



## **Data Submittal for Water Quality Monitoring Event #1 on 20 May 2003 Providence River and Harbor Maintenance Dredging Project**

**Event Monitored:** First disposal event – CAD Cell 1R – high tide disposal on 20 May

**Applicable Water Quality Certification Conditions:**

- 26a – dissolved metals and TSS for the first high tide disposal event
- 31a – toxicity for the first high tide disposal event

**Associated Files:**

- Prov\_R\_1\_stn – Microsoft Excel document with station and sample ID information (Table 1-1)
- Prov\_R\_1\_data – Microsoft Word document with analytical results (Tables 1-2 through 1-4)
- Prov\_R\_1\_figure – pdf document showing the sampling locations (Figure 1-1)

**Summary:**

The first disposal event into cell 1R took place at 1233 on 20 May 2003, shortly after the predicted high tide for Providence (4.4 feet at 1225). Dredge 51 was actively working just south of the disposal cell prior to and following the disposal event, removing maintenance material from over cell 3R and a surrounding buffer (see Figure 1-1).

Pre-disposal monitoring was performed during the latter stage of the incoming flood tide, and a reference sample was collected up current (south) of the dredging and disposal locations prior to disposal (UCR1 in Figure 1-1 and Table 1-1). The monitoring revealed a relatively uniform water column of low turbidity water on the incoming tide. A turbidity plume was identified down current of Dredge 51 (moving north toward cell 1R), and samples were collected within the plume to characterize the potential influence of the dredging on the disposal monitoring (DRG1 in Figure 1-1).

Post-disposal monitoring revealed a turbidity plume of limited intensity (less than that identified for the dredging) down current of the cell (now in the ebb tide direction). As the tide continued to ebb, the monitoring tracked the low intensity plume moving south toward the dredge. Monitoring was then shifted to the down current side of the dredge as the trajectory of the disposal plume indicated it would pass beneath the dredge/scow working over cell 3R. A turbidity plume of greater intensity was identified near the bottom, down current of the dredge at the compliance point for metals (1500 feet down current of the disposal). Although the elevated turbidity was likely caused by the dredging (the disposal plume should have further dissipated by this time), it coincided with the estimated time for disposal plume migration to the compliance point for metals, and samples were collected in the location of peak turbidity (CM in Figure 1-1). Although not specifically required, a full-depth composite water sample was also collected at station CM for analysis of toxicity to further characterize potential impacts associated with the disposal.



As the turbidity was elevated to approximately 10-15 NTU above background near the bottom at the compliance location 1500 feet from the disposal, attempts were made to track the plume further down current and collect additional samples as per Condition 29 of the Water Quality Certification Condition. However, the plume was not identified further down current (turbidity returned to background levels), and the additional samples were collected at a location approximately 2500 feet from the disposal cell (CM2 in Figure 1-1) at the time the plume was estimated to be passing based on current velocity. Post-disposal monitoring continued, but was unable to identify any disposal (or dredging) related turbidity plume further down current. As a result, the compliance samples for toxicity were collected at Fields Point at the time of slack low tide.

Results of the analysis of TSS and dissolved metals are presented in Table 1-2. Elevations of TSS above background coincide with the elevated turbidity and acoustic backscatter measurements of the real-time monitoring. Dissolved silver concentrations were below the reporting limit of 0.5 ug/L for all samples, well below the acute water quality criterion of 1.9 ug/L. Dissolved copper concentrations were all below the acute water quality criterion (4.8 ug/L) with concentrations ranging from 0.56 to 2.1 ug/L, and the highest concentration was reported at the reference location.

Results of the *Arbacia punctulata* fertilization test are presented in Table 1-3, and the mean fertilization was above 98% for all samples with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (Fields Point) and the additional sample at 1500 feet from the disposal cell. Results of the *Arbacia punctulata* embryo survival and development test are presented in Table 1-4. The mean embryo survival was at or above 96% for all samples. The mean normal embryo development was at or above 94% for all samples, with no statistically significant difference between the reference sample and the samples collected down current at the compliance point (Fields Point) and the additional sample at 1500 feet from the disposal cell.