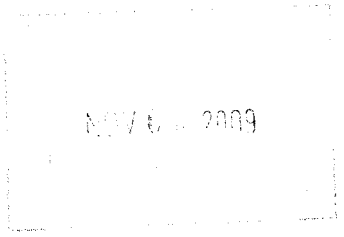
WOODARD &CURRAN

Interim Remedial Measure Work Plan

Taylors Lane Landfill ID No. 360021



213733.00
Village of Mamaroneck
Mamaroneck, NY
September 30, 2009
Revision 1
November 6, 2009

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TRANSMITTAL

WOODARD &CURRAN

TO: Ramanand R. Pergadia, PE
NYSDEC
Division of Env. Rem., Region 3
21 South Putt Corners Road
New Paltz, NY 12561

RE: Taylors Lane Landfill (ID No. 360021)

DATE: 11.06.09
PROJECT NAME: Taylors Lane Landfil
PROJECT NUMBER: 213733.00
PLANT LOCATION: N/A

WE ARE SENDING:

☐ Quotation ☐ Drawings ☐ Bid Package ☐ Floppy Disk / CD ☐ Brochure ☐ Schedule ☐ Installation Package

☐ Sample ☐ Change Order ☐ Manuals ☐ Other (specify) **Work Pan**

Qty	Doc. No.	Rev. No.	Dated	Description
1			11.6.09	Interim Remedial Measure Work Plan – Taylors Lane Landfill – Mamaroneck, NY

For Your:

☐ USE
☐ APPROVAL
☐ REVIEW/COMMENTS
☐ INFORMATION
☐ OTHER

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☐ REGULAR MAIL
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☐ OTHER

COMMENTS: Mr. Pergadia: Please find enclosed the above referenced document in response to our meeting of October 8, 2009 and letter of October 30, 2009.

Please do not hesitate to contact me if you have any questions or require further information.

CC:
Richard Slingerland – Village Manager
Keith W Furey, P.E. - KW Furey Engineering, P.C.

BY: Lou Russo

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1. INTRODUCTION

This Interim Remedial Measure Work Plan (IRMWP) was prepared for the Taylors Lane Compost Site (ID No. 360021) located at Taylors Lane and Shadow Lane in the Village of Mamaroneck, Westchester County, New York. The location of the Taylors Lane Compost Site (hereinafter referred to as the "Site") is shown on Figure 1. Pursuant to a recent letter sent to the Village of Mamaroneck by the New York State Department of Environmental Conservation (NYSDEC) dated August 24, 2009 and a subsequent meeting held on September 16, 2009, Woodard & Curran (W&C) developed this IRMWP, on behalf of the Village of Mamaroneck, to initiate on interim remedial measure to address the leachate buildup at the Site. The initial work plan was provided to NYSDEC on September 30, 2009 and this revised IRMWP is based on a subsequent meeting with NYSDEC on October 8, 2009 and NYSDEC comment letter dated October 30, 2009.

1.1 SITE GEOLOGY & HYDROGEOLOGY

As discussed in the 1992 Feasibility Study (Malcolm Pirnie, 1992), the topography generally drains surface water towards the Site center and ground water flow is generally from north to south. The fill layer extends an average of 15 feet below grade. A sand layer extends on average from below the fill to 40-feet below grade. Bedrock is found on average from eight feet to 80-feet below grade.

1.2 OBJECTIVES

The objectives of this interim remedial measure are to attempt to lower the level of the leachate by gravity drainage through the use of a leachate recovery well. The recovered leachate is to be discharged into the Westchester County Department of Environmental Facilities (WCDEF) sewer line, subject to the agreement between the Village and the Westchester County Department of Environmental Facilities (WCDEF). The objective is to maintain the leachate elevation at approximately 9.2-feet above mean sea level (amsl) (+/-) at the leachate recovery well designed for optimum collection of leachate as recommended by the NYSDEC in their letter dated August 24, 2009. The proposed intrusive work associated with the IRMWP will be completed with a New York State Department of Health Community Air Monitoring Plan, which will be prepared under separate cover.

1.3 SCOPE OF WORK

The proposed scope of work to achieve the project objectives includes the following:

- ***Install a passive leachate recovery well*** – The proposed leachate recovery well will be installed as indicated in the August 24, 2009 NYSDEC letter at the down gradient end of the Site near the intersection of Taylors Lane and Shadow Lane (Figure 3). The leachate recovery well will be a large diameter well with a lateral discharge pipe with invert elevation at approximately 9.2-feet amsl. The discharge pipe will be connected to the sanitary sewer on Taylors Lane (Figure 3).

- ***Implement a ground water level monitoring program*** – A ground water level monitoring program will be implemented, which will include monitoring water levels in select existing monitoring wells during the installation of the leachate recovery well and during the operation of the leachate recovery well to determine the influence of the well on controlling the leachate buildup within the landfill. As shown on Figure 2, additional monitoring wells will be installed to monitor water levels during the

operation of the leachate recovery well. The proposed monitoring wells include one at the Weinstein residence on Greehaven Road, one in the vicinity of the sanitary sewer manhole located on Taylors Lane, one adjacent to the proposed discharge pipe, and two at 10-feet and 100-feet away from the proposed leachate recovery well. As shown on Figure 3, there is an existing piezometer, which will be utilized in lieu of a new piezometer at a radial distance of 10-feet (i.e., PZ-B). The existing piezometer's usability will be determined in the field prior to installing the proposed piezometer.

- ***Sample Soil at an adjacent residence*** – As requested in a recent September 16, 2009 meeting, soil sampling will be completed at the Markowitz residence on Shadow Lane to determine potential soil impacts from leachate migration at that location. The sampling will be conducted after the ground water elevation in MW-4S falls to about 2-feet below the existing level measured prior to the commencement of work at the site.

- ***Collect recovery well discharge water quality samples*** – A sampling program will be implemented to characterize the water being discharged to the sanitary sewer WCDEF, Mamaroneck Waste Water Treatment Plant (MWWTP)). The sampling program will also include provisions to monitor the potential for saltwater intrusion, which will include both field measurements and laboratory analysis.

2. LEACHATE RECOVERY WELL

As shown on Figure 3, the proposed leachate recovery well is located in the southern corner of the Site near the intersection of Shadow Lane and Taylors Lane as recommended in the NYSDEC August 24, 2009 letter.

2.1 WELL DESIGN

The proposed leachate recovery well design is shown on Figure 4B and is discussed below:

- ***Well Diameter*** – The proposed leachate well diameter is 14-inches.

- ***Well Depth*** – The ground elevation at the proposed leachate well location is approximately 13.8-feet amsl. The well will be set within the fill material above the top of the lower sand layer. Based on a review of the MW-14 and MW-15 series well logs, the lower sand layer is approximately 15 feet below grade (i.e., elevation -1.2-feet amsl). Based on this stratigraphy, the well will be set approximately 13-feet below ground surface to approximately elevation 0.8 amsl, which is two feet above the anticipated depth of the lower sand layer.

- ***Well Screen*** – The proposed well screen construction is stainless steel continuous wire wound fabrication. In addition, as discussed in our October 8, 2009 meeting, the tee area will be perforated with 1/8-in holes to increase the open area of the well. The screen length will be approximately 6.8-feet and the well will have a 1-foot silt trap. Therefore, the bottom of the well will be at elevation 0.8-feet amsl, the top of the silt trap/bottom of the screen will be at approximately elevation 1.8-feet amsl, and the top of the screen will be at approximately elevation 8.6-feet amsl. The preceding well design measurements are approximate for illustrative purposes and the controlling factor will be installing the lateral discharge pipe invert at between elevation 9-feet and 9.2-feet amsl and the location of the lower sand unit. The screen slot size will be determined as discussed in Section 2.2 below.

- ***Discharge Pipe*** – The well will have a custom fabricated "tee" to accommodate a 6-in high density polyethylene (HDPE) pipe. The pipe invert will be at approximately elevation 9.2 feet amsl (approximately 4.6 feet below existing grade).

- ***Filter Pack*** – The filter pack material will be sized accordingly based on the formation grain size distribution and screen slot size. The filter pack material will extend to the bottom of the cap liner and will intersect the existing vapor aggregate layer. As shown on Figure 4B, the filter pack material will be sloped during excavation and installation of the lateral discharge pipe. In addition, within the "tee" area, the filter pack material will be ¼-in gravel unless the results of the formation grain size analysis suggest a change in the gravel size.

- ***Well Seal*** – Because the filter material will extend to the bottom of the existing cap liner and to increase the well open area, a conventional bentonite well seal is not proposed.

2.2 WELL INSTALLATION

The proposed leachate recovery well will be installed utilizing the mud-rotary drilling method. Revert™ will be utilized as the drilling fluid to maintain an open borehole during the drilling operation. Revert™ is a commonly used organic polymer drilling fluid additive that readily breaks down in the subsurface.

Using Revert™ will decrease the amount of well development time, wastewater and waste solids generated during drilling and well development.

A pilot hole will be completed prior to installing the proposed leachate recovery well. Soil sampling will be completed using a split spoon sampler and split spoon samples will be collected continuously from approximately three feet below grade (i.e., below the geomembrane cap liner) to the top of the lower sand unit. Split spoon samples will be logged as described in Section 4.1. Samples for laboratory analysis will not be collected; however, geotechnical samples will be collected from each of the split spoon samples. Select split spoon samples will be sent to a geotechnical testing laboratory for grain size distribution analysis. The grain size distribution data will be utilized to design the leachate recovery well screen and filter pack material.

In the interim, while the grain size distribution data is generated and well screen is designed, the pilot hole will be temporarily sealed. Once the grain size data is received and the well screen/filter pack is designed, the proposed leachate recovery well design will be submitted to the NYSDEC for approval. Once the well design is approved by NYSDEC, the leachate recovery well will be installed. As indicated during the October 8, 2009 meeting with NYSDEC, once the refuse/soil samples from the pilot hole are evaluated, an open construction with tiered filter packs will be considered in lieu of a drilled well.

Once the well design is approved, the pilot hole will be reamed to facilitate the installation of the leachate recovery well. The mud rotary method will be utilized to ream the borehole to the prescribed depth based on the final well design. Upon reaching the target depth, the well string consisting of the well screen and casing will be lowered to the prescribed depth utilizing the drill rig derrick winch. The tee shown on Figure 4B may require custom fabrication and will be pre-fabricated. The designed tee stub shown on Figure 4B, which will receive the lateral discharge pipe, will protrude approximately 2-inches from the well casing.

Once the leachate recovery well is installed, it will be developed using pump and surge methodology or other method as applicable to remove sediment and drilling fluids from the well screen and filter pack area, which will optimize the well communication with the surrounding fill material. Water quality parameters including pH and specific conductivity will be measured during development to aid in determining the end point for well development. The waste water will be characterized prior to discharge to the sanitary sewer as described in Section 3.2.2.

The drilling process will generate waste soil (i.e., drill cuttings). The drill cuttings will be redistributed below the landfill cap; however, if excess materials remain, they will be temporarily staged as shown on Figure 3, characterized, and properly disposed off-site.

2.3 DISCHARGE PIPE

As discussed previously in Section 2.1, the proposed leachate recovery well will flow under gravity and discharge through a lateral subsurface discharge pipe.

As shown on Figure 4A and 4B, the discharge pipe will be a 6-inch diameter HDPE pipe connected to the proposed leachate recovery well with an invert elevation of 9.2 feet amsl and will extend to the sanitary sewer where it will be connected with an invert elevation of 8.7 feet amsl. The proposed discharge pipe sections will be connected to the leachate well using a flexible connection (Figure 4B). As discussed recently in our October 8, 2009 meeting with NYSDEC, the proposed discharge pipe will be perforated with 3/8-inch holes and backfilled with ¾-inch gravel to allow additional infiltration along its length

(Figure 3). However, based on the soil conditions, this configuration may be modified accordingly. As shown on Figure 4A, the perforated pipe sections will be perforated with four holes at 45° to the vertical or equivalent. The final 60-feet of the discharge pipe will be solid to facilitate the installation of a clay dam at the edge of the capped area and a gate valve (Figure 3).

As shown on Figure 3 and Figure 4C, a flow meter will be installed inside a utility manhole structure at the end of the pipe, near the sanitary sewer manhole. In addition, as shown on Figure 3 and Figure 4B, a gate valve will be installed to control flow. As required by the WCDEF, the final leachate recovery well flow can not exceed 100 gpm. Also, as shown on Figure 3 and Figure 4B, one cleanout port will be installed along the discharge pipe to facilitate future pipe maintenance.

As shown on Figure 3 and Figure 4C, clay dam will be installed along the pipe trench and low permeability materials will be utilized as trench backfill along the solid section of piping (Figure 4A) to mitigate the effects of preferential flow along the piping trench.

2.3.1 Excavation

As shown on Figure 3, the excavation of the discharge piping trench will occur through the landfill cap area. As such, the cap will require deconstruction and repair to facilitate the proposed scope of work. The excavation will extend approximately 4.5 feet below grade and continue at a 0.3 percent grade to the sanitary manhole. A detail of the proposed discharge piping trench is provided on Figure 4A.

Once the landfill cap is opened, the excavation will occur from down grade near the sanitary sewer manhole towards the proposed leachate recovery well. In addition, the trench excavation support (i.e., trench box) will be utilized as necessary to provide support of the excavation. As shown on Figure 4A, the discharge pipe will be installed with engineered fill materials. As such, excess excavated materials will be redistributed beneath the landfill cap to the extent practicable and remaining materials will be temporarily staged as shown on Figure 3, characterized, and properly disposed off-site.

Erosion control measures will be implemented as shown on Figure 3 and Figure 4A. In addition, the installation of the discharge pipe will require the temporary removal of the existing chain link fence (Figure 3). The chain link fence will be replaced upon completion of the discharge pipe installation.

2.3.2 Dewatering

Dewatering will be required to facilitate the installation of the lateral discharge pipe. The proposed dewatering plan will consist of trench dewatering during the pipe installation.

As discussed in the Shaw (2005) hydrogeological evaluation, the historical ground water piezometric elevation at the proposed leachate recovery well location and near the sanitary sewer manhole was approximately 14.5 feet amsl. Assuming the current ground water elevation is at a similar elevation, a drawdown of approximately five feet would be required to facilitate the excavation and discharge pipe installation.

As shown on Figure 3 and Figure 4B, a 4-inch diameter monitoring well is proposed in the vicinity of the manhole but off of the landfill cap area to monitor water levels during the construction dewatering. The proposed monitoring well construction is discussed further in Section 3.1.2.

2.3.3 Landfill Cap

The existing landfill cap will require deconstruction and repair to facilitate the installation of the proposed leachate recovery well and associated discharge pipe. Figure 4A shows a generalized cross section of the existing landfill cap. Prior to initiating any work, the area shown on Figure 3 will be cleared to expose the geomebrane cap. The geomembrane cap will be cut open to expose the landfill surface. Upon completion of the proposed leachate recovery well and discharge pipe installation, the geomembrane cap will be repaired. The leachate recovery well, piezometers, and clean outs will be booted as shown on Figure 4B.The boots and repaired cap seals will be tested prior to reconstructing the cap.

3. GROUND WATER MONITORING

There will be several components to ground water monitoring as a part of the IRMWP including ground water sampling and water level monitoring (Table 1). The ground water monitoring program described below is for the period of time during construction of the proposed interim measure and the initial three months after construction of the proposed interim measure. Ground water monitoring beyond the initial three months will be based on the monitoring data from the initial three month period in consultation with the NYSDEC.

3.1 GROUND WATER LEVEL MONITORING

Ground water level monitoring will be completed during dewatering operations and post construction for a period of up to three months during the operation of the proposed leachate recovery well. The water levels will be monitored periodically beyond this initial three months to evaluate the operation of the leachate recovery well as required by the NYSDEC. The proposed water level monitoring program is designed to monitor the hydraulic changes as a function of the proposed dewatering operation and operation of the proposed leachate recovery well. The water level monitoring program is not intended for the determination of hydraulic properties of the various hydrostratigraphic units.

3.1.1 Ground Water Level Monitoring Network

Ground water levels will be monitored at 22 locations during the installation of the proposed leachate recovery well (Figure 2). Specifically, the proposed monitoring network will include the proposed leachate recovery well, MW-4S, MW-4M, MW-4D, MW-9S, MW-9D, MW-14S, MW-14M, MW-14D, MW-15D, 94-1-S, 94-1-D, 94-2-S, 94-2-D, 94-3-S, 94-3-D, MW-A (proposed), PZ-A (proposed), PZ-B (proposed), PZ-C (proposed), PZ-D (proposed), and Magid Pond. The proposed monitoring well network consists of surface water (Magid Pond), shallow wells completed within the landfill materials or shallow surrounding native soil (MW-A, PZ-A, PZ-B, PZ-C, PZ-D, MW-4S, MW-9S, MW-14S, 94-1-S, 94-2-S, and 94-3-S), lower sand layer wells (MW-4M, MW-14M, 94-1-D, 94-2-D, and 94-3-D), and bedrock wells (MW-9D, MW-14D, and MW-15D).

Precipitation data will be noted in tabulations of ground water level measurements during the proposed ground water level monitoring program. The precipitation data will be from Rye Beach, which is a readily available local public weather station from Weather Underground (www.wunderground.com) in close proximity to the Site.

The proposed monitoring schedule is as follows:

- ***Baseline Period*** – Collect a complete round of water levels at each of the proposed monitoring locations daily for a period of three to five days prior to beginning work at the Site.

- ***Dewatering Period*** – Monitor water levels in each of the monitoring wells and Magid Pond during the dewatering operations at the Site described in Section 2.3.2. Water levels will be recorded at a minimum daily during the dewatering operations.

- ***Leachate Recovery*** - Monitor water levels in each of the monitoring wells and Magid Pond during an initial 3-month period and periodically after the initial period. During the initial three month period, water levels will be measured every 4 hours during working hours on the first day, monitored once every two weeks, and monthly thereafter for two more months. Based on the

water level data collected during the initial three month period, the water level monitoring frequency will be adjusted accordingly in consultation with the NYSDEC.

3.1.2 Monitoring Well Installation

Five additional monitoring locations will be added to the existing network of monitoring wells at the Site. As shown on Figure 3, the additional monitoring locations include the following:

- a 4-inch diameter PVC monitoring well will be installed near the sanitary manhole off of the landfill cap (MW-A) area,
- a 2-inch diameter PVC piezometer in the rear of the Weinstein residence (PZ-A),
- a 2-inch diameter PVC piezometer at a radial distances of approximately 10-feet from the proposed leachate recovery well (PZ-B). If existing piezometer shown on Figure 3 is usable as determined in the field, then PZ-B will not be installed.
- a 2-inch diameter PVC piezometer at a radial distance of 100-feet away from the proposed leachate recovery well (PZ-C), and
- a 2-inch diameter PVC piezometer at a distance of 50-feet away from the discharge pipe along the length of the discharge pipe (PZ-D).

These monitoring wells are proposed to evaluate water levels during the installation and post-installation of the proposed leachate recovery well.

The monitoring well construction specifications are shown on Figure 4B. The additional monitoring wells will be installed utilizing the hollow-stem auger method. Continuous split spoon samples will be collected from the ground surface to the final installation depth of the wells. The wells will be installed to intersect the water table and it is anticipated that the monitoring wells will not extend below a depth of approximately 10 to 15 feet. The wells will have up to 15 feet of 0.02-inch slot screens. The annular space will be filled with No. 2 filter sand to a minimum of two feet above the top of the screen. A minimum two foot bentonite seal will be installed above the sand and the remainder of the annular space will be filled with grout to the ground surface. During the monitoring well installation, soil sampling will be completed utilizing split spoon samplers at a minimum frequency of one sample every five feet or at the discretion of the field engineer/scientist. Split spoon soil samples will be logged as described in Section 4.1. Separate aliquots of soil will not be submitted to a laboratory for analysis.

As shown on Figure 4B, the piezometer well head will be completed with a flush mounted protective access box and the monitoring well will be completed with an above ground protective casing.

As discussed previously in Section 2.2, drill cuttings will be redistributed below the landfill cap. Excess materials will be temporarily staged as show on Figure 3, characterized, and properly disposed off-site.

Decontamination of drilling equipment will be completed between locations at the designated staging and decontamination area. Dedicated sampling equipment will be utilized as practicable to minimize the potential for cross contamination. Drilling equipment will be decontaminated utilizing steam cleaning and/or non-phosphate soap solution.

3.2 GROUND WATER QUALITY MONITORING

Ground water quality monitoring will consist of collecting field screening data and ground water samples for laboratory analysis.

3.2.1 Field Water Quality Measurements

As part of the IRMWP, field measurements of water quality parameters will be completed during the baseline, dewatering and leachate recovery well operation periods.

The proposed water quality parameters include dissolved oxygen, pH, temperature, specific conductivity, and salinity will be collected to evaluate leachate quality and the potential for salt water intrusion during the proposed field activities. The water quality parameter measurements will be collected manually utilizing field meters as indicated below:

- ***Baseline Period*** – One reading from all monitoring wells in the proposed monitoring network at the beginning of the baseline period.
- ***Dewatering Period*** – One reading from all monitoring wells in the proposed monitoring network at the end of the dewatering period.
- ***Leachate Recovery*** –Readings to coincide with the water level monitoring discussed in Section 3.1.1.

3.2.2 Ground Water Sampling

3.2.2.1 Discharge Characterization Sampling

A ground water sample will be collected from MW-14S to serve as a representative sample to characterize the discharge water quality to the WCDEF sanitary sewer.

Monitoring well MW-14S will be sampled using conventional purge and sample methodology. MW-14S will be purged until three well volumes of ground water are removed from the well. Upon purging the well, an unfiltered sample will be collected utilizing a dedicated bailer and transferred to the laboratory provided bottles.

The MW-14S sample will be sent to a New York State certified laboratory and analyzed for Target Compound List (TCL), Target Analyte List (TAL), and other parameters as follows:

- Volatile Organic Compounds (VOCs) by Method 8260;
- Semivolatile Organic Compounds (SVOCs) by Method 8270;
- Metals by Method 6010, 7000 for mercury and 7196 for hexavalent chromium;
- Polychlorinated Biphenyls (PCBs) by Method 8082;
- Pesticides by Method 8081;
- Herbicides by Method 8151;
- Chemical Oxygen Demand (COD) by Method 410.4;
- Biochemical Oxygen Demand (BOD) by Method 405.1;
- Oil and Grease by Method 1664;
- Total Dissolved Solids (TDS) by Method 160.1; and

- Total Suspended Solids (TSS) by Method 160.2.

The need for the above proposed sampling and associated listed analytical protocol will be verified with the WCDEF prior to sampling and analysis.

Quality assurance and quality control samples (i.e., field blank and trip blank) will not be collected as this data is for disposal purposes only. Laboratory reports will be provided in ASP Level B format.

3.2.2.2 Leachate Quality Sampling

As requested in the October 8, 2009 meeting with the NYSDEC, water quality monitoring is proposed to evaluate leachate quality and to monitor for possible salt water intrusion. Total dissolved solids (TDS) is proposed as an indicator parameter to evaluate leachate quality.

A sample for TDS analysis (Method 2540C) will be collected from the proposed leachate recovery well during the operation of the well to monitor leachate quality as follows:

- ***Baseline Period*** – Collect one sample at the beginning of the baseline period.
- ***Dewatering Period*** – Collect one sample at the end of the dewatering period.
- ***Leachate Recovery*** – Collect one sample from the proposed leachate recovery well at the end of the initial 3-month operation period.

The leachate quality sampling will coincide with water level monitoring and water quality parameter monitoring discussed in Section 3.1.1 and Section 3.2.1, respectively. Because the proposed leachate recovery well will be flowing, purging of stagnant water as with conventional purge and sample methodology will not be required. As such, a sample will be retrieved from the proposed leachate well utilizing a dedicated bailer at the time of sampling.

3.2.2.3 Salt Water Intrusion Sampling

A sample for total chloride analysis (Method 353.2) will be collected from select monitoring wells during the operation of the proposed leachate recovery well to monitor for possible salt water intrusion. This total chloride data will be utilized in conjunction with the field measurements of water quality parameters described in Section 3.2.1 to evaluate the potential for salt water intrusion during the proposed leachate recovery well installation and operation.

The proposed total chloride analysis will be completed in 94-1-S, 94-2-S, and 94-3-S as follows:

- ***Baseline Period*** – Collect one round of samples from the proposed monitoring wells at the beginning of the baseline period.
- ***Dewatering Period*** – Collect one round of samples from the proposed monitoring wells at the end of the dewatering period.
- ***Leachate Recovery*** – Collect one round of samples from the proposed monitoring wells at the end of the initial 3-month of operation period.

The chloride sampling will coincide with water level monitoring and water quality parameter monitoring discussed in Section 3.1.1 and Section 3.2.1, respectively. Except for the proposed leachate recovery well, the chloride sampling will be completed using conventional well sampling methodology, which will include purging three well volumes from the monitoring well and collecting a sample with dedicated bailers. Because the proposed leachate recovery well will be flowing, purging of stagnant water as with conventional purge and sample methodology will not be required. As such, a sample will be retrieved from the proposed leachate well utilizing a dedicated bailer at the time of sampling.

4. SOIL SAMPLING PLAN

As required by the NYSDEC, soil sampling will be completed in the rear portion of the Markowitz residence adjacent to the Site. The soil sampling is proposed to evaluate potential impacts to soil resulting from the migration of impacted ground water from the landfill. The location of the proposed borings is shown on Figure 3.

As requested by the NYSDEC, the proposed soil sampling will be implemented when the operation of the proposed leachate recovery well demonstrates that the ground water elevation in MW-4S falls to about 2-feet below the existing level measured prior to the commencement of work at the site.

4.1 SOIL SAMPLING METHODOLOGY

A total of six soil borings (SB-1 through SB-6) are proposed to a depth of four feet. The proposed borings will be completed utilizing direct push drilling methodology and/or manually with a hand auger. Samples from the direct-push method will be collected with 4-feet or 5-feet macro core samplers lined with acetate sleeves. The sleeves will be cut open and the soil sample will be screened with a photoionization detector (PID). The soil type and other field observations will be recorded on boring logs. Soil samples will be collected from each boring at the following depth intervals:

- 0-feet to 0.2 feet (i.e., top 2-inches),
- 0.2-feet to 0.5-feet,
- 0.5-feet to 1-foot,
- 1-foot to 1.5-feet,
- 1.5-feet to 2-feet,
- 2-feet to 3-feet, and
- 3-feet to 4-feet.

A total of 42 primary and two duplicate soil samples will be collected for analysis as described in Section 4.2. Soil samples will be transferred from the macro-core samplers and/or hand auger to the laboratory utilizing dedicated stainless steel or plastic trowels. One field blank will be collected during soil sampling. A trip blank will not be used because the analytical parameter list does not include VOCs.

4.2 SOIL ANALYTICAL PROGRAM

As requested by the NYSDEC, each soil sample will be analyzed for the following Part 375-6 Soil Cleanup Objectives (SCO) list parameters:

- SVOCs by Method 8270;
- Metals by Method 6010 and 7000 for mercury;
- PCBs by Method 8082; and
- Pesticides/Herbicides by Method 8081/8151.

Laboratory reports will be provided in ASP level B format.

5. SCHEDULE AND REPORTING

5.1 PROJECT SEQUENCE AND SCHEDULE

Based on the recent September 16, 2009 meeting, the Village of Mamaroneck understands that the proposed IRMWP shall be implemented by November 15, 2009. Once the leachate recovery well installation is completed and favorable water level conditions are observed, the soil sampling at the Markowitz residence will be completed.

In addition, the Village of Mamaroneck anticipates that it will enter into an inter-municipal agreement with WCDEF by December 31, 2009.

The general project sequence is anticipated to be as follows:

- Procure contractors.
- Sample MW-14S for disposal characterization and submit data to WCDEF.
- Obtain authorization from WCDEF to discharge to sanitary sewer.
- Mobilize to the Site and setup staging area.
- Install PZ-A, PZ-B, PZ-C, PZ-D, and MW-A and develop.
- Establish the water level monitoring network (existing locations & Magid Pond) and initiate baseline water level monitoring period.
- Collect baseline water quality parameter measurements.
- Collect baseline total chloride and TDS samples.
- Remove chain link fence.
- Remove cap materials and expose landfill surface through the geomembrane cap.
- Install leachate recovery well pilot hole
- Evaluate pilot hole data
- Design leachate recovery well
- Obtain approval of the leachate recovery well from NYSDEC
- Install leachate recovery well and develop.
- Excavate discharge pipe trench and complete pipe installation.
- Install discharge pipe, appurtenances (utility vault, meter, and valve), and backfill trench.
- Redistribute excess soil from drilling and excavation below the geomembrane cap liner.
- Repair cap liner and construct boots on leachate recovery well, piezometers, and discharge pipe cleanout.
- Test repaired cap liner welds and boots.
- Reconstruct landfill cap above geomembrane.
- Collect post dewatering water quality parameter measurements.
- Collect post dewatering total chloride and TDS samples.
- Open valve and begin initial three month leachate recovery well operation period.
- Repair chain link fence.
- Characterize and dispose any excess excavated materials.
- Complete periodic total chloride and TDS sampling, water quality parameter monitoring, and water level monitoring during the initial three month leachate recovery well operation period.
- Complete soil sampling at Markowitz residence if leachate recovery well operation creates a minimum drawdown at the Markowitz residence as measured in MW-4S.
- Process data and complete report for submittal to NYSDEC.

5.2 REPORTING

Upon completing the installation of the proposed leachate recovery well and test period, the Village of Mamaroneck will present the results of the Interim Remedial Measure to the NYSDEC. Unless instructed by the NYSDEC, the leachate recovery system shall be maintained in full and satisfactory operational condition.

6. REFERENCES

Malcolm-Pirnie, 1992. Mamaroneck Feasibility Study.

New York State Department of Environmental Conservation, 2004. Leachate Investigation at Mamaroneck Taylor Lane Leaf Compost Site: Site No. 360021. December 2004.

Shaw Environmental and Infrastructure, Inc. 2005. Hydrogeologic Evaluation: Taylors Lane Compost Site, Village of Mamaroneck, NY. Report dated January 2005.

Shaw Environmental and Infrastructure, Inc, 2009. Phase I Pump Test Results. Letter to the Village of Mamaroneck dated May 12, 2009.

TABLES

Table 1
Proposed Ground Water Sampling and Monitoring Program
Interim Remedial Measure
Taylors Lane Landfill - Mamaroneck, NY

		Period			Frequency					Parameter				
Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
leachate recovery well	landfill material	X				X			3 to 5 days	X				
leachate recovery well	landfill material	X			X				at beginning of baseline	X	X	X		
leachate recovery well	landfill material		X			X			until end of dewatering	X				
leachate recovery well	landfill material		X		X				at end of dewatering	X	X	X		
leachate recovery well	landfill material			X			X		first month	X	X			
leachate recovery well	landfill material			X				X	2nd & 3rd month	X	X			
leachate recovery well	landfill material			X	X				at end of 3-months	X	X	X		
94-1-S	shallow soil	X				X			3 to 5 days	X				
94-1-S	shallow soil	X			X				at beginning of baseline	X	X			X
94-1-S	shallow soil		X			X			until end of dewatering	X				
94-1-S	shallow soil		X		X				at end of dewatering	X	X			X
94-1-S	shallow soil			X			X		first month	X	X			
94-1-S	shallow soil			X				X	2nd & 3rd month	X	X			
94-1-S	shallow soil			X	X				at end of 3-months	X	X			X
94-1-D	sand layer	X				X			3 to 5 days	X				
94-1-D	sand layer	X			X				at beginning of baseline	X	X			
94-1-D	sand layer		X			X			until end of dewatering	X				
94-1-D	sand layer		X		X				at end of dewatering	X	X			
94-1-D	sand layer			X			X		first month	X	X			
94-1-D	sand layer			X				X	2nd & 3rd month	X	X			
94-1-D	sand layer			X	X				at end of 3-months	X	X			
94-2-S	shallow soil	X				X			3 to 5 days	X				

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Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
94-2-S	shallow soil	X			X				at beginning of baseline	X	X			X
94-2-S	shallow soil		X			X			until end of dewatering	X				
94-2-S	shallow soil		X		X				at end of dewatering	X	X			X
94-2-S	shallow soil			X			X		first month	X	X			
94-2-S	shallow soil			X				X	2nd & 3rd month	X	X			
94-2-S	shallow soil			X	X				at end of 3-months	X	X			X
94-2-D	sand layer	X				X			3 to 5 days	X				
94-2-D	sand layer	X			X				at beginning of baseline	X	X			
94-2-D	sand layer		X			X			until end of dewatering	X				
94-2-D	sand layer		X		X				at end of dewatering	X	X			
94-2-D	sand layer			X			X		first month	X	X			
94-2-D	sand layer			X				X	2nd & 3rd month	X	X			
94-2-D	sand layer			X	X				at end of 3-months	X	X			
94-3-S	shallow soil	X				X			3 to 5 days	X				
94-3-S	shallow soil	X			X				at beginning of baseline	X	X			X
94-3-S	shallow soil		X			X			until end of dewatering	X				
94-3-S	shallow soil		X		X				at end of dewatering	X	X			X
94-3-S	shallow soil			X			X		first month	X	X			
94-3-S	shallow soil			X				X	2nd & 3rd month	X	X			
94-3-S	shallow soil			X	X				at end of 3-months	X	X			X
94-3-D	sand layer	X				X			3 to 5 days	X				
94-3-D	sand layer	X			X				at beginning of baseline	X	X			
94-3-D	sand layer		X			X			until end of dewatering	X				
94-3-D	sand layer		X		X				at end of dewatering	X	X			
94-3-D	sand layer			X			X		first month	X	X			
94-3-D	sand layer			X				X	2nd & 3rd month	X	X			
94-3-D	sand layer			X	X				at end of 3-months	X	X			

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Interim Remedial Measure
Taylors Lane Landfill - Mamaroneck, NY

		Period			Frequency					Parameter				
Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
MW-4S	landfill material	X				X			3 to 5 days	X				
MW-4S	landfill material	X			X				at beginning of baseline	X	X			
MW-4S	landfill material		X			X			until end of dewatering	X				
MW-4S	landfill material		X		X				at end of dewatering	X	X			
MW-4S	landfill material			X			X		first month	X	X			
MW-4S	landfill material			X				X	2nd & 3rd month	X	X			
MW-4S	landfill material			X	X				at end of 3-months	X	X			
MW-4M	sand layer	X				X			3 to 5 days	X				
MW-4M	sand layer	X			X				at beginning of baseline	X	X			
MW-4M	sand layer		X			X			until end of dewatering	X				
MW-4M	sand layer		X		X				at end of dewatering	X	X			
MW-4M	sand layer			X			X		first month	X	X			
MW-4M	sand layer			X				X	2nd & 3rd month	X	X			
MW-4M	sand layer			X	X				at end of 3-months	X	X			
MW-4D	bedrock	X				X			3 to 5 days	X				
MW-4D	bedrock	X			X				at beginning of baseline	X	X			
MW-4D	bedrock		X			X			until end of dewatering	X				
MW-4D	bedrock		X		X				at end of dewatering	X	X			
MW-4D	bedrock			X			X		first month	X	X			
MW-4D	bedrock			X				X	2nd & 3rd month	X	X			
MW-4D	bedrock			X	X				at end of 3-months	X	X			
MW-9S	shallow soil	X				X			3 to 5 days	X				
MW-9S	shallow soil	X			X				at beginning of baseline	X	X			
MW-9S	shallow soil		X			X			until end of dewatering	X				
MW-9S	shallow soil		X		X				at end of dewatering	X	X			
MW-9S	shallow soil			X			X		first month	X	X			
MW-9S	shallow soil			X				X	2nd & 3rd month	X	X			

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Taylors Lane Landfill - Mamaroneck, NY

		Period			Frequency					Parameter				
Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
MW-9S	shallow soil			X	X				at end of 3-months	X	X			
MW-9D	bedrock	X				X			3 to 5 days	X				
MW-9D	bedrock	X			X				at beginning of baseline	X	X			
MW-9D	bedrock		X			X			until end of dewatering	X				
MW-9D	bedrock		X		X				at end of dewatering	X	X			
MW-9D	bedrock			X			X		first month	X	X			
MW-9D	bedrock			X				X	2nd & 3rd month	X	X			
MW-9D	bedrock			X	X				at end of 3-months	X	X			
MW-14S	landfill material	X				X			3 to 5 days	X				
MW-14S	landfill material	X			X				at beginning of baseline	X	X		X	
MW-14S	landfill material		X			X			until end of dewatering	X				
MW-14S	landfill material		X		X				at end of dewatering	X	X			
MW-14S	landfill material			X			X		first month	X	X			
MW-14S	landfill material			X				X	2nd & 3rd month	X	X			
MW-14S	landfill material			X	X				at end of 3-months	X	X			
MW-14M	sand layer	X				X			3 to 5 days	X				
MW-14M	sand layer	X			X				at beginning of baseline	X	X			
MW-14M	sand layer		X			X			until end of dewatering	X				
MW-14M	sand layer		X		X				at end of dewatering	X	X			
MW-14M	sand layer			X			X		first month	X	X			
MW-14M	sand layer			X				X	2nd & 3rd month	X	X			
MW-14M	sand layer			X	X				at end of 3-months	X	X			
MW-14D	bedrock	X				X			3 to 5 days	X				
MW-14D	bedrock	X			X				at beginning of baseline	X	X			
MW-14D	bedrock		X			X			until end of dewatering	X				
MW-14D	bedrock		X		X				at end of dewatering	X	X			
MW-14D	bedrock			X			X		first month	X	X			

Table 1
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Interim Remedial Measure
Taylors Lane Landfill - Mamaroneck, NY

		Period			Frequency					Parameter				
Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
MW-14D	bedrock			X				X	2nd & 3rd month	X	X			
MW-14D	bedrock			X	X				at end of 3-months	X	X			
MW-15D	bedrock	X				X			3 to 5 days	X				
MW-15D	bedrock	X			X				at beginning of baseline	X	X			
MW-15D	bedrock		X			X			until end of dewatering	X				
MW-15D	bedrock		X		X				at end of dewatering	X	X			
MW-15D	bedrock			X			X		first month	X	X			
MW-15D	bedrock			X				X	2nd & 3rd month	X	X			
MW-15D	bedrock			X	X				at end of 3-months	X	X			
MW-A	shallow soil	X				X			3 to 5 days	X				
MW-A	shallow soil	X			X				at beginning of baseline	X	X			
MW-A	shallow soil		X			X			until end of dewatering	X				
MW-A	shallow soil		X		X				at end of dewatering	X	X			
MW-A	shallow soil			X			X		first month	X	X			
MW-A	shallow soil			X				X	2nd & 3rd month	X	X			
MW-A	shallow soil			X	X				at end of 3-months	X	X			
PZ-A	shallow soil	X				X			3 to 5 days	X				
PZ-A	shallow soil	X			X				at beginning of baseline	X	X			
PZ-A	shallow soil		X			X			until end of dewatering	X				
PZ-A	shallow soil		X		X				at end of dewatering	X	X			
PZ-A	shallow soil			X			X		first month	X	X			
PZ-A	shallow soil			X				X	2nd & 3rd month	X	X			
PZ-A	shallow soil			X	X				at end of 3-months	X	X			
PZ-B	landfill material	X				X			3 to 5 days	X				
PZ-B	landfill material	X			X				at beginning of baseline	X	X			
PZ-B	landfill material		X			X			until end of dewatering	X				
PZ-B	landfill material		X		X				at end of dewatering	X	X			

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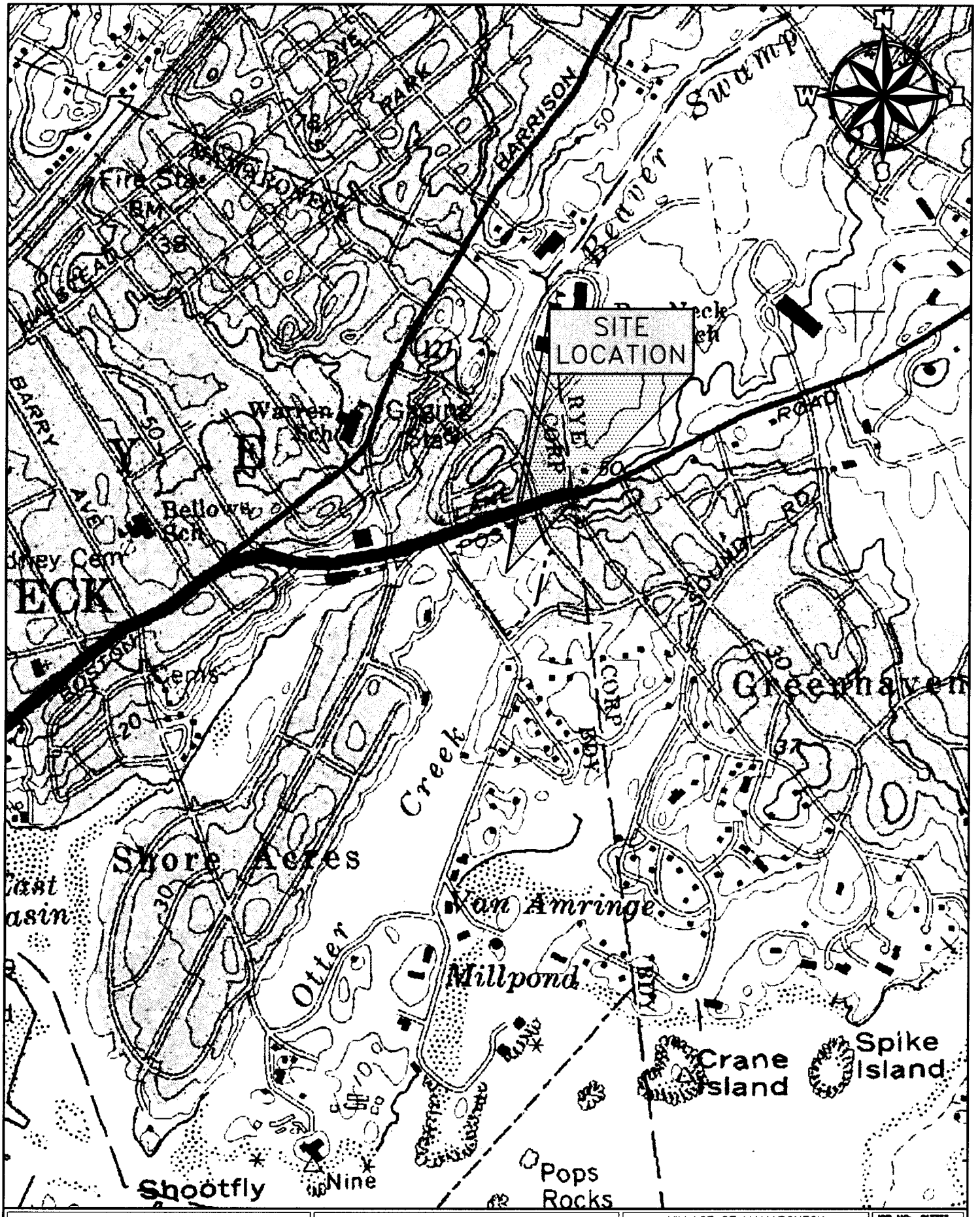
		Period			Frequency					Parameter				
Location	Lithologic Unit	Baseline	Dewatering	Leachate Recovery[2]	Once	Daily	Biweekly	Monthly	Duration	Water Level	Fld Meter Readings	TDS	Lab[1]	Total Cl
PZ-B	landfill material			X			X		first month	X	X			
PZ-B	landfill material			X				X	2nd & 3rd month	X	X			
PZ-B	landfill material			X	X				at end of 3-months	X	X			
PZ-C	landfill material	X				X			3 to 5 days	X				
PZ-C	landfill material	X			X				at beginning of baseline	X	X			
PZ-C	landfill material		X			X			until end of dewatering	X				
PZ-C	landfill material		X		X				at end of dewatering	X	X			
PZ-C	landfill material			X			X		first month	X	X			
PZ-C	landfill material			X				X	2nd & 3rd month	X	X			
PZ-C	landfill material			X	X				at end of 3-months	X	X			
PZ-D	landfill material	X				X			3 to 5 days	X				
PZ-D	landfill material	X			X				at beginning of baseline	X	X			
PZ-D	landfill material		X			X			until end of dewatering	X				
PZ-D	landfill material		X		X				at end of dewatering	X	X			
PZ-D	landfill material			X			X		first month	X	X			
PZ-D	landfill material			X				X	2nd & 3rd month	X	X			
PZ-D	landfill material			X	X				at end of 3-months	X	X			
Magid Pond	surface water	X				X			3 to 5 days	X				
Magid Pond	surface water	X			X				at beginning of baseline	X	X			
Magid Pond	surface water		X			X			until end of dewatering	X				
Magid Pond	surface water		X		X				at end of dewatering	X	X			
Magid Pond	surface water			X			X		first month	X	X			
Magid Pond	surface water			X				X	2nd & 3rd month	X	X			
Magid Pond	surface water			X	X				at end of 3-months	X	X			

(1) analytical program as indicated in Interim Remedial Measure Work Plan to characterize for disposal within sanitary sewer. Required sampling and analytical parameters to be confirmed with Westchester County Department of Environmental Facilities.
(2) Measure every 4-hrs during working hours on the first day of operation.

FIGURES



WOODARD &CURRAN 709 Westchester Avenue | Suite L2 White Plains, New York 10604 914.448.2266 | www.woodardcurran.com COMMITMENT & INTEGRITY DRIVE RESULTS	SITE LOCATION MAP DESIGNED BY: / CHECKED BY: DRAWN BY: 213733_Site.dwg	VILLAGE OF MAMARONECK 123 MAMARONECK AVENUE MAMARONECK, NEW YORK 10543 TAYLORS LANE LANDFILL INTERIM REMEDIAL MEASURE VILLAGE OF MAMARONECK, NEW YORK	JOB NO: 213733 DATE: September 2009 SCALE: N.T.S. FIGURE 1