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September 29, 2016

Nigel N. Crawford, P.E.
New York State Department of Environmental Conservation
Region 2
47-40 21st Street, LIC
New York, NY 11101

Subject: Pilot Test for Discontinuation of Leachate Pumping
Pelham Bay Closed Landfill
Bronx, NY

Dear Mr. Crawford:

TRC, on behalf of the City of New York Department of Parks and Recreation (NYC Parks), has prepared this revised correspondence to request approval of a pilot test of the discontinuation of leachate pumping at the above referenced site. This revised correspondence has been prepared, in part, based on the June 15, 2016 telephone conversation between Mr. Marty Rowland of NYC Parks, Mr. Barry Kline of TRC and yourself. This revised correspondence also addresses your comments provided in emails dated August 5, 2016 and August 16, 2016.

Background

Pelham Bay Landfill is a closed and capped landfill located in the Bronx, NY. Remedial Action goals for the landfill were specified in the Record of Decision (ROD) for the site, issued by NYSDEC in August 1993. The Declaration Statement of the ROD identifies Alternative III as the selected remedy for the site. Alternative III as described in Section 7.0 of the ROD includes the installation of a landfill cap to minimize infiltration of precipitation and a cutoff wall with upgradient groundwater and downgradient leachate management systems. The remedy that was installed at the site included both the landfill cap and a cutoff wall. The cutoff wall was designed and installed to prevent groundwater from Pelham Bay Park flowing onto the landfill site. Groundwater on the Park side is collected and directed into Eastchester Bay (Bay). Leachate on the landfill side of the cutoff wall is collected and ultimately discharged to the New



York City Department of Environmental Protection (NYCDEP) Hunt's Point Water Pollution Control Plant (WPCP).

As described in Section 3.1 of the ROD, the primary sources of leachate generation at the Site, prior to implementation of the ROD prescribed remedy, were

- precipitation infiltration into the waste,
- groundwater flow into the waste from the southwest through Pelham Bay Park, and
- upward groundwater flow from the underlying bedrock.

Historical data collected at the Site indicate that groundwater beneath the landfill is tidally affected by surface water from Eastchester Bay, which enters and mixes with natural groundwater and leachate beneath the Site during high tide, followed by drainage back to the Bay during low tide.

Leachate Quantity

Based on pre-remedy estimates in the ROD, up to 75,000 gallons of leachate could discharge from the landfill to Eastchester Bay and the surrounding tidal wetlands. Information provided by ARCADIS indicated that during the first year after the landfill closure the average daily flow of leachate was approximately 45,000 gallons per day. More recent leachate discharge flowrates provided by the Pelham Bay Landfill Operation, Maintenance and Monitoring (OM&M) Contractor, Stratis Contracting Corporation (Stratis), to the NYCDEP, showed an average daily leachate discharge volume of 40,476 gallons during the past six months. The Stratis information was provided to the NYCDEP in two reports; "Self Monitoring Report, December 1, 2015 to February 29, 2016", Stratis, March 4, 2016 and "Self Monitoring Report, March 1, 2016 to May 31, 2016", Stratis, June 5, 2016. This data would appear to show that the implemented remedy at the site, including the landfill cap and cutoff wall, have been successful at reducing the amount of leachate being generated at the site when compared to ROD estimated values.

Leachate Quality

In addition to the quantity of the leachate generated, TRC reviewed the quality of the leachate currently being generated at the site. Based on the recent Stratis Self Monitoring Reports (past six months), data for the sampled parameters (pH, metals, cyanide, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, and conventional leachate parameters) show that the only parameters that exceeded the NYS Ambient Water Quality Standard and Guidance Values were chloride (six samples) and total

nitrogen (five out of six samples). The chloride in the leachate is likely due to the tidal influence of the Bay on the site groundwater and leachate. The Total Nitrogen concentration has remained relatively similar to pre-capping concentrations and it should be noted that the current levels of Total Kjeldahl Nitrogen are significantly less than the historical pre-capping concentrations.

Groundwater Quality and Well Gauging

Based on a September 23, 2015 letter from Marty Rowland to NYSDEC, memorializing the modifications to the post-closure monitoring requirements (agreed to during a May 26, 2015 meeting between NYSDEC and NYC Parks), groundwater sampling is currently being conducted on a biennial basis. Additionally, that same letter describes the removal of PCBs and pesticides from the sampling program, and the elimination of saltwater-related compounds from the conventional leachate parameter analytical tests. NYC Parks also provided additional information to justify a request to eliminate VOCs and SVOCs from the sampling program for all but one well at the landfill. The basis for the removal of select sampling parameters from the monitoring program, and the basis for the petition to eliminate others in the future, was the low and/or sporadic detection of such parameters in post-capping groundwater sampling events.

In addition to the groundwater sampling, historical gauging of monitoring wells and piezometers has been ongoing at the landfill site. Currently, based also on the September 23, 2015 NYC Parks correspondence, Stratis gauges the groundwater elevation at the site (in 13 monitoring wells and 6 piezometers) on a biennial basis.

Landfill Gas Generation and Flare System Operation

In addition to the leachate recovery and pumping system described above, an active landfill gas collection and flaring system is currently in operation at the site. The system collects gas through a series of gas extraction wells and utilizes a series of lateral and header pipes to transport the gas to an extraction blower and enclosed flare. Stratis monitors and records the landfill gas volumetric flow rate and extracted gas composition daily. Information provided to TRC by Stratis in Quarterly Maintenance, Repair, and Monitoring Reports indicates that currently the methane in the extracted gas ranges from approximately 22% to 32% (averaging approximately 27%) and the flow rate ranges from approximately 1,100 standard cubic feet per minute (scfm) to 1,200 scfm.

Proposed Pilot Test Activities



Based on information provided heretofore, it appears that the landfill capping system and cut-off wall have been effective at mitigating the infiltration of precipitation into, and horizontal flow of groundwater through, the landfill waste material. The leachate volume has decreased since the implementation of the ROD-selected remedy and, with few exceptions, the concentration of contaminants in the leachate are below NYS Ambient Water Quality Standard and Guidance Values. Additionally, the low levels of contamination found in monitoring wells at the site have allowed NYSDEC to reduce sampling parameters and frequencies, and to potentially eliminate other sampling parameters in the future. Therefore, NYC Parks is requesting approval to perform a pilot test by temporarily deactivating portions of the leachate collection system at the site. The parts of the leachate pumping system that would remain online would be the pumps in collection sump D1 and lift station #1 (LS1), and associated system components. D1 receives water from D2 which includes condensate from the flare system and LS1 collects the gravity flow of leachate from the curtain drain installed along the northwestern side of the landfill. A site plan and schematic showing the components that will be deactivated during the pilot test are attached to this correspondence.

During the pilot testing, data will be collected to ensure that the temporary deactivation does not negatively impact the leachate/groundwater quality at the site or the operation of the landfill gas collection and flaring system. Such data will include:

1. **Leachate Sampling.** Samples of leachate will be collected from the gravity fed leachate collection sumps. The leachate samples will be analyzed for those parameters currently included in the leachate discharge sampling program. Such samples will be collected at three months, six months, nine months, and twelve months following initiation of the pilot test. Results of the sampling will be compared to historical leachate data to determine if the cessation of active leachate collection is negatively impacting leachate quality. All leachate sampling will be conducted in accordance with the Pelham Bay Landfill approved Site Management Plan (SMP) Quality Assurance Project Plan (QAPP).
2. **Groundwater Sampling.** Groundwater samples will be collected from each of the ten monitoring wells currently included in the site-wide sampling program. The sampled parameters will include VOCs, SVOCs, metals (total and dissolved), PCBs, pesticides, and conventional leachate parameters. Although, approval to eliminate PCBs, pesticides, and saltwater-related compounds from inorganic and conventional leachate parameter analytical tests was granted by NYSDEC, these will be included such that the pilot test analytical results can be compared to

historical groundwater sampling results. The comparison of pilot test results to historical groundwater data will be used to determine if the cessation of active leachate collection is negatively impacting groundwater quality. Pilot test groundwater samples will be collected at three months, six months, nine months, and twelve months following initiation of the pilot testing.

3. **Water Level Gauging.** Following the initiation of the pilot test, and throughout the pilot test period, water levels in 13 monitoring wells will be gauged on a monthly basis. Data from the well gauging will be evaluated to determine if a rising trend in groundwater elevations is being detected at the site. Additionally, the pilot test well gauging data will be compared to historical well gauging data to determine if the groundwater elevations are within normal ranges observed at the site. A significant rise in the water table elevation could allow groundwater to infiltrate into additional waste materials thereby creating additional leachate or increasing contaminant concentrations in the leachate. In addition to gauging the monitoring wells, the depth to water in collection sump D-8 will be measured. This measurement will be utilized to determine if the elevation of the groundwater/leachate adjacent to the cutoff wall is increasing.
4. **Landfill Gas Generation and Quality Monitoring.** Throughout pilot testing, Stratis will continue its daily landfill gas flow rate and extracted gas composition monitoring. The gas generation rate and quality observed during pilot testing will be compared to baseline data from the landfill gas collection system, including the recently repaired components. The purpose of this data evaluation will be to determine if the cessation of leachate pumping is resulting in a reduction of the volume of the gas being generated, or in a reduced gas quality. Negative impacts to the gas generation rate would likely be due to a general rise in the groundwater elevation at the site or the saturation of previously unsaturated portions of the waste materials. This would limit the ability of the gas collection system to extract landfill gas due to reduced unsaturated pore space in the waste materials or the flooding of all, or part, of the extraction well screens. The quality of the landfill gas could be similarly affected if waste materials available for biological breakdown become saturated with leachate.

With NYSDEC's approval, NYC Parks proposes beginning the pilot testing activities as soon as possible. Upon completion of the pilot testing, if a review of the pilot test data

indicates that termination of the leachate pumping has not created any negative impacts, NYC Parks will petition the NYSDEC to permanently terminate the leachate pumping and discharge from those portions of the system deactivated during the pilot test. If, however, at any time during the pilot test activities, negative impacts are observed, the leachate pumping will immediately resume. A summary of the proposed pilot test data collection and explanation of the data evaluation methodologies has been attached as **Table 1**. Additionally, during the pilot testing, NYC Parks will evaluate the operation of collection sump D1 lift station #1, along with analytical data from the effluent of lift station #1, and potentially propose a plan to permanently eliminate discharges from one or both of these components.

Elimination of any, or all, of the leachate discharge from the site will help reduce the load on the Hunt's Point WPCP. Additionally, the elimination of some, or all, of the leachate discharge will allow NYC Parks to decommission the associated leachate collection, storage, and discharge components, moving the site forward towards the ultimate goal of its transition into a usable parkland space.

We trust that the information provided is sufficient to allow NYSDEC to approve NYC Parks moving forward with the pilot testing process. Should you have any questions regarding this correspondence, please do not hesitate to contact me at your earliest convenience.

Very truly yours,
TRC



Barry A. Kline, P.E.
Senior Project Engineer

w/enclosures

cc: Mr. Mary Rowland – NYC Parks

Mr. Nigel Crawford

8/29/2016

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I James Peronto, P.E. certify that I am currently a NYS registered professional engineer and that this correspondence (work plan) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



Mr. James Peronto, P.E. (NY PE #083861)

11/04/2016

Date

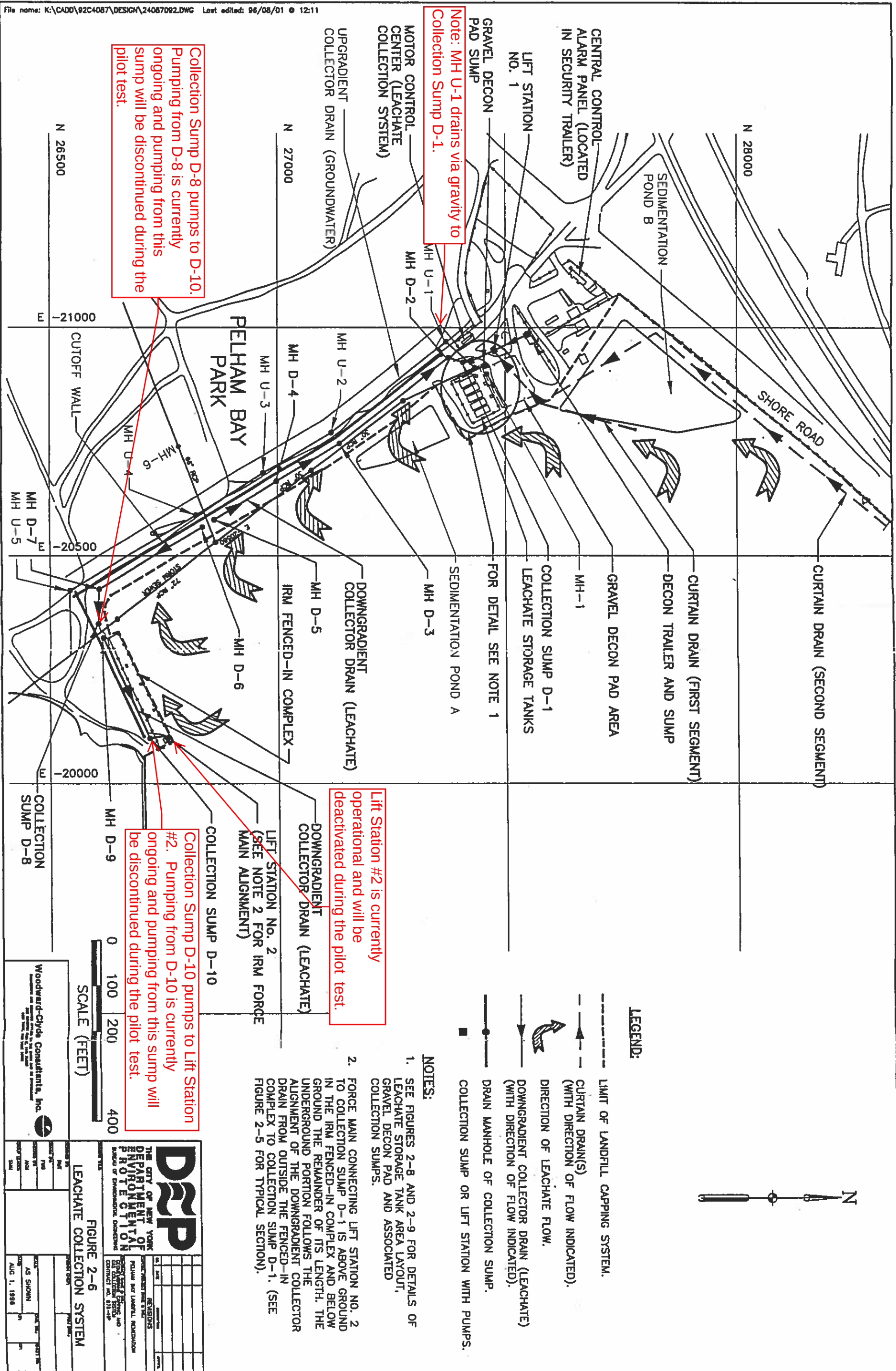


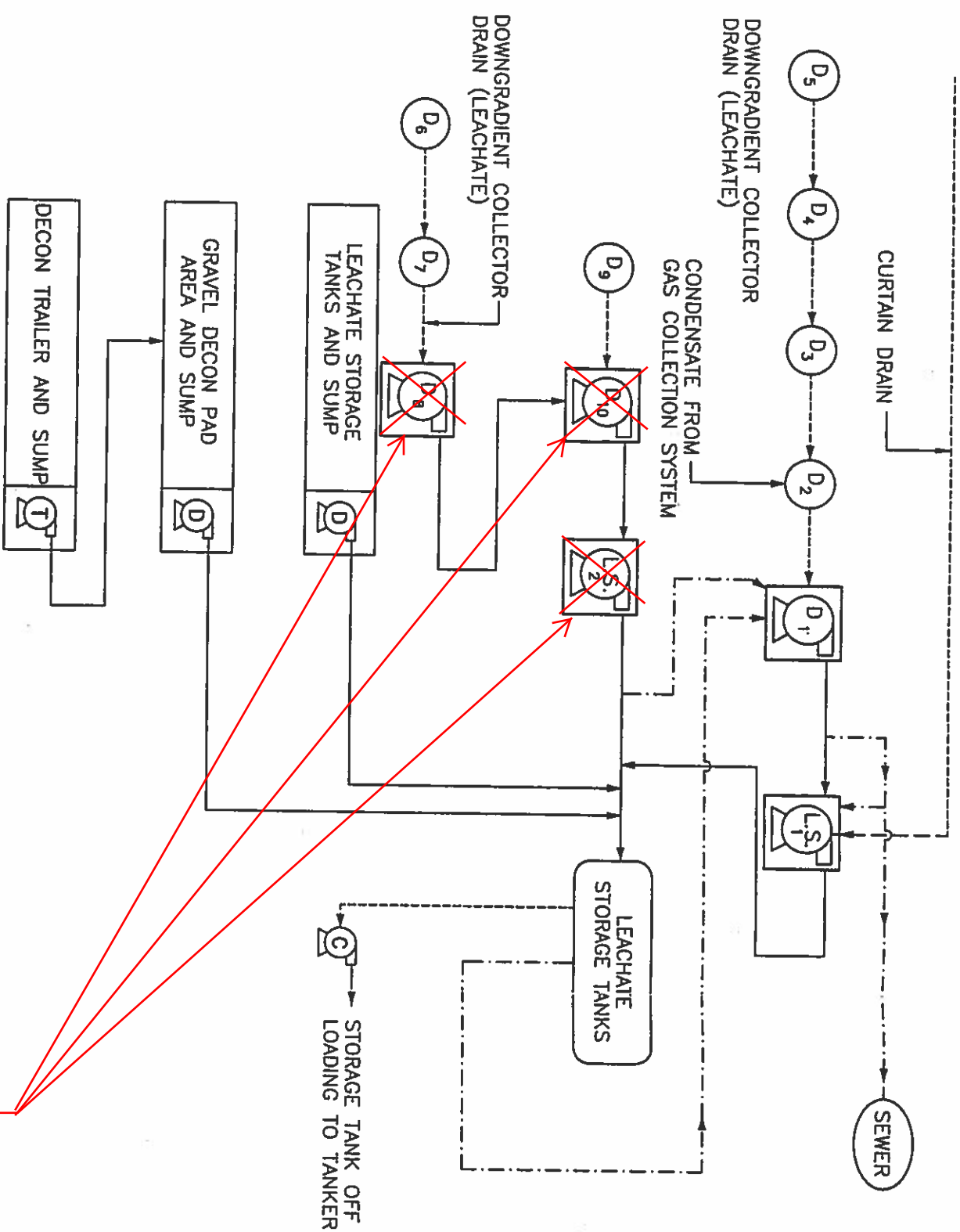
Table 1
Pilot Test for Discontinuation of Leachate Pumping - Data Collection and Evaluation Description
Pelham Bay (Closed) Landfill
Bronx, NY

Pilot Test Period	Purpose of Test Period	Measured Parameters	Explanation of Data Evaluation
Mid-May till Sept 1, 2016 (at the earliest)	Allow the newly repaired landfill gas collection system to operate for a minimum of three months before collecting landfill gas collection system gas quantity and quality data.	Landfill Gas Generation Rates (volumetric)	None. This period will allow for baseline data collection.
		Landfill Gas Quality (%CH ₄ , CO ₂ , O ₂ , and Balance Gas)	None. This period will allow for baseline data collection.
Months 1 through 3	Collect leachate quality, groundwater quality, groundwater level, and landfill gas quantity and quality data to determine if the cessation of leachate pumping is having any negative impacts at the site.	Leachate sampling and analysis for parameters currently included in the leachate discharge sampling program. Data will be collected on a monthly basis during months 1 through 3.	Results of the pilot test sampling will be compared to historical leachate data to determine if cessation of active leachate pumping is negatively impacting the leachate quality (i.e. resulting in increases in leachate contaminant concentrations).
		Groundwater sampling and analysis for VOCs, SVOCs, metals (total and dissolved), PCBs, pesticides and conventional leachate parameters. Data will be collected from 10 monitoring wells at the end of month 3.	Results of the pilot test sampling will be compared to historical groundwater data to determine if cessation of active leachate pumping is negatively impacting the groundwater quality (i.e. resulting in increases in groundwater contaminant concentrations).
		Water level gauging. The water levels in 13 monitoring wells will be gauged on a monthly basis. Additionally, the water level in collection sump D-8 will be measured on a monthly basis.	Data from the water level gauging will be compared to historical groundwater elevations at the site to determine if local or site-wide increases in groundwater elevations are being observed. Potential negative impacts would include increases in either local or site-wide groundwater elevations.
		Landfill Gas Generation Rates (volumetric). The volume of landfill gas generated will be measured and recorded daily.	The volume of gas being generated and extracted by the landfill gas collection system will be compared to baseline data. A negative impact would include a significant decrease in the volume of gas being generated.
		Landfill Gas Quality (%CH ₄ , CO ₂ , O ₂ , and N ₂ /Balance Gas). The landfill gas quality will be measured and recorded daily.	The quality of gas being generated and extracted by the landfill gas collection system during the pilot test will be compared to baseline data. A negative impact would include a significant decrease in the %CH ₄ being generated or increases in %O ₂ or N ₂ /Balance Gas.
Months 4 through 6	Collect leachate quality, groundwater quality, groundwater level, and landfill gas quantity and quality data to determine if the cessation of leachate pumping is having any negative impacts at the site.	Leachate sampling and analysis for parameters currently included in the leachate discharge sampling program. Data will be collected on a monthly basis during months 4 through 6.	Results of the pilot test sampling will be compared to historical leachate data to determine if cessation of active leachate pumping is negatively impacting the leachate quality (i.e. resulting in increases in leachate contaminant concentrations).
		Groundwater sampling and analysis for VOCs, SVOCs, metals (total and dissolved), PCBs, pesticides and conventional leachate parameters. Data will be collected from 10 monitoring wells at the end of month 6.	Results of the pilot test sampling will be compared to historical groundwater data to determine if cessation of active leachate pumping is negatively impacting the groundwater quality (i.e. resulting in increases in groundwater contaminant concentrations).
		Water level gauging. The water levels in 13 monitoring wells will be gauged on a monthly basis. Additionally, the water level in collection sump D-8 will be measured on a monthly basis.	Data from the water level gauging will be compared to historical groundwater elevations at the site to determine if local or site-wide increases in groundwater elevations are being observed. Potential negative impacts would include increases in either local or site-wide groundwater elevations.
		Landfill Gas Generation Rates (volumetric). The volume of landfill gas generated will be measured and recorded daily.	The volume of gas being generated and extracted by the landfill gas collection system will be compared to baseline data. A negative impact would include a significant decrease in the volume of gas being generated.
		Landfill Gas Quality (%CH ₄ , CO ₂ , O ₂ , and N ₂ /Balance Gas). The landfill gas quality will be measured and recorded daily.	The quality of gas being generated and extracted by the landfill gas collection system during the pilot test will be compared to baseline data. A negative impact would include a significant decrease in the %CH ₄ being generated or increases in %O ₂ or N ₂ /Balance Gas.

Table 1
Pilot Test for Discontinuation of Leachate Pumping - Data Collection and Evaluation Description
Pelham Bay (Closed) Landfill
Bronx, NY

Pilot Test Period	Purpose of Test Period	Measured Parameters	Explanation of Data Evaluation
Months 7 through 9	Collect leachate quality, groundwater quality, groundwater level, and landfill gas quantity and quality data to determine if the cessation of leachate pumping is having any negative impacts at the site.	Leachate sampling and analysis for parameters currently included in the leachate discharge sampling program. Data will be collected on a monthly basis during months 7 through 9.	Results of the pilot test sampling will be compared to historical leachate data to determine if cessation of active leachate pumping is negatively impacting the leachate quality (i.e. resulting in increases in leachate contaminant concentrations).
		Groundwater sampling and analysis for VOCs, SVOCs, metals (total and dissolved), PCBs, pesticides and conventional leachate parameters. Data will be collected from 10 monitoring wells at the end of month 9.	Results of the pilot test sampling will be compared to historical groundwater data to determine if cessation of active leachate pumping is negatively impacting the groundwater quality (i.e. resulting in increases in groundwater contaminant concentrations).
		Water level gauging. The water levels in 13 monitoring wells will be gauged on a monthly basis. Additionally, the water level in collection sump D-8 will be measured on a monthly basis.	Data from the water level gauging will be compared to historical groundwater elevations at the site to determine if local or site-wide increases in groundwater elevations are being observed. Potential negative impacts would include increases in either local or site-wide groundwater elevations.
		Landfill Gas Generation Rates (volumetric). The volume of landfill gas generated will be measured and recorded daily.	The volume of gas being generated and extracted by the landfill gas collection system will be compared to baseline data. A negative impact would include a significant decrease in the volume of gas being generated.
		Landfill Gas Quality (%CH ₄ , CO ₂ , O ₂ , and N ₂ /Balance Gas). The landfill gas quality will be measured and recorded daily.	The quality of gas being generated and extracted by the landfill gas collection system during the pilot test will be compared to baseline data. A negative impact would include a significant decrease in the %CH ₄ being generated or increases in %O ₂ or N ₂ /Balance Gas.
Months 10 through 12	Collect leachate quality, groundwater quality, groundwater level, and landfill gas quantity and quality data to determine if the cessation of leachate pumping is having any negative impacts at the site.	Leachate sampling and analysis for parameters currently included in the leachate discharge sampling program. Data will be collected on a monthly basis during months 10 through 12.	Results of the pilot test sampling will be compared to historical leachate data to determine if cessation of active leachate pumping is negatively impacting the leachate quality (i.e. resulting in increases in leachate contaminant concentrations).
		Groundwater sampling and analysis for VOCs, SVOCs, metals (total and dissolved), PCBs, pesticides and conventional leachate parameters. Data will be collected from 10 monitoring wells at the end of month 12.	Results of the pilot test sampling will be compared to historical groundwater data to determine if cessation of active leachate pumping is negatively impacting the groundwater quality (i.e. resulting in increases in groundwater contaminant concentrations).
		Water level gauging. The water levels in 13 monitoring wells will be gauged on a monthly basis. Additionally, the water level in collection sump D-8 will be measured on a monthly basis.	Data from the water level gauging will be compared to historical groundwater elevations at the site to determine if local or site-wide increases in groundwater elevations are being observed. Potential negative impacts would include increases in either local or site-wide groundwater elevations.
		Landfill Gas Generation Rates (volumetric). The volume of landfill gas generated will be measured and recorded daily.	The volume of gas being generated and extracted by the landfill gas collection system will be compared to baseline data. A negative impact would include a significant decrease in the volume of gas being generated.
		Landfill Gas Quality (%CH ₄ , CO ₂ , O ₂ , and N ₂ /Balance Gas). The landfill gas quality will be measured and recorded daily.	The quality of gas being generated and extracted by the landfill gas collection system during the pilot test will be compared to baseline data. A negative impact would include a significant decrease in the %CH ₄ being generated or increases in %O ₂ or N ₂ /Balance Gas.





Pumps at these locations are currently operational and will be deactivated during the pilot test.

1. D₁, D₈ AND D₁₀ SUMP PUMPS HAVE SIMILAR OPERATING CHARACTERISTICS.
2. LIFT STATIONS 1 AND 2 SUMP PUMPS HAVE SIMILAR OPERATING CHARACTERISTICS.
3. DURING STORM EVENTS LEACHATE FLOW WILL AUTOMATICALLY BE DIVERTED FROM SEWER DISCHARGE AND HELD IN LEACHATE STORAGE TANKS.
4. ISOLATION AND CONTROL VALVES NOT SHOWN. SEE CONTRACT HP-875 RECORD DRAWINGS FOR DETAILS.
5. SEE VOLUME III SECTION 4 FOR PUMP MODELS AND DESCRIPTIONS.

LEGEND:

- | | |
|---|---|
|  | COLLECTION SUMP WITH PUMPS (2) |
|  | LIFT STATION WITH PUMPS (2) |
|  | MISC. CONCRETE MANHOLE SUMP WITH PUMPS (2) |
|  | DECON TRAILER SUMP WITH PUMP (1) |
|  | CENTRIFUGAL PUMPS (2) |
|  | LEACHATE COLLECTION MANHOLES |
| _____ | FLOW DIRECTION IN PIPE |
| ----- | FLOW DIRECTION OF GRAVITY DRAIN TO MANHOLE OR COLLECTION PUMP |

NOT TO SCALE

Woodward-Clyde Consultants, Inc.

FIGURE 2-7
SCHEMATIC DIAGRAM
LEACHATE COLLECTION SYSTEM

[illegible]