

# **PART E**

# **SPECIFICATIONS**

## PART E - SPECIFICATIONS

### GENERAL

#### E1. GENERAL

- E1.1 These Specifications shall apply to the Work.
- E1.2 The following Information Drawing is applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
Figure 1	Polymer and Sludge Flow Schematic

#### E2. GOODS

- E2.1 The Contractor shall supply and deliver sludge dewatering polymer in accordance with the requirements hereinafter specified.

#### E3. DELIVERY

- E3.1 Goods shall be delivered on an "as required" basis during the term of the Contract, f.o.b. destination, freight prepaid, to the following location:  
NEWPCC.  
Sludge Dewatering Facility  
2230 Main Street  
Winnipeg, Manitoba  
R2V 4T8
- E3.1.1 Goods shall be delivered within thirty (30) Business Days of the placing of an order, except where otherwise agreed at the time of ordering.
- E3.2 Goods shall be delivered between 8:00 a.m. and 4:00 p.m. on Business Days. The Contractor shall notify the Contract Administrator twenty-four (24) hours in advance of delivery.
- E3.3 Access to the unloading area in the Sludge Dewatering Facility is through doors 4 m wide by 3.2 m high. The Sludge Dewatering Facility does not have a loading dock. The load shall be positioned on the edge of delivery vehicles for off-loading by City owned and operated forklift. Shipment shall be made in 700 - 800 kg bags positioned on **wooden** pallets.
- E3.4 The Polymer bags shall be suitable for lifting by crane and bottom discharge. The bags must be water resistant construction to ensure no moisture enters the product during shipment or while in storage prior to use.

#### E4. POLYMER

- E4.1 Safety
- E4.1.1 The polymer shall be acceptable for use as determined by the City of Winnipeg Employee Occupational Safety and Health Department and shall not be injurious to the health of those persons coming in contact with it.
- E4.2 Polymer Type
- E4.2.1 Polymer shall be dry, contain no lumps and shall be free flowing with no bridging or funnelling in the bag or hopper. The product shall contain no foreign material, including pieces of bag material.

#### E4.3 Quality

- E4.3.1 The Contractor will be required to supply sufficient analytical information on his polymer to enable the City of Winnipeg laboratory services personnel to carry out quality control tests on each shipment, if required.

### E5. SLUDGE QUANTITIES

- E5.1 Liquid sludge is dewatered mechanically through the use of six (6) Sharples PM 76000 Centrifuges. Currently two (2) machines are normally in operation. Quantities of sludge that have been dewatered (on a dry tonne basis) since the plant began operation in July, 1990 are as follows:

Minimum monthly quantity	858
Average monthly quantity	1030
Maximum monthly quantity	1159

- E5.2 Minimum annual sludge quantity dewatered is expected to be 12000 dry tonnes.
- E5.3 Influent sludge consistency varies from 1.8 - 4% and dewatered sludge cake total solids content has ranged from 20 - 30%. Centrate total suspended solids have ranged from 300 - 2500 milligrams per litre.

### E6. PRE-BID TESTING

- E6.1 Every bidder can do pre-bid bench scale testing if he so desires.
- E6.2 Arrangements will be made for the Bidders to perform pre-bid bench scale testing to evaluate their product for the sludge dewatering facility. Arrangements for the test can be made with the Contract Administrator and shall be done during the time period of December 6 to December 10, 2004.
- E6.3 Each Bidder will be allowed four hours to perform tests and only one Bidder at a time will be scheduled to perform tests.
- E6.4 Bench scale testing will take place on the main floor of the NEWPCC Sludge Dewatering Facility, 2230 Main Street, Wpg, MB.
- E6.5 All costs incurred by the Bidders during the bench scale testing shall be at their own expense.
- E6.6 Bidders will be provided with a bench, twenty litres of digested sludge and wash up facilities. Bidder shall clean the area after performing tests.
- E6.7 City laboratory services personnel will perform a maximum of two total solids tests for each Bidder to confirm digested influent sludge content.
- E6.8 A tour of the Sludge Dewatering Facility will be provided.

### E7. POLYMER PERFORMANCE REQUIREMENTS

- E7.1 The polymer shall meet the following performance criteria.
- |  |  |
|--|--|
| (a) Solid Content of Dewatered Sludge Cake | 22% minimum (Dry Weight)                     |
| (b) Suspended Solids in Centrate           | 2500 mg/litre (Milligrams per litre) maximum |

## **E8. FULL SCALE TESTING**

- E8.1 The City may conduct a full scale test after the Bid Opportunity closing date during the month of January 2005.
- E8.2 Testing dates are dependent on plant operation and will be confirmed following the Bid Opportunity closing date.
- E8.3 Polymer used during the full scale testing shall be paid for by the City at the quoted unit price in the Bid Opportunity Submission. Expected polymer consumption during the full scale testing is the equivalent of 700 - 800 kilograms of 100% active ingredient polymer.
- E8.4 Arrangements for delivery of polymer will be made by Contract Administrator.
- E8.5 The full scale testing will be scheduled as follows:
- (a) Day 1 Polymer preparation and conditioning. From 0900 to 1500 hours the Bidder together with the plant operators will conduct polymer dosing tests using methods in accordance with normal plant operations. The plant operators will adjust the dosing rate as recommended by the Bidder.
  - (b) Day 2 By 0730 hours the supplier shall advise the dewatering plant senior operator of the recommended polymer dosage rate to be used for the remainder of the full scale evaluation. The final testing will be based on this recommended dosage rate.
  - (c) Day 2 to Day 4 The plant operators will evaluate the polymer and will conduct daily evaluation starting at 0800 hours in accordance with the following sampling procedures.
- E8.6 The sludge feed rate will be 12 to 14 litres per second.
- E8.7 Sampling Procedures
- (a) Feed - One composite sample, aliquots taken every 2 hours\*.
  - (b) Polymer - One composite sample, aliquots taken every 2 hours\*.
  - (c) Cake and Centrate - 4 individual grab samples taken every 2 hours\*. Sludge cake will be analysed for total solids content. Centrate will be analysed for total suspended solids.
  - (d) \*Grab samples will be taken at 0900, 1100, 1300 and 1500 hours.
- E8.8 The City will operate centrifuges and will monitor performance in accordance with normal plant operations. Bidders may be present during Day 2, 3 and 4 (between 1:00 p.m. and 3:00 p.m.) if they so desire, to observe the full scale testing but they will not be allowed to participate in actually operating the equipment. The Bidder shall communicate with the Contract Administrator or his designate as necessary.
- E8.9 The full scale testing may be terminated at any time at the discretion of the Contract Administrator.
- E8.10 The daily test results will be averaged arithmetically and the performance of the polymer will be evaluated on the basis of these averages.
- E8.11 If a full scale test is done the Bid Price used in the evaluation of the Bid Submission for award of the contract will be based on a formula determining the cost of producing one dry tonne of Dewatered Sludge using the hauling cost/wet tonne, a solids reprocessing cost/kg and the unit price bid for polymer/kg. Average polymer dewatering performance characteristics achieved during the full-scale test will be used in this evaluation.

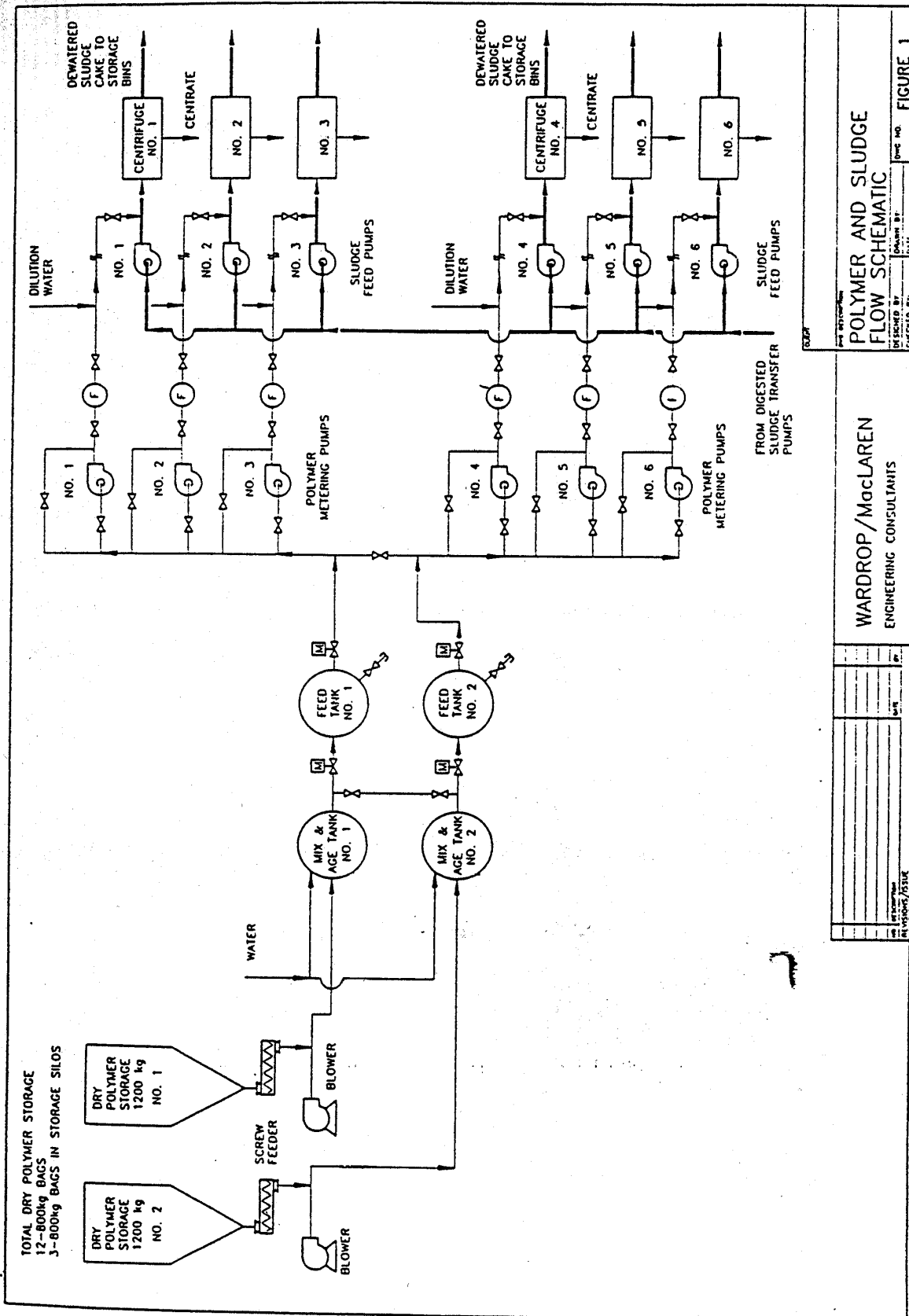
## **E9. SLUDGE DEWATERING FACILITY DESCRIPTION**

- E9.1 The City of Winnipeg operates the NEWPCC, SEWPCC and WEWPCC treatment Plants. The NEWPCC is the largest plant and the only plant that has sludge digestion capabilities. Co-thickened primary and secondary sludge is hauled from the SEWPCC and from the WEWPCC to the NEWPCC for digestion and dewatering.
- E9.2 The sludge dewatering building at the NEWPCC has been designed to provide sludge dewatering based on processing sludge quantities from the three wastewater treatment facilities. The Bidder shall be aware the City will be upgrading the treatment plants and that by 2007 the treatment process at the NEWPCC may include the addition of metal salts (Ferric Chloride or Alum) for Biological Nutrient removal and, that the treatment process at the WEWPCC will be upgraded to achieve a decrease in the Nitrogen content and an increase in the Phosphorous content of the sludge. The contribution from the WEWPCC is approximately 10% of the volume of sludge treated at the NEWPCC.
- E9.3 The dewatering facility operates seven days/week on a twenty-four hour basis. Dewatered sludge is stored in enclosed sludge storage bins in the dewatering facility overnight when the dewatering operation is active but sludge hauling is not active. The dewatered sludge is loaded into trucks inside the building for transport to disposal.

## **E10. POLYMER HANDLING SYSTEMS**

- E10.1 The dewatering facility has a dry polymer makeup system. A polymer and sludge flow schematic is shown in Figure 1.
- E10.2 The Contractor is responsible for ensuring that his polymer is compatible with the polymer equipment and systems at the NEWPCC Sludge Dewatering Facility.
- E10.3 Dry polymer is loaded into the stainless steel storage hopper by the City of Winnipeg personnel. When the plant control system calls for a new batch of polymer to be made up, the appropriate quantity of polymer is measured out by a screen feeder and pneumatically fed to a Jet Wet mixing head on top of the mix and age tank. Additional water is added to the mix and age tank and the polymer solution is aged for one hour before draining to the polymer feed tank. Polymer is pumped from the feed tank to the centrifuges as called for by the plant control system.

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**POLYMER AND SLUDGE FLOW SCHEMATIC**

**WARDROP/MacLAREN**  
 ENGINEERING CONSULTANTS

FIGURE 1

DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 SCALE: \_\_\_\_\_