

## **PART 1 GENERAL**

### **1.1 SUMMARY**

- .1 The work under this Section includes the preparation and supply of an Operation and Maintenance (O&M) manual for the Tunnel Mountain Lift Station.
- .2 The Tunnel Mountain Lift Station O&M manual is to describe and detail all operational and maintenance requirements of the retrofit including all building and process equipment and systems, new and existing, that interact with the upgraded system.
- .3 Provide an overview of the retrofit include both the existing and upgraded system. Describe process and building systems including design intent, criteria and loads, capacities and limitations. Include general concept of operations, modes of operation, operation sequences and procedures, and maintenance requirements.

### **1.2 GENERAL**

- .1 In addition to the installation, operation and maintenance information supplied for field use, the Contractor shall provide four copies of clean, unmarked operation and maintenance manuals, and electronic PDF files on CD.
  - .1 Bind data in vinyl hard covered, 3 ring loose leaf binders for 219 x 279 mm size paper.
  - .2 Enclose title sheet, labelled "Operation and Maintenance Manual", project name, date and list of contents.
  - .3 Labelled tabs shall separate the sections and the tabs shall be plastic laminated for protection.
  - .4 The print shall be black and all manuals must be properly typed with proper grammar and spelling in a clear and concise manner.
  - .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
  - .6 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
  - .7 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

### **1.3 GENERAL EQUIPMENT AND SYSTEMS REQUIREMENTS**

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.

- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and 01 91 13 - General Commissioning Requirements.
- .15 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .16 Training: refer to Section 01 91 13 - General Commissioning Requirements.
- .17 Additional requirements: as specified in individual specification sections.

#### **1.4 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Additional Requirements: as specified in individual specifications sections.

## **1.5 TABLE OF CONTENTS**

- .1 The operating and maintenance manuals shall be assembled according to the following Table of Contents:
  - .1 Introduction:
    - .1 To include location of facility and components of facility.
  - .2 Facility Explanation:
    - .1 Provide a description of the project and the purpose of the O&M manual being presented. Provide an overview of the facility, include both the existing and upgraded system, and describe the integration of the two systems.
    - .2 Describe process and building systems including design intent, criteria and loads, capacities and limitations.
    - .3 Include an explanation of each system and component and define purpose, size, and method of operation. The following components shall be defined:
      - .1 Pump Control Systems
      - .2 Wet Well
      - .3 Forcemain (valves, etc., draining and flushing)
  - .3 One complete set of Sub-contractors Process and Building System Drawings, Shop Drawings, Equipment Specifications, Manufacturer's Data, Trouble Shooting Information.
  - .4 General Information:
    - .1 Maintenance instructions for finished surfaces and materials.
    - .2 Copy of hardware and paint schedules, including a piping colour code.
    - .3 Names, addresses and phone numbers of subcontractors and suppliers.
    - .4 Certification and permits.
    - .5 Guarantees, warranties and bonds showing:
      - .1 Guarantee commencement date.
      - .2 Duration of guarantee.
      - .3 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.

## **1.6 TIMING**

- .1 The Operation and Maintenance Manual must be submitted and accepted as complete by the Departmental Representative before any consideration for the Substantial Completion Certificate can be given.

**END OF SECTION**