system. The purpose of the interim final cover is to control surface water runoff, leachate generation and containment, odor control and provides a visual appearance similar to the surrounding area. Interim final cover will also be installed on areas of the landfill that have not or will not receive waste within one year, regardless of the area reaching final waste elevations.

Interim Final Cover

Interim final cover soil for the existing landfill will consist of relatively homogeneous, natural soil, which is free of material that, due to nature, size or shape, is deleterious to the intended use. No particles larger than 6-inch in maximum dimension (per ASTM D 422) will be allowed. The material will have at least 30 percent passing the No. 200 sieve by weight and will be classified according to the Unified Soil Classification System (per ASTM D 2487) as CL, ML, SC, SM, GM, or GC.

The interim final cover soil will be placed on the existing landfill in two or more lifts as required to meet the minimum 24-inch thickness requirement. The initial lift of soil will be spread over the underlying waste/temporary cover soils to a loose thickness not exceeding 14 inches and the soil will be uniformly compacted with a minimum of two passes by a minimum 10 ton padfoot compactor, or by other acceptable means. The succeeding lift(s) of interim final cover soil will be placed to a loose thickness of 14 inches or less as needed to meet the 24-inch thickness requirement and uniformly compact the soil. Additional soil will be placed or grades as needed to meet the minimum 24-inch thickness requirement. A pass is defined as one back and forth traverse by the compactor over the same area.

The interim final cover for the proposed landfill will be constructed 27-inches in thickness, consisting of 24-inches of soil having the ability to achieve a permeability of $1x10^{-6}$ cm/sec and 3-inches of topsoil. The lower 24-inches of soil shall be placed in two loose lifts of sufficient thickness to achieve a compacted thickness of 12-inches for each lift. The placement and compaction criteria for this soil shall be determined based on developing a moisture density relationship with comparisons to remolded permeability tests. If the soil is similar to the soils being used at the site for low permeability liner construction, sufficient data should exist to allow for placement of the soil following the same compaction criteria as was used for the liner. If the soil source is different, or significant changes in index properties are noted, additional testing will be required in combination with the construction of a test pad to determine the required compaction criteria.

In areas within 2 feet of gas wells the material will be compacted with hand-held compaction equipment. Heavy equipment and trucks will be prohibited from traveling on the finished interim cover soil areas, and any ruts or low areas will be filled to provide positive drainage and promote stormwater runoff from the interim cover area.

Existing Landfill Schedule

In general, the site will be filled and final cover will be applied in five stages as shown in Figure 3. Stage 1 has already been completed and final cover was applied over this area in 2001 and 2002. The remaining Sections 2 through 5 will be filled and allowed to settle for a period of time before the final cover system is constructed. As each section of the landfill reaches final grade, the interim final cover will be applied to the area. After the rate of waste settlement in a completed area has diminished significantly, the final cover system will be applied. In areas where significant settlement has taken place, additional waste will be placed to achieve the final permitted waste grades prior to application of the final cover system.

Interim final cover will be placed on areas of waste that will not or have not received waste for one year in accordance with Condition 3 of the current Part 360 Permit.

Construction Seasons 2001 and 2002

Applied final cover system to Section 1.

Completed construction of the east and southwest berms within the limits of Sections 2, 3, and 5.

Construction Season 2003

Fill Section 2 to top of waste elevation 1655 feet. Total estimated volume is 180,000 cubic yards (approximately 146,000 tons). Grade upper plateau of waste area at 4 percent slope and outer final slopes at three horizontal to one vertical (3H:1V). Grade interim south slope at 3H:1V slope to Sections 3, 4, and 5.

Apply interim final cover to Section 2.

Complete construction of southeast berm within limits around Section 4.

Construction Season 2004

Fill Section 3 to top of waste elevation 1647 feet. Total estimated volume is 450,000 cubic yards (approximately 365,000 tons). Grade outer final slopes along west and south sides at 3H:1V. Grade interim east slope at 3H:1V toward Section 5.

Apply interim final cover to Section 3.

Construction Season 2005

Fill Section 4 to top of waste elevation 1627 feet. Total estimated volume is 450,000 cubic yards (approximately 360,000 tons). Grade outer final slopes along east and south sides at 3H:1V. Grade interim west slope at 3H:1V toward Section 5.

Apply interim final cover to Section 4.

Construction Season 2006

Complete filling of landfill (Section 5) to top of waste elevation 1655 feet. Total estimated volume is 360,000 cubic yards (approximately 292,000 tons). Grade upper plateau of waste area at 4 percent slope and outer final slope along south side at 3H:1V.

Apply interim final cover to Section 5.

Apply final cover to Section 2.

Construction Season 2007

Apply final cover system to Section 3 as rate of settlement of waste diminishes.

Construction Season 2008

Apply final cover system to Section 4 as rate of settlement of waste diminishes.

Construction Season 2009

Apply final cover system to Section 5 as rate of settlement of waste diminishes.

Proposed Landfill Schedule

As shown in Figures 9 through 13, the site will be constructed and filled in five stages. The schedule for installing the interim final cover will be based upon waste placement schedules and development of the proposed cells. In general, interim final cover will be placed on the outside slopes of the landfill upon reaching grade and will be placed in the following order. The interim final cover will also be installed on areas of the landfill that have not or will not receive waste within one year, regardless of the area reaching final waste elevations. Upon reaching final waste grades, 12-inches of intermediate cover will be placed to comply with 6NYCRR 360-2.17(d). As time and weather allows, the intermediate cover might be removed and replaced with interim final cover followed by seeding and mulching as per Section 9.2.1. Seeding of the interim final cover will not take place during freezing or inclement weather periods, and will be completed as soon as practical.

The schedule for installing the final cover is shown on Figure 14. The areas proposed for final cover placement are divided into five capping events that are scheduled based on the anticipated cell construction sequence and a waste receipt rate of 600,000 tons per year (exclusive of BUD). The figure presents the approximate area scheduled for final cover placement, the year since initial construction and the year that the capping event is scheduled to take place. As shown on the figure, capping events one and two will be performed prior to completing the landfill cell construction. Events three through five will occur over several construction seasons depending upon the rate of waste receipt.

In general, the site will be filled and final cover will be applied in five events. As each section of the landfill reaches final grade, the interim final cover will be applied to the area. After the rate of waste settlement in a completed area has diminished significantly, the final cover system will be applied. In areas where significant settlement has taken place, additional waste will be placed to achieve the final permitted waste grades prior to application of the final cover system.

Final Cover

Prior to the installation of the final cover system, the interim cover will be stripped and removed to a minimum thickness of 6 inches. The final cover system will be constructed once portions of the site have reached design height and initial settling has occurred.

The final cover system for the existing landfill will consist of the following components in the ascending order:

For all slopes

- Prepared grading layer over the waste
- Geocomposite gas venting layer
- Geomembrane liner
- Geocomposite drainage layer
- 24-inch barrier protection layer
- 6-inch topsoil layer

The final cover system for the proposed landfill will consist of the following components:

For 3H:1V slopes

- Prepared grading layer over the waste
- Geocomposite gas venting layer
- Geomembrane liner
- Geocomposite drainage layer
- 24-inch barrier protection layer
- 6-inch topsoil layer

For 4% slopes

- Prepared grading layer over the waste
- Geocomposite gas venting layer
- Minimum 18-inch barrier soil layer (Permeability less than $1x10^{-6}$ cm/sec. The thickness shall be verified through permeability testing.)
- Geomembrane liner
- Geocomposite drainage layer
- 24-inch barrier protection layer
- 6-inch topsoil layer

The specifications and construction requirements for the final cap materials will meet the requirements of 6 NYCRR Part 360-2.13(r). Engineering design and Construction QA/QC procedures must be submitted and approved by the NYSDEC prior to constructing the final cap. A construction certification report will be submitted to the Department within 45 days after the completion of landfill closure construction. The report will include all items required under §360-2.15(d)(7).

9.2 Cover Maintenance

9.2.1 Seeding and Mulching

Seeding and mulching will occur within 14 days of completion of intermediate, interim or final cover construction. The seed mixture will be in accordance with following seed mixture for either temporary or permanent uses.

Name of Grass	Application Rate Per Acre	Purity	Germination
Perennial Ryegrass	10 pounds	95%	85%
Kentucky Bluegrass	20 pounds	85%	75%
Strong Creeping Red Fescue	20 pounds	95%	80%
Chewing Fescue	20 pounds	95%	80%
Hard Fescue	20 pounds	95%	80%
White Clover	10 pounds	98%	75%

The seeded areas will be mulched to conserve soil moisture and provide additional temporary erosion protection. Mulch may consist of clean hay, straw or wood-fiber. Alternatively hydro seeding may be used or the inclusion of a natural or synthetic erosion mat may be installed prior to seeding.

9.2.2 Mowing

Vegetated cover areas will be mowed on an annual basis. Initial mowing will not begin until after vegetated areas have completed one growing season and the grasses have set and dropped seeds.

One of Chaffee Landfill's goals is to establish grassland bird habitat on areas of the landfill that have been final capped. In order to best manage the final capped areas for grassland birds, half of the final capped areas of the landfill should be mowed each year. This mowing practice is based on the findings of the breeding bird surveys performed at the several final capped Waste Management landfills in Western New York (see Appendix H). The results of the breeding bird surveys on the capped landfill indicate that the sites were excellent habitat for several grassland species that are either absent or uncommon in the general area.

9.2.3 Cover Assessment

Chaffee Landfill will implement a program of assessing daily and intermediate cover in accordance with the Cover Integrity Assessment form in Appendix B3a. Other cover inspections are also performed in accordance with the Stormwater Pollution Prevention Plan (SWPPP) and the gas Collection and Control System (GCCS) Plan cover integrity inspection. The inspection frequency and reporting requirements are discussed in those plans. Copies of the SWPPP and GCCS plan are on file at the facility.

9.3 Quantity Of Cover Material

The following are the estimated material needs for the existing landfill's final cover system;

6" Suitable Subbase Soil;	41,000 CY
Gas Venting Geocomposite;	250,000 SY
LLDPE Liner;	250,000 SY
Drainage Geocomposite;	250,000 SY
Barrier Protection Soil (24 inches);	165,000 CY
Topsoil (6 inches);	41,000 CY

These quantity estimates are based on approximately 50 acres of cover system construction. The components of the cover and their thickness are as stated in the current 6 NYCRR Part 360 regulations. Criteria for placement of the final cap materials can be found in the final cap design drawings prepared by Benchmark in 2001, Chaffee Landfill Berm, Cover System, Gas Collection & Leachate Storage Construction drawings, and 2002, Chaffee Landfill 2002 Construction Project drawings, and by Golder Associates in 2003 Final Cover and Berm Construction Project drawings.

The following are the estimated materials needs for the proposed landfill's final cover system;

6" Suitable Subbase Soil;	48,671 CY
Gas Venting Geocomposite;	292,025 SY
Barrier Soil (18 inches on 4% slopes)	25,229 CY
LLDPE Liner;	292,025 SY
Drainage Geocomposite;	292,025 SY
Barrier Protection Soil (24 inches);	194,683 CY

Topsoil (6 inches); 48,671 CY

These quantity estimates are based on approximately 58 acres of cover system construction. The components of the cover and their thickness are as stated in the current 6 NYCRR Part 360 regulations. Criteria for placement of the final cap materials will be based upon design drawings, specifications and QA/QC plans developed for each capping event. These plans will be submitted to the NYSDEC for review and approval prior to beginning the construction of each capping event.

Stockpiles of materials will be made available for emergency, daily, intermediate or interim covers.

10. ENVIRONMENTAL MONITORING PLAN

The Environmental Monitoring Plan for the existing Chaffee Landfill is a separate stand alone document that includes groundwater, surface water and leachate monitoring. The February 1999 revision to the EMP was submitted to the NYSDEC and approved as part of the Part 360 permit renewal in October 1999. The existing EMP includes discussions pertaining to the operation and maintenance of the monitoring points.

For the proposed western landfill expansion, the Environmental Monitoring Plan is included as Part IX of this submittal. The proposed EMP includes discussions pertaining to the operation and maintenance of the monitoring points.

10.1 Groundwater Collection System

For the proposed western landfill expansion, Cell 6 has been designed with a groundwater collection system in accordance with 6 NYCRR Part 360-2.13(d). This system will collect potential groundwater through a geocomposite drainage material, which will direct the water to a collection trench and pipe, which then flows to a collection sump where a submersible pump will discharge the water into the perimeter drainage swale.

The groundwater collection pump will consist of an EPG wheeled sump drainer, model WSD2-2 and be installed into a 12-inch HDPE sideslope riser. Associated flow meters and valves will also be installed within each of the sideslope riser. The riser pipe will allow for the pump to be removed for repair and replacement if necessary. The groundwater pump is sized to remove 10.5 gpm at 32 feet of total head.

Groundwater Sump Pumping System Control/Operation

The groundwater collection pump will be configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high level probe, which are described below;

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the sump has a liquid level of 12-inches.

- Pump-On: initiated by a high-level conductance probe located in the sump and interlocked to the pump starter in the pump control panel. This is activated when the sump has a liquid level of 18-inches.

- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. This alarm is activated when the liquid level in the sump reaches a level of 24-inches and will deactivate when the liquid level in the sump drops to a level of 23-inches.

An Autodialer will also be installed as part of the leachate storage tank controls and will be formatted to send an alarm in the event that a high liquid level alarm condition in the groundwater sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

The groundwater sump pumps are operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the leachate loadout building must be in the "On" position. Note; both disconnect switch and circuit breaker should normally be in the "On" position.

- Sump normally operates with Hand-Off-Auto Switch (H-0-A) switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the groundwater level in the sump reaches the "pump on" level probe, and turns off automatically when the groundwater level in the sump reaches the "pump off" level probe.

- Typically the sump would only operate with the Hand-Off-Auto Switch (H-0-A) switch in the "Hand" position if there were problems with the sump level probes.

- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

Groundwater Sump Pumping System Inspection

Inspection of the groundwater collection sumps consists of daily and monthly activities and are listed in Appendix B3c and B3e. Once a day, the flow meter in the sump will be read and the amount of groundwater generated will be recorded on the form in Appendix B3c. Each month, the high level alarm and flow meter for the sump will be checked to ensure proper functioning (form in Appendix B3e).

11. LEACHATE MANAGEMENT PLAN

11.1 Introduction

This section addresses the requirements of 6 NYCRR Part 360-2.9(j) and 2.17(g) regarding leachate management. The existing and proposed Chaffee Landfill is constructed, operated, and maintained in a manner that is intended to limit the quantity of leachate generated, and to prevent the migration of leachate into surface water and groundwater. This section addresses how leachate has been and will be managed at the site to meet these goals.

11.1.1 Existing Landfill Leachate Collection System

The existing landfill's leachate collection system was constructed in two ways. The first included the construction of a perimeter leachate drain around the Original Fill Area (see Figure 15) with the installation of three collection tanks at location 1, 2 and 3. The second included construction of 24 inches of compacted liner material with an in-place hydraulic conductivity of less than 1.0×10^{-7} cm/sec to both the west and north of the Original Fill Area. The lined areas were constructed with approximately three percent slopes to allow leachate to drain to a series of leachate collection pipes and ultimately to collection tanks at locations 4 and 5. This complete system is referred to as the Former Leachate Collection System and is shown on Figure 15.

As the existing landfill began to reach capacity and portions were scheduled for closure, several components of the leachate collection system were replaced to allow for continued collection. This work allowed for the facility to better maintain and operate the collection system during closure and post closure. The work included retrofitting the existing leachate collection tanks at locations 1, 2, 3 and 4 by decommissioning the original tanks located within the landfill (see Figure 15), and replacing them with new tanks located outside of the landfill berm (see Figure 16). The leachate collection tanks at locations 3 and 4 were replaced with one double walled, cathodically protected steel tank. Leachate collection tanks at locations 1 and 2 were each replaced with a sump and riser located within the landfill and a double walled, cathodically protected steel tank located outside of the landfill. The existing leachate collection sump at location 5 remains in its original location. Leachate from sump 5 is manually pumped through a dual contained transfer line to the replacement tank for 3/4. The operation and maintenance plan for the existing system is discussed in Section 11.2.

11.1.2 Proposed Landfill Leachate Collection System

Each cell of the proposed landfill will be constructed with a double composite liner system meeting the requirements of 6 NYCRR Part 360-2.13. The double composite liner system contains a primary leachate collection layer and secondary leachate collection layer. The primary system is constructed with a granular drainage layer, collection pipes, collection sump and sump pump to allow for removal of the leachate to the gravity transmission line and on-site storage tanks. The secondary leachate collection system is constructed with a geocomposite drainage layer, collection pipes, collection sump and sump pump to allow for removal of liquid to the gravity transmission line and on-site storage tanks. The leachate storage system consists of two above ground storage tanks located within a secondary containment tank. Leachate flow into and out of the tanks is controlled by piping, valves and a loadout pump located in the control vault, which is constructed within the secondary containment tank. Leachate is transferred to tanker trucks through the loadout pump. Trucks are loaded on the loadout pad, which is located within the enclosed loadout building. The components of the proposed collection system are shown on Figure 17 and the design of the leachate collection system is shown in the Engineering Report Appendix C (Part IV of this submittal) and on the Engineering Drawings, specifically sheets 16 through 26. The operation and maintenance plan for the proposed system is discussed in Section 11.3.

11.2 Present Leachate Collection, Transmission and Storage System

11.2.1 Introduction

The existing Chaffee Landfill leachate collection, transmission and storage system is designed to collect and store leachate generated from the landfill in a manner that limits impacts to public health and the environment. Due to the fact that the operation of the landfill includes limiting the size of the working face, smaller amounts of precipitation are introduced into the waste mass, which limits the generation of leachate. Limiting leachate generation is also a result of applying daily, intermediate and interim cover as required by the regulations and the installation of a NYSDEC approved final cover system at closure.

The existing Chaffee Landfill's present leachate transmission and storage system is constructed with a series of interior leachate collection sumps (LCS) and exterior leachate storage tanks (LST) used to manage the leachate collected within the landfill. As part of the gas control system there are currently three condensate knockouts, which either transmit condensate directly to a LST or collect it in a storage tank for subsequent disposal. Two of the condensate knockouts drain liquid directly into either LST 1 or LST 2. The third condensate knockout consists of a tank, which collects liquid from the gas header just prior to the gas entering the flare, the operation and maintenance of this tank will be discussed in this section. The LCS and LST designations and numbering has been revised to reflect the design and operation of the present system. The current layout and location of the various sumps and tanks can be seen in Figure 16.

For the purposes of this Operation and Maintenance Plan the existing Chaffee Landfill leachate collection, transmission, and storage facilities are designated as follows:

- Leachate System 1,
- Leachate System 2,
- Leachate System 3/4,
- Leachate System 5, and
- Gas Condensate Knockout Tank.

Leachate generated at the existing facility is transported off-site by tanker truck to a permitted wastewater treatment facility. Currently, the landfill maintains agreements with the City of Niagara Falls Wastewater Treatment Facility and the Buffalo Sewer Authority. The landfill will

maintain agreements with at least two (2) treatment facilities. Copies of current Discharge Permits are included in Appendix D.

Hauling of leachate is primarily provided by Chaffee Landfill. A contract with a secondary leachate hauler, Tonawanda Tank Transport Service Inc. is maintained by the facility. A copy of the contract is included in Appendix E.

11.2.2 Leachate System 1 and 2

As shown on Figure 16, leachate generated along the eastern half of the existing facility is collected in perimeter perforated drain pipes that slope to either leachate collection sump 1 or 2 (LCS 1 or LCS 2). These sumps were installed in the location of the former leachate collection tanks 1 and 2, and consist of a manufactured HDPE sump with 24-inch diameter sideriser pipe daylighting along the outside of the landfill berm. Located within each of the siderisers is a sump pump equipped with level controls. Leachate is pumped from the siderisers to each of the new leachate storage tanks, denoted as either LST 1 or LST 2. These tanks are dual contained and have been equipped with a submersible pump, level controls, leak detection monitoring system and cathodic protection monitoring test station. The submersible pumps located within the tanks allow for leachate to be transferred to a tanker truck for off-site disposal. The tanker trucks are filled on concrete loadout pads, which have been constructed adjacent to the storage tanks.

In the event of a power failure, a diesel powered backup generator is located adjacent to the flare building. This generator can be manually started to operate both LCS 1 and 2 and LST 1 and 2. Instructions for operating the emergency generator can be found in Appendix I. If a power failure occurs at LCS 1 or 2 or at LST 1 or 2, an autodialer has been installed as part of these systems to transmit a power failure message to a list of site personnel. The receipt of this message will allow site personnel to initiate a manual startup of the generator.

Leachate Collection Sumps No. 1 and No. 2 Operation

Leachate is collected and pumped from LCS 1 and LCS 2 located along the toe of the east berm of the existing landfill. Each sump is equipped with an EPG WSDPT 5-2 wheeled sump drainer. The pump and associated level probes are located inside a 24 inch diameter HDPE sideslope riser pipe which is welded to the HDPE sump. The pump control panel is located at the corresponding leachate storage tank. This riser pipe allows the pumps and level probes to be

accessed for service, if necessary. The pumps are sized to pump approximately 15 gpm at 45 feet of total head.

Leachate Sump Pumping System Control/Operation

The leachate sump pumps are configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high-level probe (see Appendix A1 and A2) which are also described below;

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the liquid level in the sump has a level of 8-inches.

- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the liquid level in the sump has a level of 36-inches.

- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. The alarm is activated when the liquid level in the sump has a level of 42-inches and will deactivate when the sump drops to a liquid level of 41-inches.

- Interlock feature to shut down sump pump based on high liquid level condition in the leachate storage tank (i.e., alarm signal relayed from Tank Control Panel).

As stated above a control interlock between LST 1 and LCS 1 or LST 2 and LCS 2 have been installed to automatically shut off the sump pumps and / or will not start if a high liquid level condition exists at LST 1 and LST 2.

An Autodialer has also been installed as part of the LST 1 and LST 2 controls and has been formatted to send an alarm in the event that a high liquid level alarm condition in the sump occurs. The specifics of the Autodialer are discussed in the leachate storage tank operation section.

The leachate sump pumps are operated in the following manner;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note; both disconnect switch and circuit breaker should normally be in the "On" position.

- Sump normally operates with Hand-Off-Auto Switch (H-0-A) switch in "Auto" position. In the "Auto" position, pump will turn on automatically when the leachate level in the sump reaches the "pump on" level probe, and turns off automatically when the leachate level in the sump reaches the "pump off" level probe.

- Typically the sump would only operate with the Hand-Off-Auto Switch (H-0-A) switch in the "Hand" position if there were problems with the sump level probes.

- Alarm horn can be shut off by pressing the "Alarm Silence" button. This does not eliminate the alarm condition.

Leachate Sump Pumping System Inspection

Inspection of the leachate collection sumps consists of both weekly and monthly activities and are listed in Appendix B3d and B3e. The weekly inspection involves monitoring of the sideslope riser secondary containment inspection ports for any signs of leakage (form in Appendix B3d). Each month, the high level alarm will be checked to ensure proper functioning (form in Appendix B3e).

Leachate Storage Tank No. 1 and No. 2 Operation

Leachate that is collected and pumped from LCS 1 and LCS 2 will be directed to LST 1 and LST 2 respectively. Each of the leachate storage tanks were manufactured by Highland Tank and Manufacturing Company. Tank drawings and information are provided in Appendix A1 and A2. LST 1 and LST 2 are double-wall steel underground storage tanks with polyurethane coating for corrosion resistance, designated as Steel Tank Institute – P3 Tank (S.T.I. P-3). LST 1 has a 12,000-gallon capacity and LST 2 has a 25,000-gallon capacity. Both tanks have an interstitial space with a leak detection monitoring system to allow continuous monitoring of the entire interstice for the life of the tanks, a rectangular piping containment sump, and a Protection Prover 2 (PP2) cathodic protection monitor test station.

Each tank is equipped with a Flygt CP 3127 HT submersible pump, which transfer the leachate from the tank to the tanker trucks located at the loadout pads. The pump control panel is located adjacent to the loadout pad to allow the tanker truck driver to turn the pump on and off when required.

Leachate Tank System Controls

The leachate tanks are configured with five different indicators that either indicate tank or pump operational problems (see Appendix A1 and A2). The following alarms are indicated at the LST 1 and LST 2 control panels;

- Tank High Level ("High Level" light on control panel), which is initiated when the tank reaches eighty percent of its volume.
- Liquid detected in the outer tank ("Leachate Detected" light on the control panel).
- Liquid accumulating in the rectangular containment chamber which could indicate a leak in one of the pipes going to the tank ("Containment Chamber Leak" light on the control panel), which is initiated when containment chamber has approximately 8-inches of liquid in it.
- Pump seal is leaking ("Seal Fail" light on the control panel).
- Pump over temperature ("Overtemp" light on the control panel).

Each of the submersible pumps is equipped with a control and status device referred to as "CAS". The "CAS" is a device that monitors the pump operating temperature for a high temperature condition ("Overtemp" and monitors moisture within the pump casing to determine if the pump seal is leaking ("Seal Fail"). The submersible pumps will automatically shut off in the event an over temperature condition is detected. Once the temperature has decreased, the pump can be restarted after depressing the "CAS Reset" button.

A control interlock between LST 1 and LCS 1 or LST 2 and LCS 2 have been installed to automatically shut off the sump pumps and /or will not start if a high level condition exists at LST 1 and LST 2.

LST 1 and LST 2 are also equipped with an autodialer that is programmed to call the list of phone numbers in Appendix A1 and Appendix A2 in the event a problem is detected with the liquid level inside LST 1 and LST 2 or the secondary containment system for each tank.

- Autodialer Telephone Number; 496-5345
- Alarm conditions that are transmitted via the autodialer;
    - "Alert Condition 1" = Leachate Collection Sump High Level
    - "Alert Condition 2" = Liquid Detected in the outer tank of the double walled tank Sump
    - "Alert Condition 3" = Leachate Tank High Level
    - "Alert Condition 4" = Liquid Detected in Rectangular Containment Chamber
    - Power Failure
- If called by autodialer, acknowledge receipt of message by entering "555" on a touch tone phone.

Instructions for the operation and maintenance of the Phonetics, Inc. Model 1104 autodialer are included in Appendix K.

Leachate Tank Pump Operation

Each of the leachate tanks are operated in the following order during routine tanker truck filling;

- For panel and pump to operate, electric disconnect switch mounted behind the control panel and the circuit breaker in the flare building must be in the "On" position. Note: both disconnect switch and circuit breaker should normally be in the "On" position.
- Connect hose from loadout pad discharge to tank truck.
- Open tank truck valve.
- Verify that the control panel "Main Circuit Breaker" switch is in the "On" position.
- Record initial leachate level, date and time on form in Appendix B3i.
- Open valve at loadout pad discharge.

- Turn Pump #1 or #2 "On-Off" switch to the "On" position. Note; if leachate tank level is low, pump will not operate.

- When tank truck is full, turn Pump #1 or #2 "On-Off" switch to the "Off" position. Note: If the pump shuts off automatically due to low level in the tank, turn Pump #1/ or #2 "On-Off" switch to the "Off" position and proceed with the steps below. Failure to turn the pump "On-Off" switch to the "Off" position could result in accidental discharge of leachate since the pump would automatically turn back on when the low tank level condition was eliminated.

- Close tank truck valve.

- Drain hose back to loadout pad discharge.

- Disconnect hose from tank truck.

- Close valve at loadout pad discharge.

- Record final leachate level, after pumping, on form in Appendix B3i.

During normal operations, the onsite tank trucks will transport all of the generated leachate to the designated wastewater treatment facility. Additional tank trucks will only be used when either of the tanks exceed their designated high level. The additional trucks will be used until the volume can be consistently maintained below the tanks high level.

Leachate Tank Inspections

Inspection of the leachate storage tanks consists of daily, weekly, monthly and semi-annual activities, which are listed in Appendix B3c through B3f. Daily inspection of the tanks involves checking and recording the current leachate level (form in Appendix B3c). The leachate levels are estimated by lowering a water meter into the tanks and recording the measurement from the top of the riser to the level of liquid within the tanks. This measurement can then be correlated to charts provided in Appendix A-1 and A-2 for each tank to estimate the stored gallons of leachate. The weekly inspection involves monitoring of the dual contained inlet and outlet piping for any signs of leakage, monitoring of the interstitial space sensor and checking of the cathodic protection terminals to ensure that the wiring and terminals are in good working order

(form in Appendix B3d). Each month, the autodialer, high level and containment chamber alarms will be checked to ensure proper functioning (form in Appendix B3e). The semi-annual inspection will involve testing the cathodic protection systems and monitoring the interstitial space by checking the functionality of the leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water, an alarm will be produced from this action if the sensor is in good working condition.

The cathodic protection testing instructions for LST 1 and LST 2 are as follows;

1. Inspect equipment and accessories to ensure that they are free from any damage.

2. Twenty-four hours prior to use, remove the porous plug and fill the electrode body with distilled water-until it is at least three-fourths full. Replace the porous plug and tighten securely. Note: To avoid contamination and resultant erroneous readings, always be sure to use distilled water.

3. Allow the copper sulfate solution to saturate-the porous plug overnight. The reference electrode or half-cell, as it is commonly called, is an integral part of the equipment.

4. Verify the cathodic protection on the S.T.I.-P3 tank as described below.

    - Remove the manhole cover exposing the PP2 terminal.

    - To setup the meter, connect the black test wire to the port marked "COM". Connect the red test wire to the port marked "FREQ". Turn the dial of the meter clockwise to the DCV2 setting. The display screen should show a decimal point and three zeros (.000).

    - Connect the positive pole (red test lead) of the meter to the PP2 test terminal. If a PP2 test terminal is not available, the inside metal surface of the steel tank can be used for terminal location by connecting a wire to a nail driven through the bottom of a wooden gauge stick and lower the stick through the tank's fill pipe.

    - Connect the negative pole (the black test lead) of the meter to the copper/copper sulfate half cell (reference electrode).

- Remove the protective cap from the base of the reference electrode (copper/copper sulfate half cell) and place the porous plug in the earth around the tank. Typically, earth can be contacted through the submersible pump or fill manhole. For best results, place the half cell adjacent to the tank. Note: Readings can be taken through soil, sand or gravel. The application of water onto the earth will assist in obtaining accurate readings. The placement of the reference electrode onto concrete or asphalt may give false, inaccurate readings.

- The meter should read more negative than -850 millivolts or -0.85 volts. This voltage reading indicates the tank is properly protected. Reference the National Association of Corrosion Engineers' Recommended Practice of Corrosion Control for Underground Storage Tank Systems, RP-02-85, for additional information and cathodic protection criteria.

- This reading should be taken at time of installation and every 6 months thereafter for the life of the installation. The PP2 test terminal will be inspected weekly to ensure wiring and connectors are in good repair.

- If the voltage level falls below -850 millivolts or if the voltage level fluctuates significantly, this may indicate poor reference cell contact with the earth. Repositioning the reference cell in several locations around the tank may be necessary to get a true indication of cathodic protection levels. If the level is more negative than -1.800 volts, contact the Steel Tank Institute or the local STI-P3 supplier. Typically new tanks with zinc anodes will exhibit a potential of -1.100 volts and tanks with magnesium anodes will exhibit a potential near -1.650 volts.

Refer to Sections 5 and 6 of Appendix A6, R-972-01, Recommended Practice for the Addition of Supplemental Anodes to STI-P3 UST's for more information on reference electrode maintenance and cathodic protection testing.

Leachate Loadout Pad Inspection

Prior to every use, the loadout pad drain will be checked to ensure that if a spill were to occur the pipe will allow flow back to the storage tank. On an annual basis, the leachate loadout pads for LST 1 and LST 2 will be checked to ensure proper functioning (form in Appendix B3g). The

concrete will be assessed for cracks and deterioration, the sump will be assessed for operational grate, cracks and deterioration and the drain pipe will be checked for any clogging.

Leachate System Alarm Procedures

In the event that an alarm has been activated, the facility operations manager will initiate a log stating the date, time, which alarm has been activated and the subsequent repair to deactivate the alarm (form in Appendix B3h). In the following section, each alarm that has been provided in either leachate system 1 or 2 will be listed.

1. High Level Sump Alarm (light/horn at the LCS 1 or LCS 2 control panel in conjunction with "Alert Condition 1" sent via the Autodialer).
2. Leachate Detected in the interstitial space of the double walled tank (light on control panel in conjunction with "Alert Condition 2" sent via the Autodialer).
3. High Level Tank Alarm (light on control panel in conjunction with "Alert Condition 3" sent via the Autodialer).
4. Liquid Detected in the Rectangular Containment (light on control panel in conjunction with "Alert Condition 4" sent via the Autodialer).
5. Pump seal is leaking ("Seal Fail" light on the control panel).
6. Pump over temperature ("Overtemp" light on the control panel).

The alarms that are sent via the Autodialer are sent to four separate phone numbers as listed in Appendices A1 and A2, the Autodialer will phone each number waiting for an acknowledgement. The landfill personnel that acknowledges the alarm will immediately go to the source of the alarm to begin trouble shooting the problem and determining what repairs are required.

11.2.3 Leachate System 3/4

As shown on Figure 16, leachate generated along the south and western sides of the existing facility is collected in perforated drain pipes which slope to two solid drain pipes which gravity drain into leachate storage tank 3 and 4 (LST 3/4). The tank is dual contained and has been equipped with two submersible pumps, level controls, leak detection monitoring system and cathodic protection monitoring test station. The submersible pumps located within the tanks allow for leachate to be transferred to a tanker truck for off-site disposal. The tanker trucks are filled on a concrete loadout pad, which has been constructed adjacent to the storage tank.

Currently a 6 inch, SDR-17, double walled HDPE pipe was installed connecting LCS 5 to section 4 of LST 3/4. Leachate is pumped manually from LCS 5 to section 4 of LST 3/4 as described under the discussion regarding LCS 5 below.

In the event of a power failure, the tanks will be manually checked for leachate levels and since the pumps are equipped with hydraulic and not electric pumps, leachate can continue to be removed with out the use of electricity.

Leachate Storage Tank No. 3 and No. 4 Operation

The leachate storage tank was manufactured by Highland Tank and Manufacturing Company. Tank drawings and information are provided in Appendix A3. LST 3/4 is a double-wall, S.T.I. P-3 steel underground storage tanks with fiberglass reinforced polyester resin coating for corrosion resistance. LST 3/4 has a 25,000-gallon capacity, the tank is equipped with a center baffle set at eighty percent of the total volume. This allows the tank to act as two separate tanks, each with 10,000 gallon capacities. The design allows total amounts of leachate, which previously flowed into each of the existing tanks at locations 3 and 4 to flow into the respective locations in the new LST 3/4 and continue to be monitored separately. The tank has an interstitial space with a leak detection monitoring system to allow continuous monitoring of the entire interstice for the life of the tanks, and sacrificial anodes have been attached on each end of the LST 3/4 for corrosion protection (see Appendix A5).

A hydraulic pump is located on each side of the tank baffle wall, which transfers the leachate from the tank to the tanker trucks located at the loadout pad. Flexible discharge piping has been installed from the pumps to the manway covers. Quick disconnect couplings are located on top of the manways for connection to leachate tanker hoses.

Leachate Tank System Controls

The leachate tank is equipped with an OMNTEC ELP21LU2 control unit that monitors the liquid high level in the tank and the presence of any liquid in the interstitial space between the primary and secondary containment tank.

- Tank High Level ("High Level" light on control panel), which is initiated when the tank reaches eighty percent of its total volume

- Liquid detected in the outer tank ("Leachate Detected" light on the control panel)

Leachate Tank Pump Operation

Either half of the leachate tank is operated in the following order during routine tanker truck filling;

- Connect hose from manway cover to tank truck.
- Open tank truck valve.
- Record initial leachate level, date and time on form in Appendix B3i.
- Open valve at loadout pad discharge.
- Connect the hydraulic pump to the designated landfill equipment, which has been modified to run the pumps.
- Start the hydraulic pump.
- When tank truck is full, turn off the hydraulic pump. Note: check the tank level during pumping, the tank may be emptied prior to filling the tank truck.
- Close tank truck valve.
- Drain hose back to loadout pad discharge.
- Disconnect hose from tank truck.
- Close valve at loadout pad discharge.
- Record final leachate level, after pumping, on form in Appendix B3i.

During normal operations, the onsite tank trucks will transport all of the generated leachate to the designated wastewater treatment facility. Additional tank trucks will only be used when the

tank exceeds its designated high level. The additional trucks will be used until the volume can be consistently maintained below the tank high level.

Leachate Tank Inspections

Inspection of the leachate storage tanks consists of daily, weekly, monthly and semi-annual activities, which are listed in Appendix B3c through B3f. Daily inspection of the tanks involves checking and recording the current leachate level (form in Appendix B3c). The leachate levels are estimated by lowering a water meter into each side of the tank and recording the measurement from the top of the riser to the level of liquid within the tank. This measurement can then be correlated to charts provided in Appendix A-3 for each tank to estimate the stored gallons of leachate. The weekly inspection involves monitoring of the dual contained inlet and outlet piping for any signs of leakage, monitoring of the interstitial space sensor and checking of the cathodic protection terminals to ensure that the wiring and terminals are in good working order (form in Appendix B3d). Each month, the high level alarm will be checked to ensure proper functioning (form in Appendix B3e). The semi annual inspection will involve testing the cathodic protection systems and monitoring the interstitial space by checking the functionality of the leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water, an alarm will be produced from this action if the sensor is in good working condition.

The cathodic protection testing instructions for LST 3/4 is as follows;

1. Inspect equipment and accessories to ensure that they are free from any damage.

2. Verify the cathodic protection on the S.T.I.-P3 tank as described below.

    - Remove the cover exposing the PP4 terminal.

    - Connect the COREXCO-STI Model PP44 Cathodic Protection System Test Meter to the terminal.

    - The meter should read more negative than -850 millivolts or -0.85 volts. This voltage reading indicates the tank is properly protected. Reference the National Association of Corrosion Engineers' Recommended Practice of Corrosion Control for Underground Storage Tank Systems, RP-02-85, for additional information and cathodic protection criteria.

- This reading should be taken at time of installation and every 6 months thereafter for the life of the installation. The PP4 test terminal will be inspected weekly to ensure wiring and connectors are in good repair.

- If the voltage level falls below -850 millivolts or if the voltage level fluctuates significantly, this may indicate poor reference cell contact with the earth. Repositioning the reference cell in several locations around the tank may be necessary to get a true indication of cathodic protection levels. If the level is more negative than -1.800 volts, contact the Steel Tank Institute or the local STI-P3 supplier. Typically new tanks with zinc anodes will exhibit a potential of -1.100 volts and tanks with magnesium anodes will exhibit a potential near -1.650 volts.

Refer to Section 6 of Appendix A6, R-972-01, Recommended Practice for the Addition of Supplemental Anodes to STI-P3 UST's for more information on reference electrode maintenance and cathodic protection testing.

Leachate Loadout Pad Inspection

Prior to every use, the loadout pad drain will be checked to ensure that if a spill were to occur the pipe will allow flow back to the storage pipe. On an annual basis, the leachate loadout pad for LST 3/4 will be checked to ensure proper functioning (form in Appendix B3g). The concrete will be assessed for cracks and deterioration, the sump will be assessed for operational grate, cracks and deterioration and the drain pipe will be checked for any clogging.

11.2.4 Leachate System 5

As shown on Figure 16, leachate generated along the north and western sides of the existing facility is collected in perforated drain pipes, which slope to leachate collection sump 5 (LCS5). The sump is a concrete tank located at the floor of the landfill and has been constructed with a steel riser, which extends through the waste to the top of the existing landfill. The tank is equipped with a submersible pump and level controls. The submersible pump located within the tanks allow for leachate to be transferred to a tanker truck for off-site disposal.

Currently a 6 inch, SDR-17, double walled HDPE pipe was installed connecting LCS 5 to section 4 of LST 3/4. Leachate is now pumped manually from LCS 5 to section 4 of LST 3/4 as described under the discussion regarding LCS 5 below.

In the event of a power failure, a gas powered portable backup generator may be installed adjacent to the riser pipe. This generator can be manually connected to the pump to allow for continued transfer of leachate to LST 3/4 if required.

Leachate Collection Sumps No. 5 Operation

Leachate Collection Sump 5 (LCS 5) is a 6,600 gallon reinforced rectangular concrete tank with approximate outside dimensions of 20 feet long by 17 feet wide by 10 feet high. The collection sump is equipped with an EPG VSDPT 17-6 vertical sump drainer. The pump and associated level probes are located inside the sump and can be removed through the steel riser pipe. The pump control panel is located adjacent to the steel riser. The pump is sized to pump approximately 100 gpm at 165 feet of total head.

Leachate Sump Pumping System Control/Operation

The leachate sump pump is configured with four level probes (from bottom of sump up); reference probe, pump off probe, pump on probe, and sump high-level probe (see Appendix A4) which are also described below;

- Low Level Alarm: initiated by a low-level conductance probe and is activated when the liquid level in the sump has a level of 8-inches and will deactivate when the liquid level in the sump reaches a level of 9 inches.

- Pump-Off: initiated by a low-level conductance probe interlocked to the pump starter to shut down the pump upon reaching a minimum liquid level in the sump. This is activated when the sump has a liquid level of 10-inches.

- Pump-On: initiated by a high-level conductance probe located in the leachate sump and interlocked to the pump starter in the pump control panel. This is activated when the liquid level in the sump has a level of 40-inches.

- High Level Alarm Condition: Initiated by a high-high point level conductance probe interlocked to an audio and visual alarm located in the pump control panel. Depressing

the Acknowledge/Silence push button will silence alarm. The visual alarm light will remain energized until the alarm condition has cleared. The alarm is activated when the liquid level in the sump has a level of 53-inches and will deactivate when the sump drops to a liquid level of 52-inches.

It should be noted that the pump will only be operated in manual mode and will not be placed in automatic mode, therefore only the high level and low level alarms probes will be used to monitor the sump. This is due to the present operational condition where leachate is transferred from LCS 5 to LST 3/4, as described below.

Leachate Sump Pump Operation

Leachate from LCS 5 is transferred to LST 3/4 via a 6 inch, SDR-17, double walled HDPE pipe connected to section 4 of LST 3/4 (see Figure 16 for location). Leachate is pumped from LCS 5 to section 4 of LST 3/4 as follows:

- Pump section 4 of LST 3/4 in accordance with the procedure described in the operations section for LST 3/4 to remove leachate before transferring leachate from LCS 5.
- In order to transfer leachate from LCS 5 to LST 3/4, place the leachate pump control switch to the "Manual' mode. Observe the liquid level indicator during the transfer operation and stop pumping when the liquid level indicator reads zero.
- Leachate is pumped from section 4 of LST 3/4 as needed.

LST 3/4 has a total capacity of approximately 25,000 gallons. Given that tank has a baffle to divide the tank into two equal sections (sections 3 and 4) of approximately 12,500 gallons, section 4 of LST 3/4 will hold the entire contents of LCS 5.

Leachate Sump Inspections

Inspection of the leachate collection sump consists of daily, weekly and monthly activities, which are listed in Appendix B3c through B3e. Daily inspection of the tanks involves checking and recording the current leachate level (form in Appendix B3c). The leachate level is based on recording the measured liquid level as indicated on the digital readout. This measurement can then be correlated to charts provided in Appendix A-4 for the sump to estimate the stored gallons of leachate. The weekly inspection involves monitoring of the dual contained outlet piping for

any signs of leakage (form in Appendix B3d). Each month, the high level alarm will be checked to ensure proper functioning (form in Appendix B3e).

11.2.5 Gas Condensate Knockout Tank

As shown on Figure 16, condensate generated in the gas header system can be discharged at three locations. Two of the condensate knockouts drain liquid directly into either LST 1 or LST 2. The third condensate knockout consists of a tank, which collects liquid from the gas header just prior to the gas entering the flare. The tank is dual contained and has been equipped with level controls and a leak detection monitoring system. Condensate drains into the tank via a 4" HDPE discharge pipe from both the incoming header and the flare knockout pot.

Condensate Knockout Tank Operation

The knockout tank is a double-wall, fiberglass tank with a 600-gallon capacity. The tank has an interstitial space with a leak detection monitoring system to allow continuous monitoring of the entire interstice for the life of the tank.

Condensate Knockout Tank System Controls

The condensate knockout tank is equipped with an OMNTEC ELP21LU2 control unit that monitors the liquid high level in the tank and the presence of any liquid in the interstitial space between the primary and secondary containment tank.

- Tank High Level ("High Level" light on control panel), which is initiated when the tank reaches eighty percent of its total volume
- Liquid detected in the outer tank ("Leachate Detected" light on the control panel)

Condensate Knockout Tank Pump Operation

The condensate knockout tank is operated in the following order during routine tanker truck filling;

- Set up portable pump adjacent to the manway.
- Connect vacuum pump to suction pipe, located within the 24-inch diameter manway.
- Connect discharge hose to the tanker.

- Open the tank truck valve.
- Record initial leachate level, date and time on form in Appendix B3i.
- Start the portable pump.
- When the condensate tank is empty, turn off the pump.
- Close tank truck valve.
- Disconnect hose from tank truck.
- Drain discharge and suction hoses back into the tank.
- Record final leachate level, after pumping, on form in Appendix B3i.

During normal operations, the condensate knockout tank is pumped upon reaching the designated high level.

Condensate Knockout Tank Inspections

Inspection of the condensate knockout tank consists of daily, weekly, monthly and semi-annual activities, which are listed in Appendix B3c through B3f. Daily inspection of the tanks involves checking and recording the current liquid level (form in Appendix B3c). The leachate levels are estimated by lowering a water meter into the tank and recording the measurement from the top of the riser to the level of liquid within the tank. This measurement can then be correlated to charts provided in Appendix A-5 for the tank to estimate the stored gallons of liquid. The weekly inspection involves monitoring of the dual contained outlet piping for any signs of leakage and monitoring of the interstitial sensor (form in Appendix B3d). Each month, the high level alarm will be checked to ensure proper functioning (form in Appendix B3e). The semi annual inspection will involve monitoring the interstitial space by checking the functionality of the leak detection sensor (form in Appendix B3f). The leak detection sensor will be checked by removing it from the tank and subjecting it to water, an alarm will be produced from this action if the sensor is in good working condition.