6.0 REVIEW OF HANDLING AND CONTROL OF ONSITE SURFACE WATER

6.1 Introduction

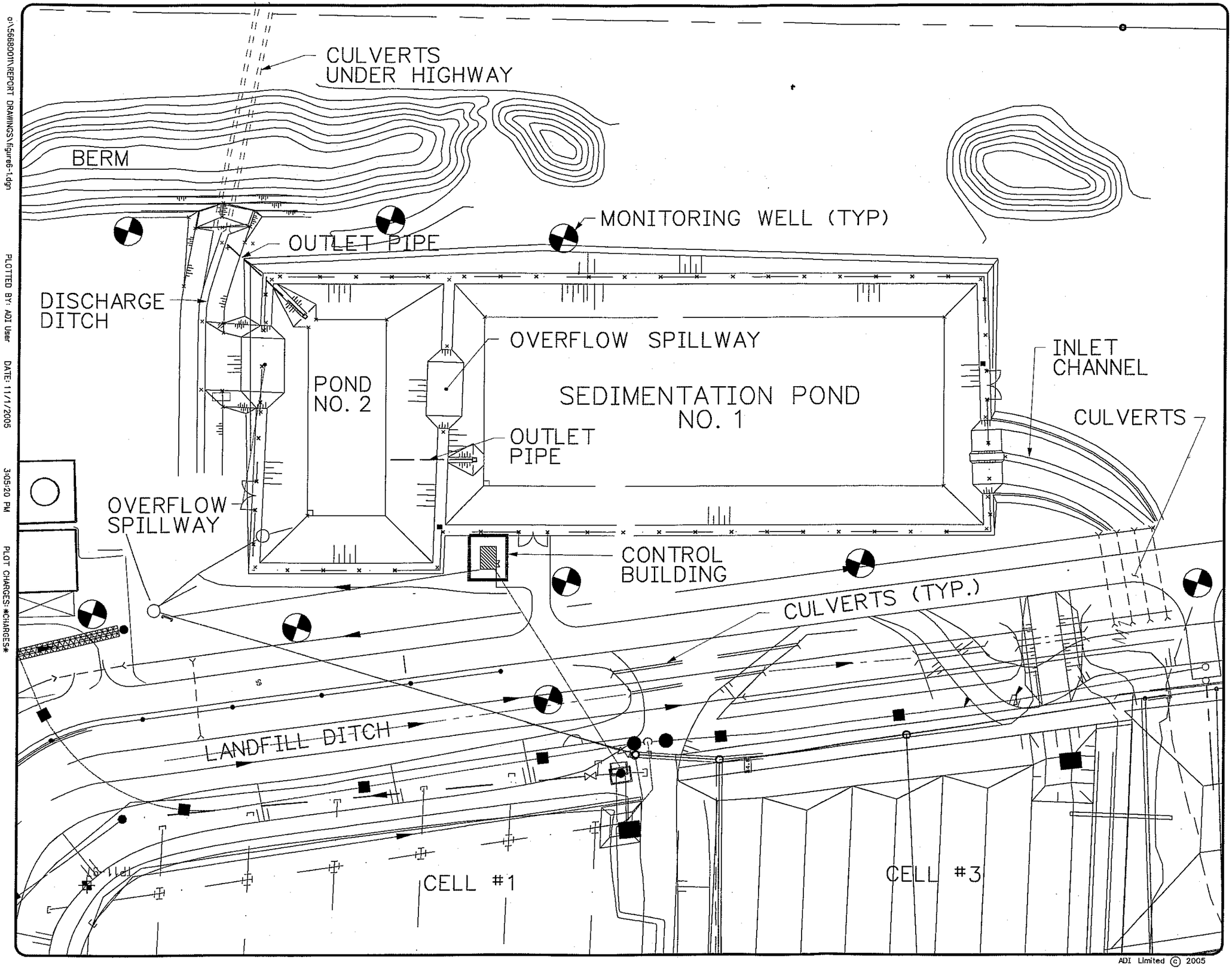
This chapter provides a Review of Handling and Control of Onsite Surface Water, Specification 3.4, which includes the following:

- *Effectiveness of sedimentation ponds in treating and containing surface runoff during normal conditions.*
- *Effectiveness of sedimentation ponds in treating and containing surface water during conditions of heavy or extended precipitation.*
- *Effectiveness of monitoring of surface water runoff.*

The management of on-site surface water at the landfill involves the diversion of clean water away from the landfill, and the collection and possible treatment of water from within the landfill operations areas. The access road around the landfill creates a berm that separates the clean stormwater from the potentially silty stormwater. Most water from outside the roadway berm is diverted around the landfill and into the two creeks on either side of the landfill. They are the Mill Creek to the south and Mellinger Brook to the north.

Drainage from within the existing and future landfill footprint is considered to be potentially silt-laden and therefore must pass through the stormwater sedimentation ponds before discharge to Mellinger Brook. The stormwater treatment system, shown in Figure 6-1, includes two sedimentation ponds and a control building. The stormwater management system were designed to handle a 1 in 100 year storm event.

The surface water is directed to the first and largest pond. The water is contained within this pond until it is ready for discharge to the second pond or the pond overflows. If the water required treatment to reduce the turbidity, then a flocculent is added to enhance the settling of the suspended solids. This is done by drawing water from the north end of the pond, injecting the flocculent, and pumping the water to the south end of the pond. Once the solids settle, the water can be released to the second sedimentation pond and then discharge to the creek.



No.	Revision	Ckd. By	Date

PRELIMINARY

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INDEPENDENT EXTERNAL REVIEW OF CRANE MOUNTAIN LANDFILL

Dwg. Title

STORMWATER MANAGEMENT SYSTEM

Project No.	5668-001.1		
Dwg. No.	FIGURE 6-1	Rev. No.	0
Scale	1:1000		

This drawing is not to be scaled

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6.2 Effectiveness of Sedimentation Ponds During Normal Conditions

The effectiveness of the sedimentation ponds in treating and containing surface runoff during normal weather conditions is considered in this section. The performance of the ponds is measured by monitoring the Total Suspended Solids (TSS) level of the discharge from the ponds. The discharge criteria is for a maximum TSS level of 25 mg/L. The following is the monitoring data from 2004.

2004 Sedimentation Ponds Discharge Data

Date	TSS at mid-point of Discharge (mg/L)	FRSWC Comments
May 26, 2004	5	Untreated
September 27, 2004	4.5	Treated with Sternpac
October 29, 2004	1.5	Treated with Sternpac
November 29, 2004	162	See note 1
Note: FRSWC states: Sampled at pond high level overflow, discharge valve is closed. See Dec 2, 2004 letter, product arrived and treatment of pond 1 started on the 30th. It was released on Dec 9th at the direction of DOELG.		

From the 2004 data, it can be seen that sometimes the water in the sedimentation pond is clean enough for direct discharge without any treatment. Other times treatment with the Sternpac flocculent is required prior to discharge.

The December 2, 2004 FRSWC letter indicates that the use of the flocculent in September 2004 was the "first time in almost two years that the sedimentation ponds required treatment prior to release". In general, the stormwater management system operates effectively under normal conditions, where normal conditions refer to average rainfall and standard landfill operations.

Figure 6-2 shows photos of the sedimentation ponds under two different operating conditions. Under normal situations the ponds are clear. Under adverse operating conditions significant siltation can occur, as can be seen in the first sedimentation pond prior to treatment. This occurred during the construction of Cell #4.

Under Normal Conditions June 2004

Under Adverse Conditions May 2005

Aerial Photos of Sedimentation Pond **Figure 6-2**

The November 29, 2004 incident could be considered a heavy precipitation event, as well as a result of construction activities, and is discussed in the next section.

6.3 Effectiveness of Sedimentation Ponds During Conditions of Heavy Precipitation

The effectiveness of the sedimentation ponds under adverse conditions was tested on November 29, 2004. A combination of factors occurred simultaneously resulting in the discharge of silty stormwater with a TSS level of 162 mg/L, compared to the limit of 25 mg/L. The reported factors leading to this problem were, heavy rainfalls in the two weeks prior to the event, ongoing construction of the Surge Pond and Cell 4, and the lack of liquid flocculent on-site at that time.

The 1997 design information states that the sedimentation system was designed for a 1-in-100 year storm event and therefore should be able to handle the heavy rainfall events. The lack of the Sternpac flocculent prevented treatment of the stormwater prior to discharge, or in this case overflow of stormwater. Subsequently the landfill now stores extra dry flocculent on-site so that it is always available.

The other adverse factor was the ongoing construction of the Surge Pond and Cell 4. All the silt-laden runoff from these construction areas has to be routed through the sedimentation ponds to remove the silt. Possibly the system would have been able to reduce the TSS level below 25 mg/L if the flocculent had been available, but perhaps a specific stormwater management plan is warranted for construction activities. This could include the diversion of clean stormwater from stabilized areas of the landfill, as suggested in Environmental Coordinator's December 2, 2004 letter, and ensuring that the sedimentation pond is kept at a low level during construction so that there is a significant buffer capacity for storm events.

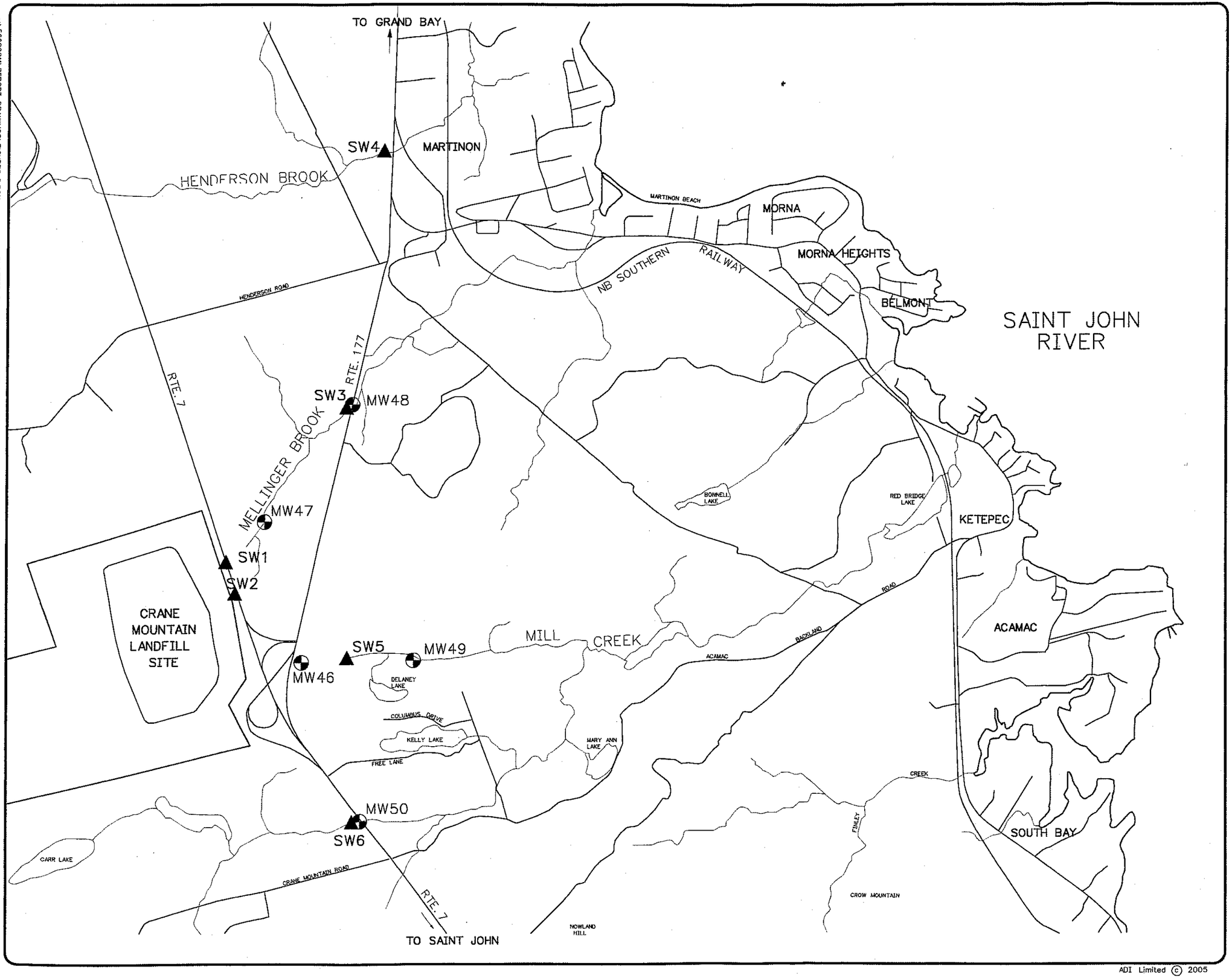
6.4 Effectiveness of Monitoring of Surface Water Runoff

The Approval to Operate requires that each discharge of water from the sedimentation pond is sampled and analyzed for TSS (Item 80). In addition, Item 89 requires surface water sampling at six surface water sites and at the sedimentation pond. The current Approval requires that this sampling be done in April and September every year, and the samples be analyzed for general chemistry (see Item 82 of the Approval to Operate in Appendix A).

The surface water monitoring sites are shown on Figure 6-3. They include one on Henderson Brook in Martinon, three on Mellinger Brook into which the sedimentation pond discharges, and two on the Mill Creek system. Thc frequency of monitoring (two times per year) is considered to be the minimum acceptable. The analytical suite is considered adequate, and screens for a number of typical landfill leachate impact indicator parameters (e.g. chloride, conductivity, ammonia).

The current surface water monitoring program is considered adequate in terms of sampling locations and analytical suite. However, regarding water quality sampling frequency, a data gap was noted in the information provided (no results for 2002). Such a gaps should be avoided. It is suggested that trend plots of key leachate impact indicator parameters (e.g. chloride, conductivity) be maintained as part of the ongoing monitoring review and interpretation process.

It is noted that ACAP Saint John conducts additional independent water quality monitoring on Mill Creek and Mellinger Brook. Their program involves sampling during thc summer monthes of June thru August. The data for Mellinger Brook indicated high turbidity in August 1998. This coincided with the construction of Cell #2. Since that time the turbidity and conductivity levels have remained low except for some slightly higher values in 2001. The results for Mill Creek indicate generally good water quality.



SW4 ▲ SURFACE WATER MONITORING SITE

MW46 ⊕ OFF-SITE GROUNDWATER MONITORING WELLS

No.	Revision	Ckd. By	Date

PRELIMINARY

Const. North

Drawn By: OSE

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INDEPENDENT EXTERNAL REVIEW OF CRANE MOUNTAIN LANDFILL

Dwg. Title

SURFACE WATER MONITORING SITES

Project No.	5668-001.1		
Dwg. No.	FIGURE 6-3	Rev. No.	0
Scale	1:20000		

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