Milton Landfill – EPR/BV4584IU

LEACHATE MANAGEMENT PLAN

April 2022 Version 16

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1. Introduction

Milton Landfill is situated approximately 1km west of the Village of Milton and 3km north of the centre of Cambridge. The landfill comprises an L – shaped plot of land approximately 48.5 hectares in area, which is divided up into three phases of development. Phases I is assessed entirely as one contained phase, Phase II consists of cells 1- 10, and Phase III is comprised of cells 12A – 24. The site was mothballed April 2020.

The landfill was developed within a number of disused clay pits excavated during the 1970's, and waste acceptance commenced in the 1980's. Phase III however, has been developed within arable land. The site is located on Cretaceous Gault Clay, which is overlain by River Gravel Terrace Deposits (RGTD). Geological data suggests that locally, the thickness of the Gault Clay ranges from 10.2 – 18.7m, and is underlain by the Cretaceous Lower Greensand.

Both hazardous and non-hazardous wastes were accepted at Milton until the 15 July 2004 and only non-hazardous thereafter. Phases I and Phase II, Cells 1 – 5B, have not been constructed on the basis of engineered containment. The cells of these phases are naturally contained by a basal geological barrier comprised of in-situ Gault Clay. The depth of insitu clay has been proven to the depths used in the HRA modeling in Improvement Condition 1a.

The basal lining systems of Phase II, Cell 6 onwards and Phase III were constructed with a fully engineered 1m clay liner prior to waste acceptance. Sidewall slope lining (where available) comprises a 1m thick low permeability engineered mineral liner. The capping system emplaced across the site comprises 1m thick site derived clay overlain by a suitable depth of subsoil.

Responsibility

The site manager has overall responsibility for Leachate Management at Milton Landfill Site. A list of the delegated tasks is below:

Leachate well Checks- Alex Bennett (Site Supervisor)
Weekly Installation Checks- Alex Bennett (Site Supervisor) Roisin Bennett (Site Business Manager)
Infrastructure Repairs- Alex Bennett (Site Supervisor) Roisin Bennett (Site Business Manager)
Monthly Installation Checks- Alex Bennett (Site Supervisor) Roisin Bennett (Site Business Manager)
Environmental Monitoring and Reporting- Jose Samuel (Compliance Advisor)
Leachate Well Drilling- Jose Samuel (Compliance Advisor), Roisin Bennett (Site Business Manager)

2. Report Objectives

The minimization of leachate generation and the control of leachate in compliance with the terms of the PPC Permit are integral elements of the risk management measures that will be incorporated into the operation of the site. This document aims to provide a comprehensive summary of the actions to be undertaken to manage leachate at the site, including criteria to be met and actions required dependent upon the leachate levels and quality that are actually reported.

3. Compliance Targets

This plan has been produced to detail the leachate extraction programme required to enable leachate level reduction to be achieved and maintained in line with the consent levels set out in the Permit or otherwise agreed with the local EA office

3.1 Leachate Trigger Level

Current and Proposed Leachate trigger limits are listed in Appendix D.

3.2 Leachate Level Monitoring

Table 1:
The Permit Variation EPR/BV4584IU states the following trigger levels.

All Compliance Wells	6.50 m AOD
Except:	
L03/2014R	8.10 m AOD
L07RB	8.00 m AOD
L11	8.40 m AOD
L15R	8.00 m AOD
L12DR2	9.50 m AOD

The leachate monitoring schedule is located in Appendix B. The monitoring schedule includes all of the required monitoring for Milton Landfill Site in one single document. It includes the monitoring intervals, laboratory analysis suites and all trigger limits for gas, water and leachate levels. A quarterly data submission is submitted to the Environment Agency in February, May, August and November. An annual review of the data collected is forwarded to the Environment Agency every year in November.

4. Engineered Infrastructure

Site engineering design provides the main leachate management control at Milton. The basic aim being to control leachate generation to levels acceptable to encourage the stabilization of the waste mass whilst not accumulating excessive excess volumes of leachate. Other facilities provided by site engineering are the provision and maintenance of suitable leachate collection, abstraction, and monitoring. In addition the site is provided with a pneumatic leachate pumping system. A summary of the basis for the construction of each phase at the site is set out as Table 2. A leachate infiltration plan is located in Appendix C.

Table 2: Summary of Cell Engineering

Phase 1			
Cell	**Basal Drainage**	**Basal Engineering**	**Capping**
	None	No engineered clay	1m engineered clay
Phase II			
Cell	**Basal Drainage**	**Basel Engineering**	**Capping**
1	None	No engineered clay	1m engineered clay
2	None	No engineered clay	1m engineered clay
3	None	No engineered clay	1m engineered clay
4	None	No engineered clay	1m engineered clay
5a&b	None	No engineered clay	1m engineered clay
6	Radial drainage system	1m engineered clay	1m engineered clay
7	Radial drainage system	1m engineered clay	1m engineered clay
8	Radial drainage system	1m engineered clay	1m engineered clay
9&10	Radial drainage system	1m engineered clay	1m engineered clay
Phase III			
Cell	**Basal Drainage**	**Basel Engineering**	**Capping**
12a	Radial drainage system	1m engineered clay	1m engineered clay
12b	Radial drainage system	1m engineered clay	1m engineered clay
12c	Radial drainage system	1m engineered clay	1m engineered clay
13a	Radial drainage system	1m engineered clay	1m engineered clay
13b	Radial drainage system	1m engineered clay	1m engineered clay
14a	Radial drainage system	1m engineered clay	1m engineered clay
14b	Radial drainage system	1m engineered clay	1m engineered clay
15a	Radial drainage system	1m engineered clay	1m engineered clay
15b	Radial drainage system	1m engineered clay	1m engineered clay
16a	Radial drainage system	1m engineered clay	1m engineered clay
16b	Radial drainage system	1m engineered clay	1m engineered clay
17a	Radial drainage system	1m engineered clay	1m engineered clay

20b	Radial drainage system	1m engineered clay	1m engineered clay /Partially temporary capping
18a	Radial drainage system	1m engineered clay	1m engineered clay
18b	Radial drainage system	1m engineered clay	1m engineered clay
18c	Radial drainage system	1m engineered clay	1m engineered clay
18d	Radial drainage system	1m engineered clay	1m engineered clay
19b	Radial drainage system	1m engineered clay	1m engineered clay /Partially temporary capping
19a	Radial drainage system	1m engineered clay	1m engineered clay
22	Radial drainage system	1m engineered clay	Temporary Capped
23	Radial drainage system	1m engineered clay	1m engineered clay /Partially temporary capping
24A and 24B	Radial drainage system	1m engineered clay	Temporary capping

5. Current Leachate Management Regime

A leachate management system has been installed in all filled and completed areas of the site. The leachate management system includes a series of leachate extraction wells and leachate monitoring wells. The location of all leachate wells are surveyed in and recorded on a plan which can be seen in Appendix A. Each well is given a unique reference number dependent on its construction and which cell it is located in.

The current leachate management systems are inspected in accordance with the site management system. All leachate wells are currently inspected on a weekly basis. Wells that are no longer fit for purpose are repaired or replaced. A tracker document has been set up to record all repairs needed to ensure these repairs are made in a timely manner.

See below inspection schedule in Table 3:

Table 3: Inspection Summary

	Weekly	Monthly	Biannual	Annual
Leachate well Installation Check- All Leachate wells	FCC			
Leachate Tanks- Bunds	FCC			
Leachate Tanks- Drip Tray	FCC			
Leachate Tanks- Floats		FCC		FCC
Leachate Tanks- Valves	FCC			FCC
Leachate Tanks- Spill Kits	FCC			
Leachate Tank Integrity Check				External Contractor
Leachate Tank Telemetry	FCC			FCC
Leachate Tanker Review		FCC		
Compressor*				

* The compressor is serviced every 2000 hours

The location of each well is surveyed and recorded on a site monitoring plan- see Appendix A. Each well is given a unique reference number. If necessary, additional or replacement leachate wells will be drilled.

All data collected each month is imported into the companies MP5 database, to enable trending and reporting. Leachate Head levels are calculated automatically by a computation set up in the database.

Leachate is pumped as necessary, predominantly from the leachate extraction wells using pneumatic pumps. The pneumatic pumps are powered by compressed air from a system compressor. The leachate is pumped to three bunded leachate storage tanks which have a total holding capacity of approximately 180m^3. To minimize the risk of contamination associated with spillage or leakage from the leachate tank, the tank is of single skin bunded construction within a secondary bund. The tanks are fitted with three float detection switches to prevent tank overflow. When the tank is full the switch isolates the compressor system to stop the operation of the pumps.

The leachate tank filling rates are monitored very closely on the remote telemetry system. The Tankering Company also have access to the telemetry system and so send tankers to site when there is available leachate to collect.

Leachate levels in each cell are monitored on a monthly basis in accordance with the Permit. Leachate wells are monitored after a 48 hour pump suspension period as per Environment Agency guidance. This data is submitted to the Agency as part of the quarterly data submission. In the case of a leachate well becoming non-compliant, the below action plan will be followed. A Schedule 5 notification will be issued to the Environment Agency within 24 hours of the leachate breach.

Leachate non – compliance Action Plan

Once compliance limits are achieved, (and for a period of 3 consecutive months) in the event that any compliance level is exceeded in one monitoring well on one occasion, the following action will be taken:

- The well will be re-measured as soon as possible; if the re-measurement does not exceed the compliance limits then no further action will be taken. If the level is exceeded then:
- The Agency will be informed and actions will be considered as described below:

  - The pump in the well will be checked to see if working efficiently
  - Leachate removal volumes will be reviewed
  - Investigate whether well requires desilting

- Increase the frequency of leachate level monitoring
- Consider installing additional leachate abstraction wells.
- The findings of the investigations and any proposed further action will be reported to the Agency for agreement.

Following a trigger limit breach, the Environment Agency will be notified via a schedule 5 submission; within the schedule 5 will be a list of the non- compliant wells and also a list of actions completed and to be completed to get the well/wells back into compliance.
As necessary, tankers remove leachate from site for treatment at a suitably licensed facility; Buckden Leachate Treatment Plant or Dogsthorpe Leachate Treatment Plant. Tankers can remove leachate from the site only during daylight hours. The rate of leachate removal from the site is maintained subject to compliance levels, pump capacity and rates of leachate recharge into specific wells. The system is inspected weekly. Where practicable, pumps are repaired or replaced as quickly as possible after the identification of a problem.

Table 4: Yearly Leachate Removal Rates (note for simplicity 1t of leachate is assumed to equate to 1m^3)

Year	Leachate Removal (m3)
2014	5506
2015	13191
2016	11158
2017	6141
2018	8929
2019	9528
2020	9527
2021	11713

6.0 Leachate Legacy

Leachate levels are monitored monthly in accordance with the PPC Permit; it is therefore possible to calculate the excess volumes per cell. Tank filling rates are monitored very closely to optimize leachate removal. The current volume leachate legacy at Milton is 6896m^3 (see below table). The main areas with the majority of legacy are cells 12C and cell 24B. This is mainly due to the infrastructure being not fit for purpose due to silt build up. These wells were desilted without success and so were redrilled November/December 2020. Pumps have now been installed and so levels should now decrease.

Table 5: Legacy Volumes monthly 2021

Jan-21	11851
Feb-21	5040
Mar-21	9021
Apr-21	6431
May-21	7077
June-21	8170
July-21	8067
Aug-21	5800
Sep-21	5255
Oct-21	4317
Nov-21	7641
Dec-21	6626
Jan-22	4443
Feb-22	4008
Mar-22	6896

Calculation of Leachate Legacy

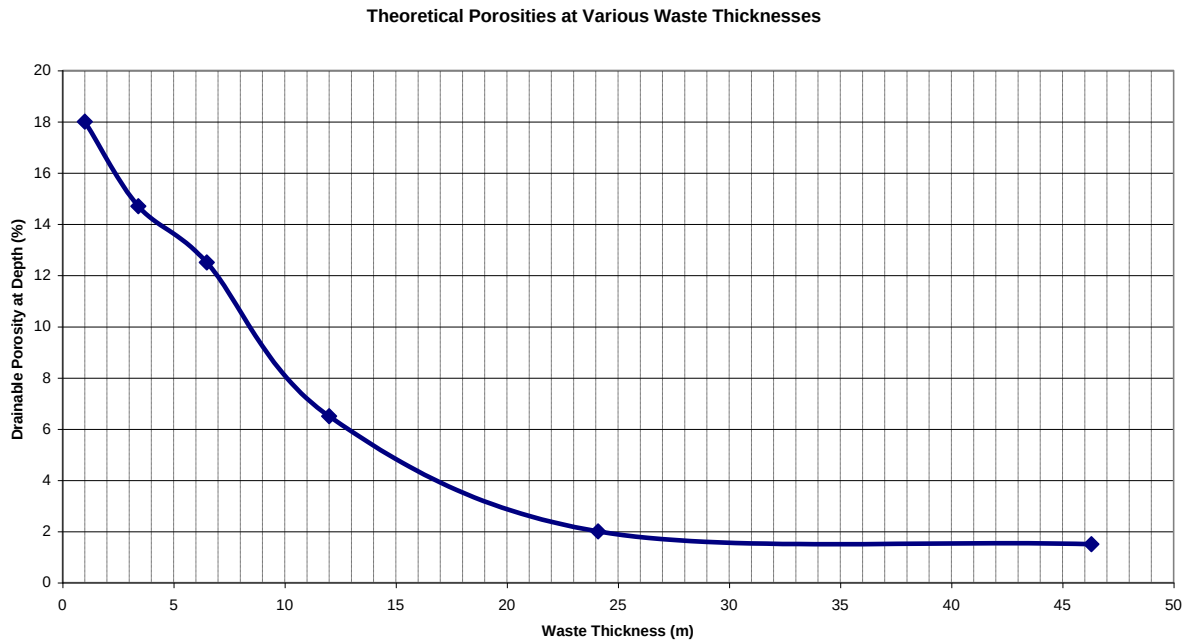
Definition

Leachate legacy is defined as the volume of leachate held above compliance limits in each cell.

Calculation

The volume in each cell is accurately known in 1m high increments, with reference to data about the construction and fill of the cell provided by the Engineering function. To calculate the actual volume of leachate held within the pores of the waste occupying the cell volume between the measured leachate level referenced to ordnance datum and the compliance limit; the volume is multiplied by a porosity factor for each metre.

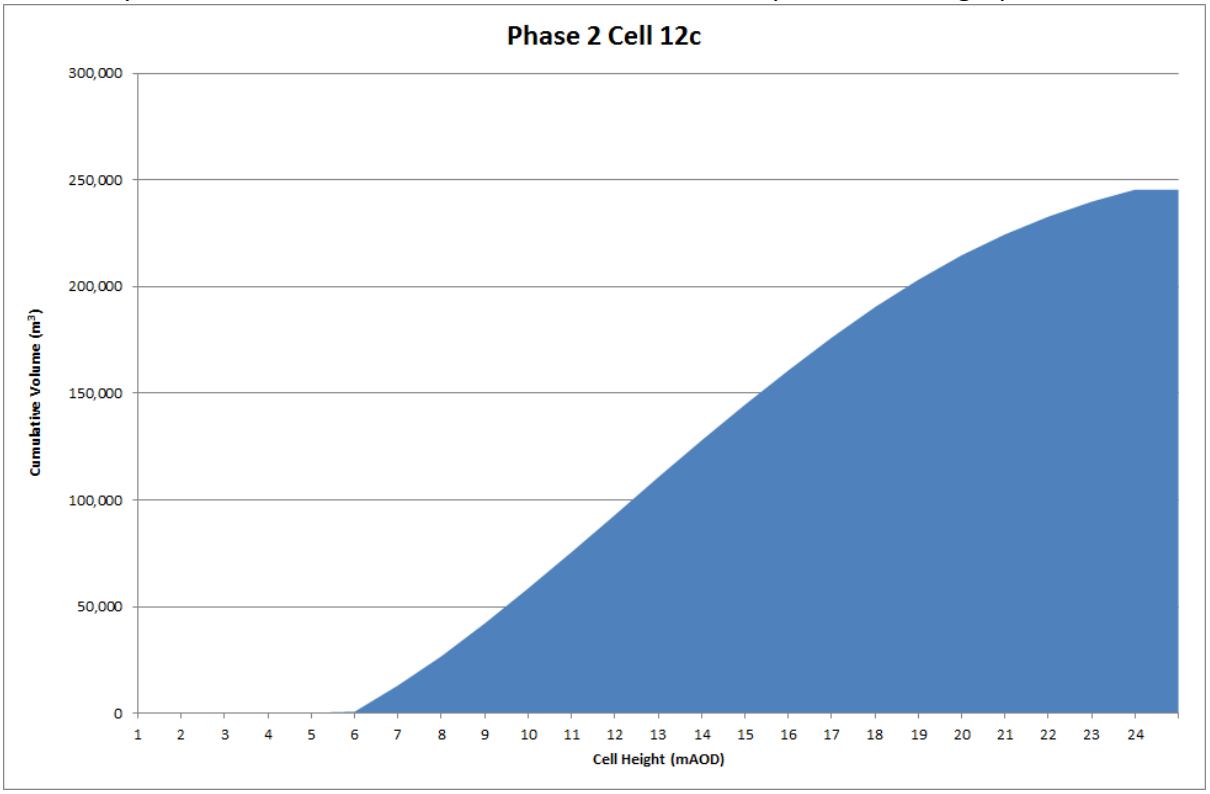
The porosity factor is variable with depth, and is derived from an academic paper by Powrie and Beavan [1]



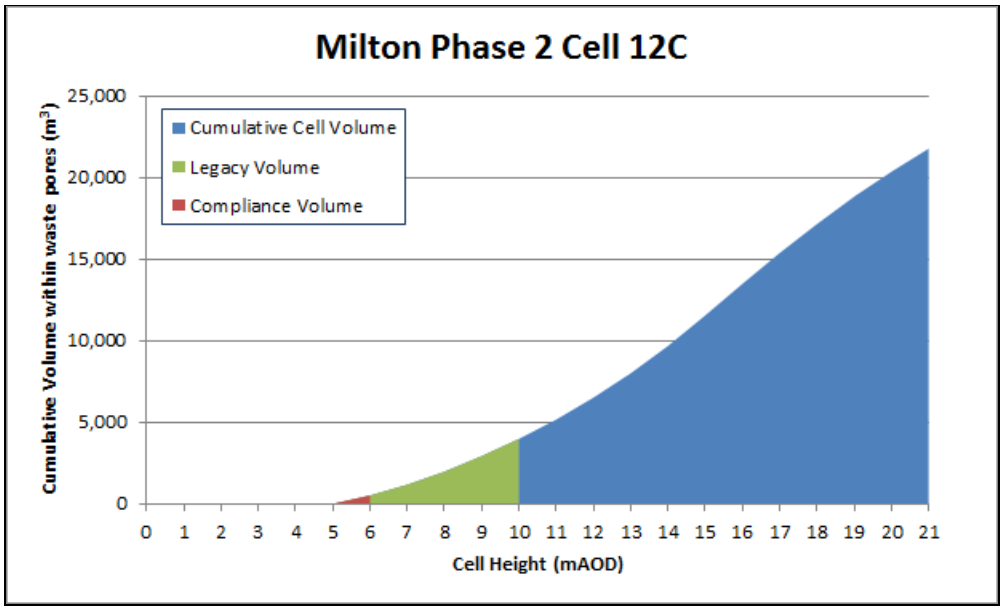
Milton Cell Volumes

Leachate Legacy is calculated on a cell by cell basis, using an average cell base and an average compliance limit across the cell if there is more than one compliance point in the cell.

For example, Milton's Phase 2 Cell 12C **cumulative** volume profile can be graphed as follows:



If we apply Powrie and Beavan's porosity curve to the volume profile for the cell, the volume profile for leachate held **within the pores of the waste** can also be graphed:



For the above graph, if Cell 12c had leachate measured at 10 mAOD, the area in green would represent the leachate legacy for that cell: 3,132 m^3 of actual leachate. Note that the volume of leachate held within pores between the cell floor and the compliance limit is calculated to be 874m^3

For Milton, the table of leachate volumes per cell is as follows, with January 2022 dip data included.

Table6: Legacy Volumes- March 2022

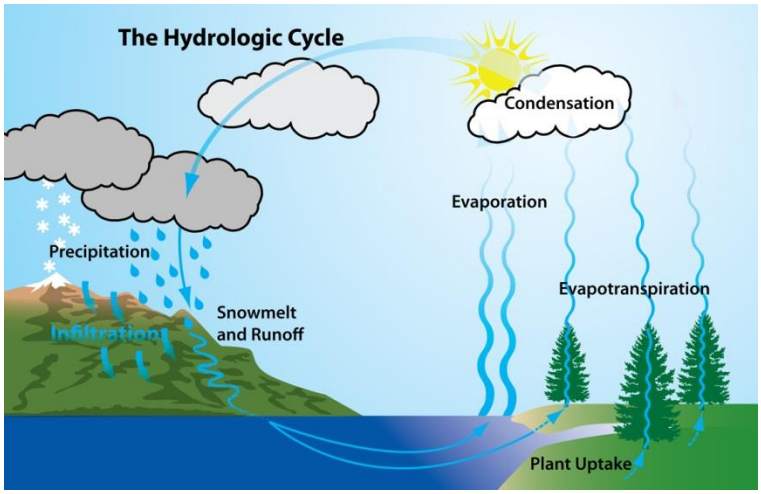
Cell Name	Cell Base (AOD)	Compliance Level (AOD)	Dip level (above compliance level(m))	Actual Excess Leachate Level (AOD) - recorded	Compliance Volume	Actual Volume	Excess Volume
Phase 2 Cell 12c	6.11	6.50	2.77	9.27	873.93	3237.52	2363.59
Phase 2 Cell 9 and 10	1.20	6.50	0.15	6.65	3022.88	3122.89	100.01
Phase 2 Cell 1	3.66	6.50	0.32	6.82	1030.36	1220.42	190.5
Phase 2 Cell 12a & b	4.99	7.25	-	6.86	1655.89	1310.79	-
Phase 2 Cell 13	2.40	6.50	1.16	7.66	2500.77	3595.37	1094.60
Phase 2 Cell 14a	2.26	6.50	-	6.36	1503.05	1433.11	-
Phase 2 Cell 14b	2.22	6.50	-	4.77	1429.64	677.88	-
Phase 2 Cell 15a	2.04	6.50	-	4.89	1270.79	663.02	-
Phase 2 Cell 15b	2.06	6.50	-	4.14	1005.55	365.49	-
Phase 2 Cell 16a	3.66	6.50	-	6.42	801.07	765.56	-
Phase 2 Cell 16b	3.48	6.50	-	4.98	557.27	174.41	-
Phase 2 Cell 17a	4.20	6.50	-	5.57	623.29	287.36	-
Phase 2 Cell 18a	3.97	6.50	-	5.29	695.77	311.13	-
Phase 2 Cell 18c	3.84	6.50	-	5.29	460.58	208.67	-
Phase 2 Cell 2	5.35	6.50	0.97	7.47	464.51	1042.34	577.83
Phase 2 Cell 20a	4.08	6.50	-	4.82	1,009.73	248.35	-
Phase 2 Cell 3	3.50	8.10	0.23	8.33	1060.71	1168.83	108.12

Phase 2 Cell 4	3.50	6.50	0.01	6.51	1047.15	1051.90	4.75
Phase 2 Cell 5 a & b	4.50	6.50	0.34	6.84	616.41	749.06	132.65
Phase 2 Cell 6	6.38	8.40	-	8.10	928.74	831.27	-
Phase 2 Cell 7	4.30	6.50	-	6.19	433.58	347.56	-
Phase 2 Cell 8	3.50	6.50	2.76	9.26	543.13	1269.94	726.80
Phase 2 Cell 12d	7.25	9.50	-	8.28	638.73	257.10	-
Phase 2 Cell 18b	3.97	6.50	-	3.61	553.12	11.93	-
Cell 21A and B	3.00	6.50	-	5.88	48.57	6.02	-
Cell 22	6.60	8.00	-	7.73	101.57	75.56	-
Phase 1	1.05	6.50	-	3.94	16731.49	7462.74	-
Cell 18D	3.43	6.50	-	5.22	606.78	254.67	-
Cell 19A	2.99	6.50	-	5.66	3548.05	2355.55	-
Cell 19B	3.08	6.50	-	6.10	3153.12	2607.98	-
cell 23	3.00	6.50	-	4.58	576.41	142.91	-
cell 24	2.64	6.50	2.09	8.59	420.37	967.52	547.15
CELL 24B	4.69	6.50	1.77	8.27	549.79	1600.29	1050.50

Calculation of Leachate Generation

Leachate generation is dependent on rainfall over the surface area of deposited waste.

At Milton the annual rainfall figure is 600mm per year. This figure has been derived from the Met Office UK annual rainfall map.



Not all of the annual rainfall is assumed to enter the waste however, as illustrated in the above diagram, some rainfall will evaporate, and some will be taken up by plants if the landfill is restored. The portion of rainfall considered is termed Effective Rainfall.

The Effective annual rainfall figure for Milton is 142mm per year. This figure has been taken from the Geological Society maps of effective rainfall in England and Wales.

Annual Rainfall –	Effective Rainfall	= Evapotranspiration
600 -	142	= 458

In areas of the site which have not been restored, the plant uptake (Transpiration) portion is assumed to be half of the Evapotranspiration, 229 mm/year.

In open waste, some of the Effective rainfall is also absorbed by the waste. There are several figures available for this factor, we use 35% based on emplaced waste figures and measured leachate volumes on well known landfills.

Capping Types

For the purposes of calculating infiltration rates, the model assumes different rates for open, temporary and permanent cap. At Milton, the majority of the capping is clay, and we assume that the capping at Milton allows 9.6% of the effective rainfall to infiltrate into the site. Temporary capping is assumed to be 80% as effective as capping. Open waste assumes all of

the effective rainfall infiltrates into the waste, as well as the portion discounted from the effective rainfall due to transpiration.

Basal Leakage

Milton is modelled as hydraulically contained, and therefore no basal leakage is applied.

7.0 Action Plan

This leachate management action plan is to outline the planned works on the leachate infrastructure to improve compliance in the immediate future. The works will be undertaken to improve monitoring and pumping infrastructure in line with Environment Agency guidance.

Table 7: Leachate Action Plans

Timeframe	Action	Comments
Weekly	All leachate infrastructure to be checked and fault reported	Ongoing
Weekly	All issues/failing pumps to be exchange as soon as practicable- target within 48 hours	Ongoing
Weekly	Monitor tank filling rates	Ongoing
Monthly	Review tank filling rates and adjust removal request rates accordingly	Ongoing
Monthly	Monitor all leachate levels	Ongoing
Annually	Update Leachate Management Plan (February 2023)	

Actions (2021)	Comments
Upgrade lines in temporary capped area	Complete
Install leachate pumps into 4 of the new drilled wells	Complete
Base dip all leachate wells	Complete
Actions (2022)	**Comments**
Desilt all leachate wells showing signs of silt build up	
Following desilting works- lower leachate pumps in wells accordingly	
Identify blocked/sheared leachate wells	
Retro drill any wells that are blocked/sheared	
Submit HRA Review to the Environment Agency	

APPENDICIES

Appendix A: Environmental Monitoring Plan- 653M282T

Appendix B: Monitoring Schedule

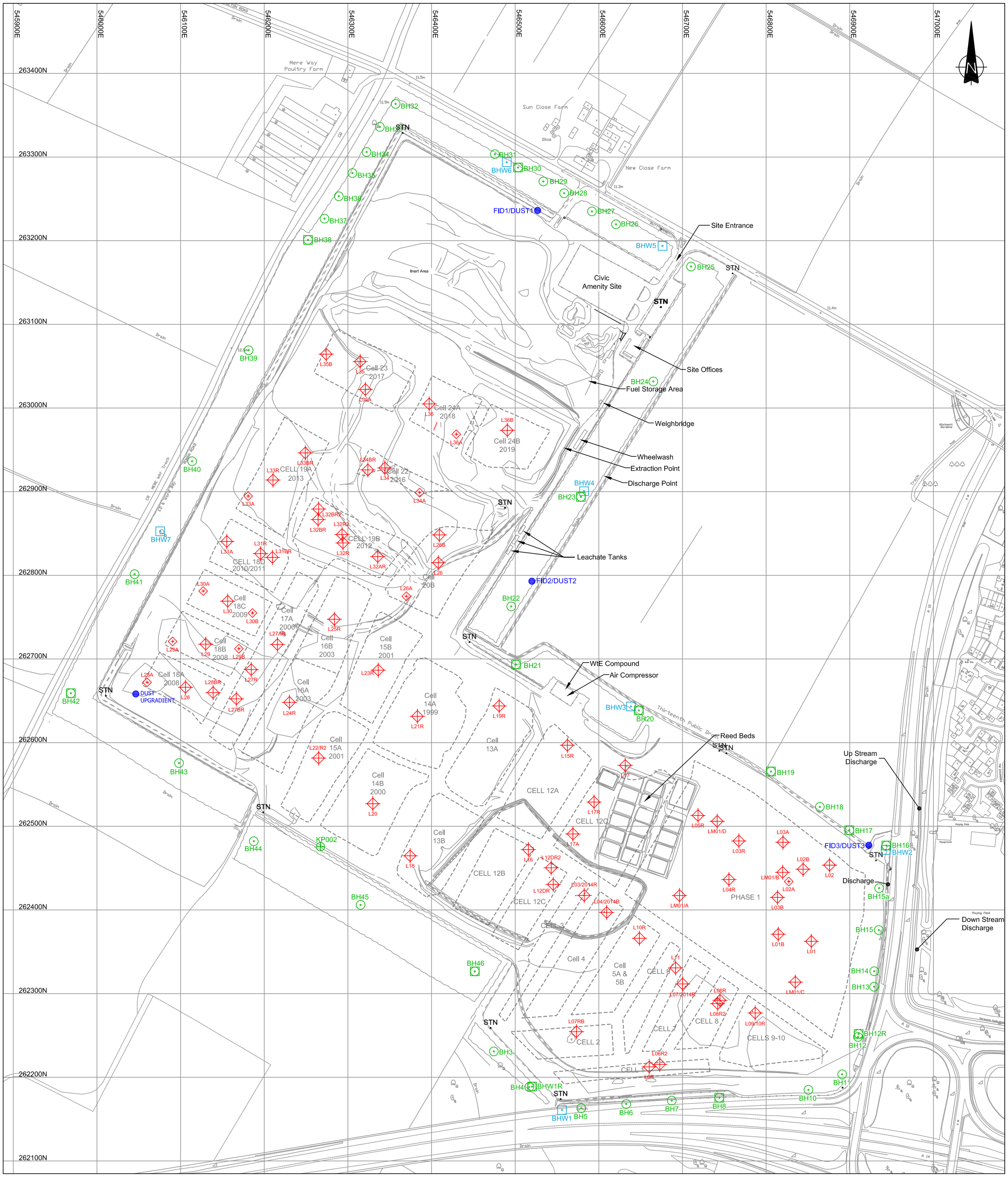
Appendix C: Leachate Infiltration Plan

Appendix D: Leachate Well List + Current and EA Approved Compliance Limits + Proposed Compliance Limits

Appendix E: Leachate well design

Appendix F: Leachate well Field check sheet + Site Installation Check Sheets

Appendix A: Environmental Monitoring Plan- 653M282T



NOTES:

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM.

2. DO NOT SCALE FROM THIS DRAWING.

3. ANY ANOMALIES IDENTIFIED WITH THE DETAILS SHOWN ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF FCC ENVIRONMENT (UK) LIMITED PRIOR TO CONSTRUCTION WORKS COMMENCING.

LEGEND:

- Landfill Gas Monitoring Borehole
- Landfill Gas Surface Monitoring Point
- Combined Gas/ Groundwater Monitoring Point
- Gas Flare Stack
- Landfill Gas Extraction Point
- Landfill Gas Extraction/ Leachate Monitoring Point
- Condensate Unit (Knock-out Pot)
- Gas Manifold
- Groundwater Monitoring Borehole
- Groundwater Pumping Point
- Surface Water Monitoring Point
- Leachate Collection Point
- Leachate Monitoring Point
- Leachate Recirculation Point
- Leachate Collection Sump
- Leachate Discharge Sampling Point
- Leachate Detection Point
- Underdrainage Monitoring Point
- Settlement Monitoring Point
- Drain/ Dewatering Tank
- Valve
- As-built Cell Footprint
- Dust Points
- Proposed Well

Revision:	Date:	Description:	By:	Chk:
T	11.02.22	Site survey updated & WtE compound label removed	BS	RB
S	23.02.21	Location amended L36B, L36A, L34BR, L30A, L30, L30B, L17R, L17A, L08R2, L06R2, BH6, BH5, BHW1, BH4, BH12, BH15A, BH15, BH14, BH13, BH11 & BH10. BHW1R & BH12R added. L34B removed.	BS	RH
R	09.11.20	L34BR, L17R, L17A, L17B, L08R2 & L06R2 location amended, Relocated Leachate Tank added	BS	RH
Q	14.08.20	L34BR, L17R, L17A, L17B, L08R2 & L06R2 proposed wells added	BS	RH
P	13.11.19	Site survey updated	BS	RB
O	08.10.19	Site survey updated. Extraction & discharge labels added. Cell 24B detail added.	BS	RB
N	20.05.19	L12DR2, L32R2 & L32BR2 installed	BS	RB
M	02.04.19	Site survey updated. Proposed wells L12DR2, L32R2 & L32BR2 added	BS	RH
L	11.03.19	L32BR REDRILL, L32R REDRILL & L12DR REDRILL added	BS	RH

Reference files:
Information taken from plans;

Site Survey:	653W2247A
Monitoring Plan:	6373 - Milton - Leachate System - April 2013
Cell Footprint:	653B2190

FCC Environment (UK) Limited
6 Sidings Court, White Rose Way, Doncaster, DN4 5NU

Site:
MILTON
LANDFILL SITE

Drawing Title:
Environmental Monitoring Plan

Drawn By:	Checked By:	Date:	Scale:	Paper Size:
BS	RB	11.02.22	1:3000	A2

Status:	Revision:	Drawing No:	Plan Number:
FINAL	T	653M282	Plan 04A

Last Saved By: BenStocks Date: 11-Feb-22 Plotted By: stocks, ben Date: 11-Feb-22

Appendix B: Monitoring Schedule

Milton

Interval	Type	Sample Points	Field Determinands	Sampling Determinands	Month	Comments
Weekly	Gas	BH12R, W01R	Gas Comp, Diff Pressure, Field log, Ground Conditions- waterlogged/frozen/snow covered	none		
Monthly	Gas	BH03, BH04, BH10-46,12R, 15A , W01R,W02-07	Gas Comp, Diff Pressure, Field log, Ground Conditions- waterlogged/frozen/snow covered	none	Jan, Feb, Apr, May, July, Aug, Oct, Nov	
	Surface Water	Discharge or Lagoon, Upstream Discharge, Downstream Discharge	Visual oil and grease	Cl, EC, NH4-N, pH, Suspended Solids. MILSWD		
	Leachate	L01, L01B, L02, L02A, L02B, L03A, L03B, L03R, L04R, L05R, L06R2,L07RB, L10R, L11, L15R, L16, L17,L17A, L17R, L18, L19R, L20, L21R, L22R2, L23R, L25R, L26, L26A, L26B, L27R, L27AR, L27BR, L28, L28A, L28BR, L29, L29A, L29B, L30, L30A, L30B, L31R, L31A, L31BR, L32R2, L32AR, L32BR2, L33R, L33A, L33BR, L24R, L12DR2, L03/2014R, L04/2014R, L07/2014R, L09/10R, L08R2, L34, L34A, L34BR, L35, L35A, L35B, L36, L36A, L36B, LM01A, LM01B, LM01C, LM01D	DTL, Pulse Counter reading	none		48hr pump suspension
	Ground Water	BH12R, W01R	field log, condition, DTL, DTB, purge vol	Cl, EC, NH4-N, Ph, Cd, Zinc, Chromium, MCPP. MILGWQ		
	Leachate	Active area wells that have been raised- check with site manager, operational manager	Dip to Base	none		
	Fugitive Emissions FID	3 main sensitive azimuths at site boundary. Any temporary capped areas.	Flammable Gases (ppm)	none		
Quarterly	Gas	BH03, BH04, BH10-46,12R, 15A , W01R,W02-07	Gas Comp, Diff Pressure, Field log, Ground Conditions- waterlogged/frozen/snow covered		March, September, December (except dust- February, August, November)	
	Groundwater	W01R,W02-07,BH12R, BH16, BH17, BH19, BH20, BH21, BH23, BH30, BH38, BH42, BH46	field log, condition, DTL, DTB, purge vol	Cl, EC, NH4-N, Ph, Cd, Zinc, Chromium, MCPP. MILGWQ		
	Leachate	L26, L32R2, L33R, L34, L35, L36	DTL, Pulse Counter Reading	Cl, EC, NH4-N, pH, Total Sulphates, Total Alkalinity, COD, BOD, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, Arsenic. MILLQ		
	Leachate	L01, L01B, L02, L02A, L02B, L03A, L03B, L03R, L04R, L05R, L06R2,L07RB, L10R, L11, L15R, L16, L17,L17R, L17A, L18, L19R, L20, L21R, L22R2, L23R, L25R, L26, L26A, L26B, L27R, L27AR, L27BR, L28, L28A, L28BR, L29, L29A, L29B, L30, L30A, L30B, L31R, L31A, L31BR, L32R2, L32AR, L32BR2, L33R, L33A, L33BR, L24R, L12DR2, L03/2014R, L04/2014R, L07/2014R, L09/10R, L08R2, L34, L34A, L34BR, L35, L35A, L35B, L36, L36A, L36B, LM01A, LM01B, LM01C, LM01D	DTL, Pulse Counter reading	none		48hr pump suspension
	Leachate	Active area wells that have been raised- check with site manager, operational manager	Dip to Base	none		
	Dust	3 main sensitive azimuths at site boundary and background.	Deposited Dust (mg/m^2) DUST BOTTLES OUT FOR 7 DAYS	Deposited Dust (mg/m2 daily)		
	Fugitive Emissions FID	3 main sensitive azimuths at site boundary. Any temporary capped areas.	Flammable Gases (ppm)	none		
	Surface Water	Discharge or Lagoon, Upstream Discharge, Downstream Discharge	Visual oil and grease	Cl, EC, NH4-N, pH, Suspended Solids. MILSWD		
	Leachate Tank	Leachate Tank		Cl, EC, NH4-N, pH, COD, Calcium, Iron, Lead, Nickel, Zinc, Chromium. TANK		
Biannual	Noise	Location 1- Sun Close Farm, Location 2- Mereway Farm		Monitoring to take place between: 06.00-07.00 (night- time) AND 07.00- 16.00 (day-time) LIMIT- 42dB Laeq 1hr for night- time and 55dB Laeq 1hr day- time	March, September	
Annual	Gas	BH03, BH04, BH10-46,12R, 15A , W01R,W02-07	Gas Comp, Diff Pressure, Field log, Ground Conditions- waterlogged/frozen/snow covered	none	June (except Annual FID- Full Site and Dust - May)	
	Dust	3 main sensitive azimuths at site boundary and background.	Deposited Dust (mg/m^2) DUST BOTTLES OUT FOR 7 DAYS	Deposited Dust (mg/m2 daily)		
	Fugitive Emissions FID	3 main sensitive azimuths at site boundary. Any temporary capped areas.	Flammable Gases (ppm)	none		
	Surface Water	Discharge or Lagoon, Upstream Discharge, Downstream Discharge	Visual oil and grease	Cl, EC, NH4-N, pH, Suspended Solids. MILSWD		
	Leachate Tank	Leachate Tank		Cl, EC, NH4-N, pH, COD, Calcium, Iron, Lead, Nickel, Zinc, Chromium. TANK		
	Groundwaters	W01R,W02-07,BH12R, BH16, BH17, BH19, BH20, BH21, BH23, BH30, BH38, BH42, BH46	field log, condition, DTL, DTB, purge vol	Cl, EC, NH4-N, pH, Total Sulphates, Total Alkalinity, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, MCPP, Xylene. MILGWA1		
	Leachate	L01, L02, L03R, L04r, L06R2, L07RB, L10R, L11, L15R, L16, L17R, L18, L19R, L20, L21R, L22R2, L28, L29, L30, L24R, L12DR2, L03/2014R, L04/2014R, L07/2014R, L09/10R, L08R2, L23R, L25R, L27R, L31R	field log, condition, DTL, DTB, purge vol	Cl, EC, NH4-N, pH, Total Sulphates, Total Alkalinity, COD, BOD, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, Arsenic, MILLQ		
	Leachate	L01, L01B, L02, L02A, L02B, L03A, L03B, L03R, L04R, L05R, L06R2.L07RB, L10R, L11, L15R, L16, L17, L17R, L17A, L18, L19R, L20, L21R, L22R2, L23R, L25R, L26, L26A, L26B, L27R, L27AR, L27BR, L28, L28A, L28BR, L29, L29A, L29B, L30, L30A, L30B, L31R, L31A, L31BR, L32R2, L32AR, L32BR2, L33R, L33A, L33BR, L24R, L12DR2, L03/2014R, L04/2014R, L07/2014R, L09/10R, L08R2, L34, L34A, L34BR, L35, L35A, L35B, L36, L36A, L36B, LM01A, LM01B, LM01C, LM01D	DTL, DTB Pulse Counter reading	none		48hr pump suspension
	Leachate	L26, L32R2, L33R, L34, L35, L36	DTL, DTB Pulse Counter reading	Cl, EC, NH4-N, pH, Total Sulphates, Total Alkalinity, COD, BOD, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, Arsenic MILLQ + Hazerdous Substances		
	ALL Areas	All Temporary and Permenently Capped areas, and installations	Flammable Gas (ppm)			MAY - Observations upon cadping
2 Yearly	Groundwater	W01R,W02-06,BH12R, BH16, BH17, BH19, BH20, BH21, BH23, BH30	field log, condition, DTL, DTB, purge vol	Cl, EC, NH4-N, pH, Total Sulphates, Total Alkalinity, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, MCPP, Xylene, MILGWA2 (with Hazerdous Substances)	June 2020, 2022, 2024	
4 Yearly	Leachate wells	L01, L02, L03R, L04r, L06R2, L07R, L10R, L11, L15R, L16, L17R, L18, L19R, L20, L21R, L22R, L28, L29, L30, L24R, L12DR2, L03/2014R, L04/2014R, L07/2014R, L09/10R, L08R2, L23R, L25, L27, L31R	DTL, DTB Pulse Counter reading	Ph, EC, Cl, NH4-N, Total Sulphates, Alkalinity, COD, BOD, TON, TOC, Sodium, Potassium, Calcium, Magnesium, Cd, Iron, Lead, Nickel, Copper, Manganese, Zinc, Chromium, Arsenic, Phenols, MCPP, Toluene, M & P Xylene, Ethylbenzene. MILLA2 (with Hazerdous Substances)	June 2021, 2025, 2029	

Appendix C: Leachate Infiltration Plan

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM.

2. DO NOT SCALE FROM THIS DRAWING.

3. ANY ANOMALIES IDENTIFIED WITH THE DETAILS SHOWN ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF FCC ENVIRONMENT (UK) LIMITED PRIOR TO CONSTRUCTION WORKS COMMENCING.

LEGEND:

- Property Interest Boundary (Yellow)
- Limit of Landfill at Surface (Orange)
- PPC Boundary or WML Boundary (Red)
- Open Waste
- 52,404m² — Temporary Cap
- 339,991m² — Capped Clay
- Capped Lap Lay Membrane
- Capped Welded Membrane
- Capped Non Engineered
- 6,152m² — Future Cells
- As-built Cell Footprint

Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Reference files:
Information taken from plans;

Site Survey: 653W2247- 2020 Q1 FULL TOPO 090320

Leachate: 653L2253

Cell Footprints: 653B2205

FCC Environment (UK) Limited
6 Sidings Court, White Rose Way, Doncaster, DN4 5NU

Site: **MILTON** LANDFILL SITE

Drawing Title: **Leachate Infiltration Plan Q3 2020**

Drawn By:	Checked By:	Date:	Scale:	Paper Size:
BS	RH	19.11.20	1:4000	A3

Status:	Revision:	Drawing No:	Plan Number:
FINAL	-	653L362	PLAN 21C

Last Saved By: BenStocks Date: 19-Nov-20Plot By: ben stocks Date: 19-Nov-20

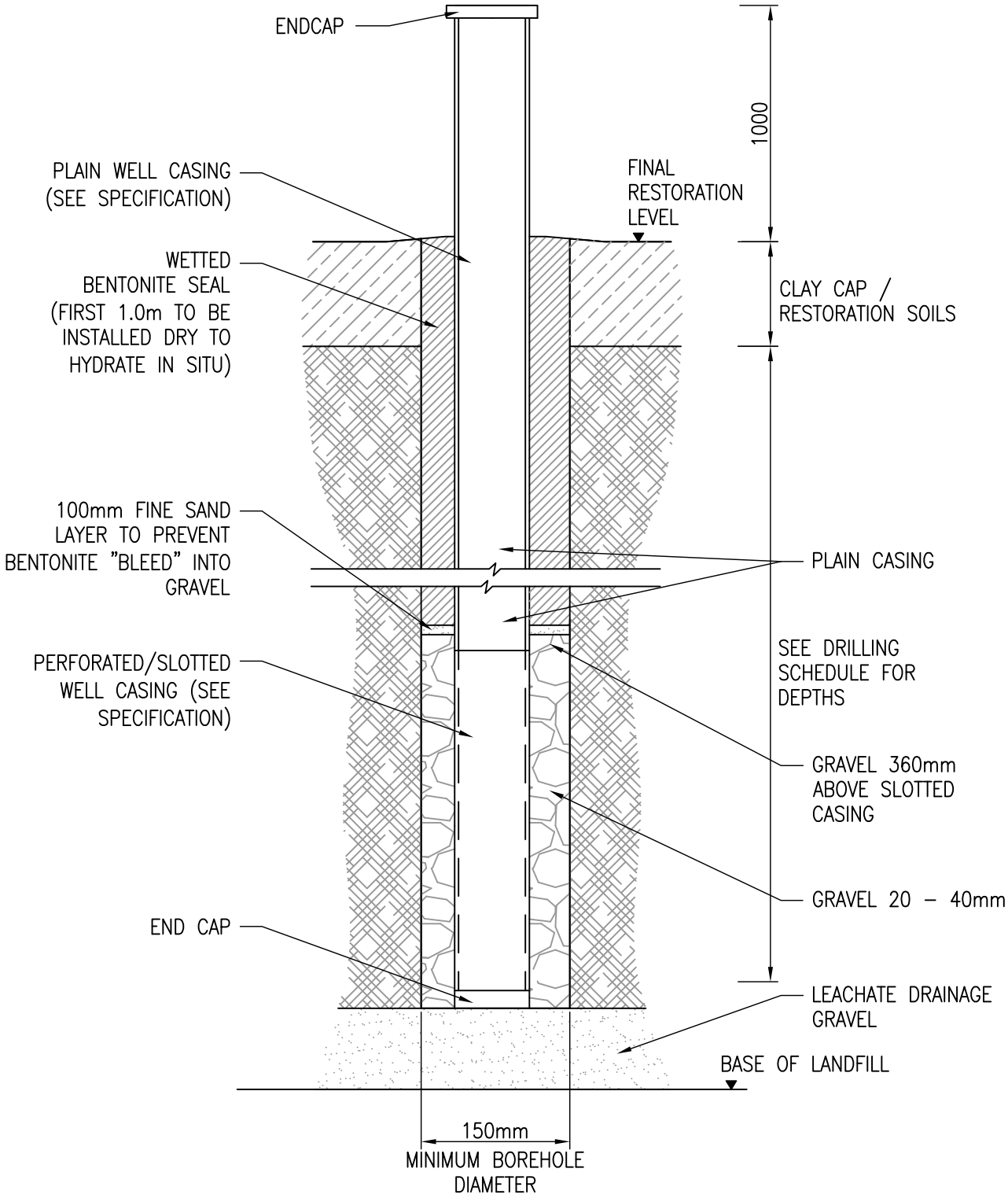
Appendix D: Leachate Well List + Current and EA Approved Compliance Limits + Proposed Compliance Limits

Well	Cell	Pump in well	Well Base (mAOD)	Well Top (mAOD)	Trigger level (mAOD)	Control level (mAOD)	Proposed Trigger level (mAOD)	Proposed Control level	Comments
LM01/A	Phase I	Y	-2.14	21.06	6.5	6	8	7.5	Drilled September 2018
LM01/B	Phase I	Y	-1.12	15.69	6.5	6	8	7.5	Drilled September 2018
LM01/C	Phase I	Y	0.92	19.45	6.5	6	8	7.5	Drilled September 2018
LM01/D	Phase I	Y	-1.86	16.85	6.5	6	8	7.5	Drilled September 2018
L01	Phase I	Y	5.69	17.30		6		7.5	No trigger limit
L01B	Phase I	Y	4.82	18.30		6		7.5	No trigger limit
L02	Phase I	Y	1.93	14.67		6		7.5	No trigger limit
L02A	Phase I	N	8.40	15.94		6		7.5	No trigger limit
L02B	Phase I	Y	2.85	14.34		6		7.5	No trigger limit
L03A	Phase I	Y	-3.89	14.56		6		7.5	No trigger limit
L03B	Phase I	Y	4.64	16.96		6		7.5	No trigger limit
L03R	Phase I	Y	0.83	16.79		6		7.5	No trigger limit
L03/2014R	Cell 3	Y	4.90	24.33	8.1	7.6	8.1	7.6	
L04R	Phase I	Y	2.25	18.79		6		6	No trigger limit
L04/2014R	Cell 4	Y	4.59	23.13	6.5	6	8	7.5	
L05R	Phase I	Y	1.23	16.69		6		7.5	No trigger limit
L06R	Cell 1	Y	2.56	15.45		6		7.5	
L06R2	Cell 1	Y	3.42	16.55	6.5	6	8	7.5	Drilled December 2020- Replaced L06R as Compliancewell
L07RB	Cell 2	Y	5.35	15.70	8	7.5	8	7.5	
L07/2014R	Cell 7	Y	4.28	20.83	6.5	6	8	7.5	
L08R	Cell 8	Y	3.54	20.32		6		7.5	
L08R2	Cell 8	Y	4.90	20.22	6.5	6	8	7.5	Drilled December 2020- Replaced L08R as Compliancewell
L09/10R	Cell9- 10	Y	3.60	20.45	6.5	6	8	7.5	
L10R	Cell 5A&B	Y	4.51	20.54	6.5	6	8	7.5	
L11	Cell 6	Y	6.38	22.38	8.4	7.9	8.4	7.9	
L12DR2	Cell 12D	Y	5.36	24.55	9.5	9	9.5	9	Replaced L12DR
L15R	Cell 12A	Y	6.01	17.42	8	7.5	8.5	8	
L16	Cell 12B	Y	3.50	23.40	6.5	6	9	8.5	
L17	Cell 12C	Y	5.00	16.30		6		7.5	
L17R	Cell 12C	Y	5.76	21.74	6.5	6	8.5	8	Drilled December 2020- Replaced L17 as Compliancewell
L17A	Cell 12C	Y	6.18	24.20		6		7.5	Drilled December 2020
L18	Cell 13A	Y	1.05	19.34	6.5	6	8.5	8	
L19R	Cell 13B	Y	1.95	18.46	6.5	6	9	8.5	
L20	Cell 14B	Y	2.15	21.66	6.5	6	9	8.5	
L21R	Cell 14A	Y	2.50	25.32	6.5	6	8.5	8	
L22R2	Cell 15A	Y	1.22	22.38	6.5	6	9	8.5	Drilled September 2018
L23R	Cell 15B	Y	2.10	25.15	6.5	6	8.5	8	
L24R	Cell 16A	Y	4.10	23.13	6.5	6	9	8.5	
L25R	Cell 16B	Y	3.71	25.59	6.5	6	9	8.5	
L26	Cell 20A	Y	3.60	23.64	6.5	6	9	8.5	
L26A	Cell 20A	N	4.90	23.40	6.5	6	9	8.5	
L26B	**Cell 20A**	Y	4.45	25.31	6.5	6	9	8.5	
L27R	Cell 17A	Y	3.87	22.61	6.5	6	9	8.5	
L27AR	Cell 17A	Y	4.14	24.39	6.5	6	9	8.5	
L27BR	Cell 17A	Y	4.55	20.70	6.5	6	9	8.5	
L28	Cell 18A	Y	3.01	19.76	6.5	6	9	8.5	
L28A	Cell 18A	N	3.94	16.74	6.5	6	9	8.5	
L28BR	Cell 18A	Y	4.05	20.09	6.5	6	9	8.5	
L29	Cell 18B	Y	3.10	20.85	6.5	6	9	8.5	
L29A	Cell 18B	N	3.80	17.60	6.5	6	9	8.5	
L29B	Cell 18B	N	3.80	22.22	6.5	6	9	8.5	
L30	Cell 18C	Y	3.07	21.27	6.5	6	9	8.5	
L30A	Cell 18C	N	3.61	19.34	6.5	6	9	8.5	
L30B	Cell 18C	Y	3.60	22.62	6.5	6	9	8.5	
L31R	Cell 18D	Y	4.01	24.45	6.5	6	9	8.5	
L31A	Cell 18D	Y	3.60	20.31	6.5	6	9	8.5	
L31BR	Cell 18D	Y	3.89	25.87	6.5	6	9	8.5	
L32R2	Cell 19B	Y	3.08	26.47	6.5	6	9	8.5	
L32AR	Cell 19B	Y	3.84	26.64	6.5	6	9	8.5	
L32BR2	Cell 19B	Y	3.91	25.92	6.5	6	9	8.5	
L33R	Cell 19A	Y	2.84	19.77	6.5	6	9	8.5	
L33A	Cell 19A	N	3.11	19.88	6.5	6	9	8.5	
L33BR	Cell 19A	Y	3.76	23.57	6.5	6	9	8.5	
L34	Cell 22	Y	6.31	26.13		8	9	8.5	Interim level until HRA Complete or Construction of
L34A	Cell 22	N	7.25	24.14		8.5	9	8.5	Interim level until HRA Complete or Construction of
L34B	Cell 22							7.5	

L34BR	Cell 22	Y	6.58	27.93		8	9	8.5	Drilled December 2020- Replaced L34B as Compliancewell
L35	Cell 23	Y	2.70	21.91		5.2	9	8.5	Interim level until HRA Complete or Construction of
L35A	**Cell 23**	Y	3.30	24.61		5.2	9	8.5	Interim level until HRA Complete or Construction of
L35B	**Cell 23**	Y	3.40	19.23		5.2	9	8.5	Interim level until HRA Complete or Construction of
L36	Cell 24A	Y	2.94	19.86		4.8	9	8.5	Interim level until HRA Complete or Construction of
L36A	**Cell 24A**	Y	3.98	15.11		4.8	9	8.5	Interim level until HRA Complete or Construction of
L36B	Cell 24B	N	4.71	14.08		4.8	9	8.5	Interim level until HRA Complete or Construction of

Blue text= subject to 48 hour pump suspension prior to monthly monitoring

Appendix E: Leachate well design



Project:

.....

Title:

.....

Drawn By	.....	Date .....
Chk'd By	.....	Date .....
Scale 1:	NTS	Sheet Size A4

FCC Environment (UK Limited)
3 Sidings Court
White Rose Way
Doncaster
DN4 5NU

Drawing No ....

FCC Environment

FCC Environment (UK Limited)
3 Sidings Court, White Rose Way, Doncaster, DN4 5NU

Appendix F: Leachate well Field check sheet + Site Installation Check Sheets

Milton Leachate Field Check Sheet Date.....

WELL ID	PULSE	PUMPING Y/N	Pumped since last visit Y/N	Times Pumped since last visit	Comments
JB WELL					
L01					
L01B					
L02					
L02A					
L02B					
L03A					
L03B					
L03r (WB13L)					
L03/2014R					
MILWB14L					
L04r (WB16L)					
L04/2014R					
L05r (WB23L)					
L06R					
L06R2					
LM01/A					
LM01/B					
LM01/C					
LM01/D					
L07R					
L07RB					
L07/2014R					
RD15					
L08R					
L08R2					
L09/10R					
RD4 (NOID4)					
L10R					
WD26L					
RB010					
RD04A					
RD002					
RD003					
W1601					
L11					
L12DR					
L12DR2					
L15R					
L16					
L17					
L17-2					
L17R					
L17A					

Milton Leachate Field Check Sheet Date.....

L18					
L19R					
L20					
L21R					
L22/R2					
L23R					
L24R					
L25R					
L26					
L26a					
L26b					
L27R					
L27AR					
L27BR					
L28					
L28A					
L28BR					
L29					
L29A					
L29B					
L30					
L30A					
L30B					
L31R					
L31A					
L31BR					
L32R					
L32AR					
L32R2					
L32BR					
L32BR2					
L33R					
L33A					
L33BR					
L34					
L34A					
L34BR					
L35					
L35A					
L35B					
L36					
L36A					
L36B					

FCC Environment	FCC Environment Integrated Management System	
Document Title:	**Installation Checks**	Mandatory Guidance Project Specific

Site: MILTON LANDFILL		
Inspector:		**Date:**
Signature:	**Position:**	**Permit No: BV4584IU**

Daily Inspection	Initial	Comments	Action	Close out
Waste Acceptance Rejected loads Unauthorised waste				
Fuel, Oil & Chemical Storage Bunds (Empty/Full Dip Trays				
Roads & Highways Any mud? Butt Lane clear Check access road to weighbridge Wheelwash operational?				
Fire Watch Any signs of fire? Hot loads?				
Litter Inspection of litter on site Weather forecast review Are litter pickers required?				
Odour Olfaltory Monitoring (Perimeter & Receptor)				
Dust Any dust visible? Are adequate dust controls in place?				
Pest Control Visual inspection of pest				
Leachate Tanks Bunds (empty/full) Drip trays full?				
Surface Water Condition of lagoons Suitable control measures in place				
Daily Cover Is waste covered? Cover material stocks sufficient? Cover material appropriate? Any uncapped waste remain uncovered?				
Comments:				

CMS Signature:	**Date:**

Site: MILTON LANDFILL		
Inspector:		**Date:**
Signature:	**Position:**	**Permit No: BV4584IU**

This Inspection sheet forms part of the installation log

Weekly Inspection	Initial	Comments	Action	Close out
Fuel, Oil & Chemical Storage Spill kits				
Roads & Highways Maintenance Road signage appropirate				
Waste Flanks Waste flanks too steep to apply cover? Waste flank steeper than 1:3				
Litter Litter fences/netting condition				
Odour Are complaints recorded on safeguard				
Pest Control Control measures suitable				
Leachate Tanks Valves Spill kits				
Security Fences & gates				
Surface Water Ditches Lagoons				
Leachate Control Wells need raising/repairing in operational area? Refer to leachate field check				
Wheel Wash Has it been cleaned down?				
Comments:				

CMS Signature:	**Date:**

FCC Environment	FCC Environment Integrated Management System	
Document Title:	**Installation Checks**	Mandatory Guidance Project Specific

Site: MILTON LANDFILL		
Inspector:		**Date:**
Signature:	**Position:**	**Permit No: BV4584IU**

This Inspection sheet forms part of the installation log

Monthly Inspection	Initial	Comments	Action	Close out
Review of accidents, Incidents & near misses RA's still valid?				
Landfill gas monitoring				
Surface water monitoring				
Ground water monitoring				
Landfill surface monitoring				
Landfill stability				
Hard surfaces, Roads & Car Parks				
Fire Extinguishers				
First Aid Boxes Contents				
Ladders- Secure/not damaged?				
Plant Fuel Usage				
Electricity Meter				
Water Meter				
Leachate Exported				
Comments:				

CMS Signature:	**Date:**

Site: MILTON LANDFILL		
Inspector:		**Date:**
Signature:	**Position:**	**Permit No: BV4584IU**

This Inspection sheet forms part of the installation log

SIX MONTHLY INSPECTIONS	Initial	Comments	Action	Close out
Emergency Drills • Gas • Leachate • Fire • Spillage • Non-conformaning waste • Other				
Training Review • New starters • Delevopment • Environmental • New Equipment? • Review training requirements				
Lifting Accessories • Chains • Eyes • Bolts				
Pressure Systems • Compressor • Water Bowser • Mobile Compressors				
Signage • Warning/Hazards Signs • Information • Suitability • Cleaniness				
Site ID Board • Information correct • Details current?				
Comments:				

Competent Person Signture:	**Date:**