the orientation indicated on the piping drawings. Actuators shall not obstruct operating aisles or walkways.
- .7 Field-routed piping shall be located such that it does not obstruct operating aisles, walkways, or equipment operation, maintenance, or removal.
- .8 Provide threaded plug in end of all vent and drain valves, material to match valve body.
- .9 Provide dielectric type connections wherever joining dissimilar metals.
- .10 Flanges:
  - .1 Protection of flange face surface finish is required. Precautions shall be taken throughout handling and fabrication operations to protect the gasket surface finish of the flanges.
  - .2 Loose flanges and fittings, other than installing materials, that require attachment by field welding, shall be shipped tack-welded to the piece to which they are to be welded at the point marked FW (field weld) or FFW (field-fit weld).
- .11 Provide additional 16mm electrical conduit from flow meter to flow transmitter to accommodate cables. All conduits shall be same material, installed in similar fashion and along same route as existing conduit system between the flow meter and flow transmitter.
- .12 All power and signal wiring from existing flow transmitter shall be disconnected and reconnected to new flow transmitter.

### **3.6 CLEANING**

- .1 Clean interior and exterior of all systems including strainers prior to start-up of new systems.
  - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
  - .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.7 INSPECTION AND TESTING**

- .1 Inspect and test all piping, valves, flow meters, and all equipment as per the manufacturer's instructions and recommendations.
- .2 Hydrostatically test all lines normally used for the conveyance of liquid using final effluent water as the test medium.
- .3 Ensure all lines are filled with final effluent water. Bleed air from all high spots using the taps provided specifically for that purpose.
- .4 Zero leakage is permitted throughout the specified test period for all exposed piping, buried insulated piping, and any liquid chemical lines.
- .5 Inspection and testing standard: ASME B31.3, Normal Fluid Service
- .6 Radiographic examination of welds: 5%
- .7 Test Conditions: Hydrotest at 1200 kPa for 120 minute duration
- .8 Give the Contract Administrator a minimum of 2 business days notice prior to testing. Timing of testing to be coordinated with the owner.

**END OF SECTION**



## **Part 1 General Conditions**

### **1.1 DESCRIPTION**

- .1 This specification covers the requirements for design, fabrication, delivery, and installation of a new Effluent Water Filter to replace existing filter S235-FIL at the WEWPCC.
- .2 S235-FIL is used to filter effluent which is used on a continuous basis for flushing water used in variable flow plant processes and cleaning operations.

## **Part 2 Products**

### **2.1 EFFLUENT WATER FILTER (S235-FIL)**

- .1 Replace existing effluent water filter with new filter to match specifications of existing filter. Existing filter as follows:
  - .1 Manufacturer: Ronning-Petter
  - .2 Model: A-304MX Auto Filter c/w 7BCF filters and Deltagard automatic backwash control
  - .3 Type: Cartridge
  - .4 Fluid: Treated effluent
  - .5 Rated capacity: 50 L/s (793 USgpm)
  - .6 Design pressure: 1034 kPa (150 psi)
  - .7 Efficiency: 95% retention of particles  $\geq$  1mm in size
  - .8 Filter screen: 20 mesh
  - .9 Refer to attachments for existing filter submittals
- .2 New filter specified as follows:
  - .1 Two (2) or more parallel-piped filter stations on common inlet/drain and outlet headers, all mounted on a galvanized steel unistrut floor stand. Each station equipped with 316SS full ported automatically actuated ball valves to provide individual isolation of each filter station, and automatic backwash cycling or automated mechanical cleaning to maintain a settable differential pressure from inlet to outlet of 70 kPa (10 psi) or less. Capacity of the filter must not drop below 37.5 L/s (594 usgpm) with one filter station isolated for maintenance.
  - .2 200mm (8") ANSI Class 150 flanged Inlet/Outlet headers.
  - .3 100mm (4") ANSI Class 150 flanged Drain header.
  - .4 316 stainless steel filter bodies and piping.
  - .5 3-way full ported ball valves connect each filter station body tube to the inlet/drain header
  - .6 2-way full ported ball valves connect each filter station body tube to the outlet header
  - .7 All gaskets to be Buna-N
  - .8 316 SS 80 mesh wire mesh filter elements to achieve 95% retention of particles  $\geq$  200 microns in size.

- .9 Provide associated controller for differential pressure detection across filter stations, automatic backwash cycling or mechanical cleaning, visual and audible alarms c/w single point power feed.
- .10 Acceptable Manufacturers: Eaton, ACME Engineering, Aslan Technologies
- .3 The piping arrangement shown on the drawings is based on a new filter unit that is identical to the existing unit. Any piping changes and associated costs required to accommodate a different filter configuration is the responsibility of the Contractor.

## **2.2 SPARE PARTS**

- .1 One set of four (4) filter elements

## **Part 3 Execution**

### **3.1 MATERIAL CONTROL, HANDLING, AND STORAGE**

- .1 Precautions shall be taken during handling, storage, loading, and installation to protect equipment from damage.
- .2 Raw materials, equipment, and components shall be protected at all times against exposure to salt water or spray, rain, and moisture from an industrial atmosphere.
- .3 Raw materials and components shall preferably be stored inside a warehouse. Where this is not possible, storage shall be such that it is out of contact with the ground and has adequate moisture proof coverage.

### **3.2 INSTALLATION**

- .1 Pipe, pipe spools, and in-line components shall be inspected internally for foreign material during final installation. Material shall be removed prior to installation and bolting or welding in place.
- .2 Install all equipment as per manufacturer's recommended installation instructions.
- .3 End protectors shall not be removed from equipment until ready for final connection. Contract Administrator shall be informed of any damage. Repairs shall not be made without approval of Contract Administrator.

### **3.3 INSPECTION AND TESTING**

- .1 Test filter equipment per manufacturer's recommendations.

### **3.4 COMMISSIONING**

- .1 The Contractor shall commission the new effluent water filter S235-FIL in accordance with manufacturer's recommendations including demonstration and training of operation and maintenance of the equipment with the Owner.

**END OF SECTION**



WEST END WATER POLLUTION CONTROL CENTRE

CONTRACT #2

TENDER NO. P.D. 91-119

DESCRIPTION: EFFLUENT WATER FILTER

PROJECT SERIES NO.: 820378

SUPPLIER: GENERAL EQUIPMENT

SPECIFICATION NO.: 13950

DATE: DEC. 9/91

AS PER: FRANK TAGNI

WEST END WATER POLLUTION CONTROL CENTRE  
 REID CROWTHER & PARTNERS LIMITED  
 CONSULTING ENGINEERS AND ARCHITECTS

<input checked="" type="checkbox"/>	NO EXCEPTIONS TAKEN
<input type="checkbox"/>	PROCEED PER COMMENTS & RESUBMIT
<input type="checkbox"/>	AMEND PER COMMENTS & RESUBMIT
<input type="checkbox"/>	REJECTED

Project No. 60910 Date Dec. 23/91 By A.L.

Reviewed only as to general conformity with the design concept. The Contract Administrator does not warrant or represent that the information contained on this drawing is either accurate or complete. Sole responsibility for correct design, details and dimensions shall remain with the part submitting the drawing.

C.C.# 5

PAGE 1 OF 4

SHOP DRAWINGS REVIEWED BY

FOR KRAFT CONSTRUCTION

DATE DEC 12 1991

ANY ERRORS OR OMISSION ARE THE RESPONSIBILITY OF THE SUBTRADE.

60910-2-13950-1

Dimensions & Data shown on E5-56A certified correct for:

Our Ref. 710440

Customer Comstock International

Order 820378-19

Job West End Water Treatment Plant

Job Requirements: **1-Only RONNINGEN-PETTER A-304MX FILTER**

- Capacity: 50 l/sec
- 95% efficiency of particles 1 m.m. and greater
- copper body, bronze castings
- four (4) tubular filter elements
- Delta-guard automatic backwash
- 20 mesh filters

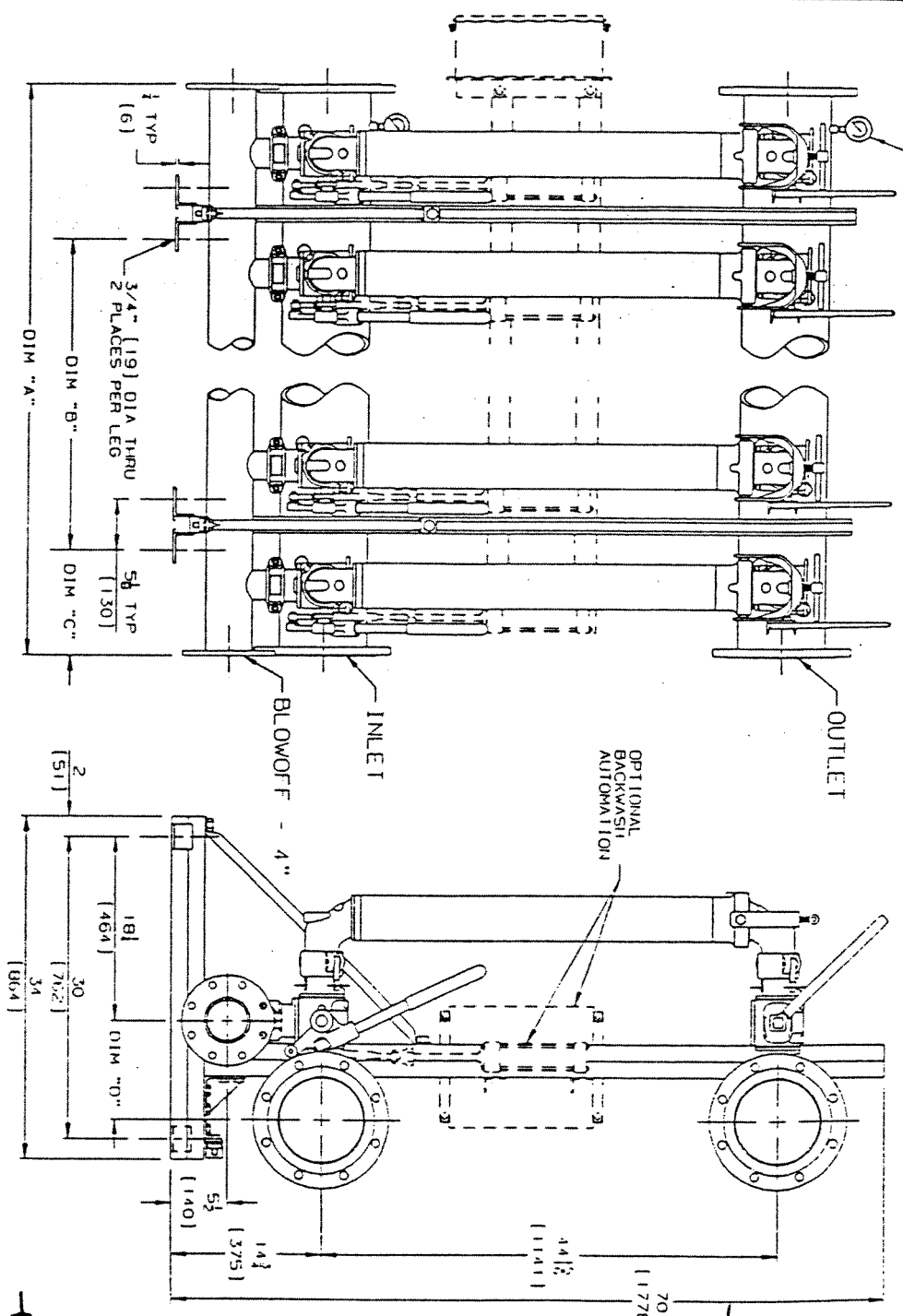
COMPLETE WITH:

**4-Only RONNINGEN-PETTER 7BCF FILTERS**

- s.s. wire mesh
- 20 mesh screen

cen#5  
2 of 4

GAUGE 0-200 PSI  
0-1379 KRA



NOTES:

1. INLET AND OUTLET HEADER FLANGES ARE LAP-JOINT TYPE WITH GALVANIZED CARBON STEEL BACK-UP RINGS.
2. BLOWOFF HEADER FLANGES ARE CARBON STEEL FLAT FACE SLIP-ON TYPE ON CARBON STEEL HEADERS OR LAP-JOINT TYPE WITH GALVANIZED CARBON STEEL BACK-UP RINGS ON STAINLESS STEEL HEADERS.
3. PROCESS FLANGE CONNECTIONS HAVE THE FOLLOWING DRILLING: (A) A.N.S.I. CLASS 150 OR (B) D.I.N. NENNRUCK 16.
4. HEADERS MAY BE PIPED AT EITHER END, BLIND FLANGES (PURCHASER SUPPLIED) REQUIRED FOR OPPOSITE END.
5. MANUAL BACKWASHING FUNCTION MAY BE AUTOMATED.
6. ALL DIMENSIONS ARE IN INCHES WITH MILLIMETER EQUIVALENTS IN PARENTHESES ( ).
7. FILTER ELEMENTS ARE DESIGNED TO WITHSTAND 150 PSI (10.5 KG/CM<sup>2</sup>) DIFFERENTIAL PRESSURE.
8. REPLACEMENT PARTS, REFER TO DRAWING N° E3-54A.
9. FOUNDATION DETAILS, REFER TO DRAWING N° E3-91A.

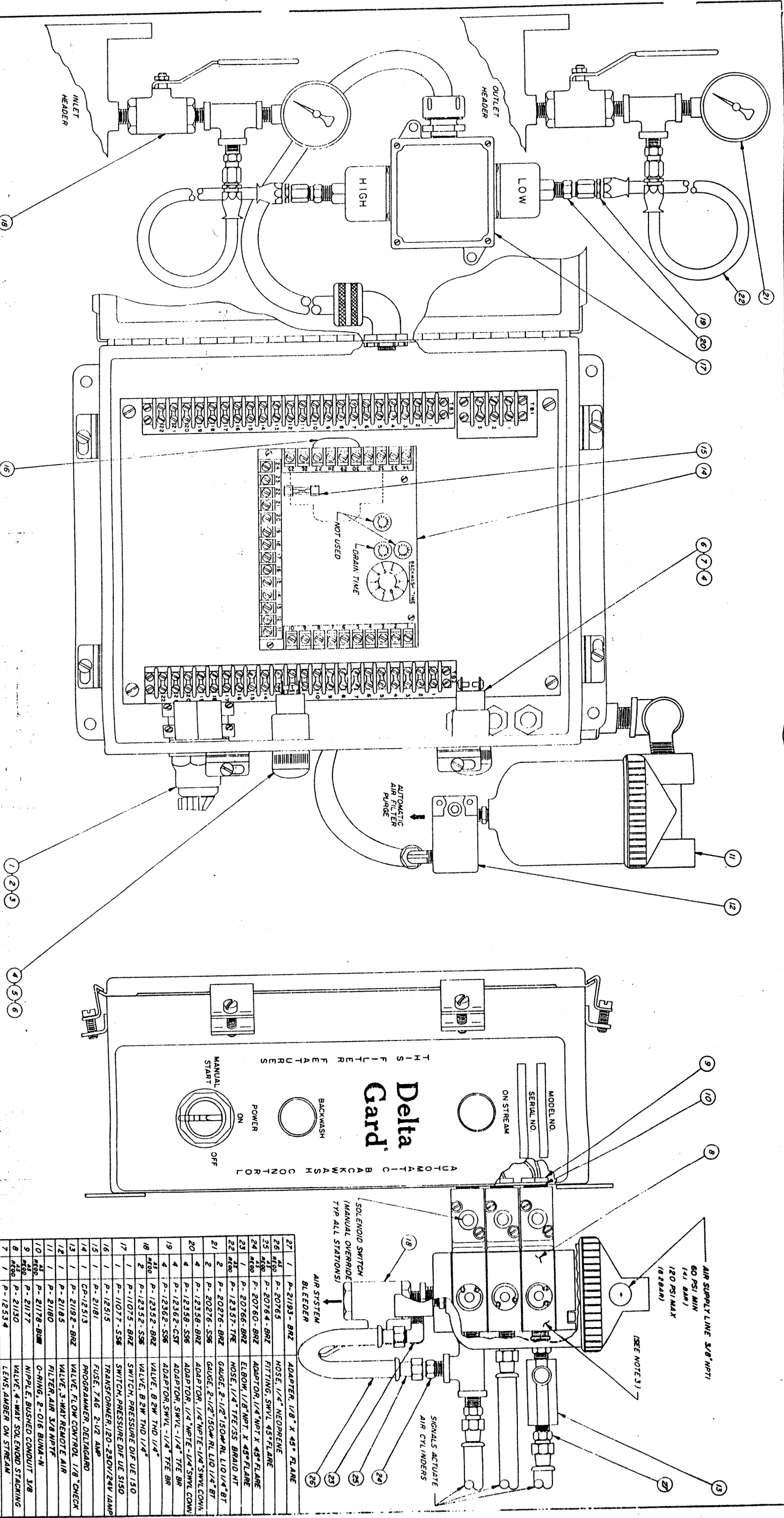
MODEL	DIM "A"	DIM "B"	DIM "C"
300	38 (965)	24 (610)	4-7/16 (113)
303	38 (965)	12 (305)	10-7/16 (265)
304	50 (1270)	24 (610)	10-7/16 (265)
305	62 (1575)	36 (914)	10-7/16 (265)
306	74 (1880)	48 (1219)	10-7/16 (265)
307	86 (2184)	60 (1524)	10-7/16 (265)
308	98 (2489)	72 (1829)	10-7/16 (265)
309	110 (2794)	84 (2134)	10-7/16 (265)
310	122 (3099)	96 (2438)	10-7/16 (265)
311	134 (3404)	108 (2743)	10-7/16 (265)
312	146 (3708)	120 (3048)	10-7/16 (265)
313	158 (4013)	132 (3353)	10-7/16 (265)
314	170 (4318)	144 (3658)	10-7/16 (265)

INLET/OUTLET HEADER SIZE	SH. STEEL	BRONZE
4"	7-3/4 (197)	7-9/16 (192)
5"	8-13/16 (224)	8-13/16 (224)
6"	9-13/16 (240)	9-13/16 (249)
8"	10-7/8 (276)	10-7/8 (276)

1/8" ± .01"  
 1 HAR. '90  
 AUTOMATIC  
 RRP ROMINGEN-PETTER  
 MULTIFLEX FILTER SYSTEM  
 SERIES A-300-MX  
 MULTIFLEX FILTER I  
 E3-54A

cen#5  
30 of 4



- NOTES:
- 1) ENCLOSURE, NEMA 4 WATER TIGHT AND DUST TIGHT
  - 2) FOR ELECTRICAL WIRING (MAX) SEE DRAWING ES-75, (BW-MX) REF. DRAWING ES-76
  - 3) TOP 4-WAY SOLENOID VALVE IN STACK (RIGHT SIDE) AND FLOW CONTROL / CHECK VALVE USED ON EXTERNAL BACKWASHING UNITS ONLY
  - 4) UNITS CONSTRUCTED WITH STAINLESS STEEL USE PART NUMBERS WITH SUFFIX S56
  - 5) DRAIN TIME AND BACKWASH TIME POTENTIOMETERS ARE ACTIVE. OTHERS ARE NOT USED
  - 6) ONE 4-WAY SOLENOID VALVE REQUIRED PER FILTER STATION, UP TO MAXIMUM OF 22 VALVES

27	1	P-2193-BRZ	ADAPTER, 1/8" X 45° FLARE
26	45	P-20765	HOSE, 1/4" NEOPRENE
25	45	P-20764-BRZ	FITTING, SWVL 45° FLARE
24	45	P-20760-BRZ	ADAPTOR, 1/4" NPT X 45° FLARE
23	1	P-20766-BRZ	ELBOW, 1/8" NPT X 45° FLARE
22	45	P-12357-TRE	HOSE, 1/4" TEE/SS BRAID HT
21	2	P-20276-BRZ	GAUGE, 2-1/2" 150# RL L10 1/4" BT
20	4	P-12358-S56	ADAPTOR, 1/4" NPT-1/4" SWVL CONN.
19	4	P-12362-S56	ADAPTOR, SWVL -1/4" TFE BR
18	4	P-12352-S56	ADAPTOR, SWVL -1/4" TFE BR
17	1	P-11077-S56	VALVE, 2" 2W THD 1/4"
16	1	P-12515	VALVE, B 2W THD 1/4"
15	1	P-21181	SWITCH, PRESSURE DIF UE 130
14	1	CP-12513	TRANSFORMER, 120-250V/24V 1AMP
13	1	P-21192-BRZ	FUSE, 7AG 2-1/2 AMP
12	1	P-21185	PROGRAMMER, DELTAGARD
11	1	P-21180-BUM	VALVE, FLOW CONTROL 1/8" CHECK
10	45	P-21178-BUM	VALVE, 3-WAY REMOTE AIR
9	45	P-21177	FILTER, AIR 3/8 NPT
8	45	P-21130	NIPPLE, BUSHED CONDUIT 3/8
7	1	P-12354	VALVE, 4-WAY SOLENOID STACKING
6	2	P-12548	LENS, LAMBER ON STREAM
5	1	P-12532	LENS, RED
4	2	P-12311	SOCKET, IND LIGHT ASSY
3	1	P-22035	BULB, INDICATOR LIGHT TYPE S6 32V
2	1	P-22036	BLOCK, CONTACT N.C.
1	1	P-22034	SWITCH, 3 POS SPRING RETURN

DELTA GARD AUTOMATIC BACKWASH CONTROL PANEL LAYOUT SERIES 84 MX/BW-MX

ES-74

PORTAGE MICHIGAN 49081

CONFORMER/ROBINSON-PETTER DIVISION

SCALE 3/4" = 1"

DATE 12-85

DESIGNED BY

CHECKED BY

APPROVED BY

DATE

DRAWING NO.

REVISIONS

REV# 5 Lot#4