Attachment 4.8.3 – Site Condition Report

Organisation Name: *	Knockharley Landfill Limited
Application I.D.: *	LA004307

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ENVIRONMENTAL MANAGEMENT FOR BUSINESS

SITE CONDITION REPORT

KNOCKHARLEY LANDFILL

Prepared For: -

Knockharley Landfill Ltd
Knockharley Landfill
Knockharley
Co. Meath

Prepared By: -

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September 2019

Project	Baseline Assessment Report Knockharley Landfill			
Client	Knockharley Landfill Ltd			
Report No	Date	Status	Prepared By	Reviewed By
	10/07/2019	Draft	Billy Hamilton MSc	Jim O'Callaghan MSc
	10/08/2019			

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1. INTRODUCTION

Knockharley Landfill Ltd (KLL) operates under an Industrial Emissions Licence (IE) (Reg No. W0146-02) issued by the Environmental Protection Agency (the Agency). The licence authorises the acceptance of 200,000 tonnes of non-hazardous waste annually for disposal and recovery.

It is proposed to increase the annual waste acceptance rate to 435,000 tonnes, which will comprise up to 150,000 tonnes of incinerator bottom ash (IBA), as well as municipal solid wastes, including organic fines, non-hazardous contaminated soils, construction and demolition (C&D) wastes and baled recyclables.

5,000 tonnes per annum of stable non-reactive hazardous waste will also be accepted for co-disposal with the non-hazardous wastes. The IBA will be pre-treated and temporarily stored in dedicated landfill cells. The residual organic fines will be treated in a new on-site biological treatment plant, with the treated solid outputs used as daily cover. A leachate treatment plant will be installed to pre-treat leachate from the non-hazardous waste cells, the IBA cells and the biological treatment plant. The proposed change requires a revision of the IE licence and this Site Condition Report has been prepared to support the review application.

2. METHODOLOGY

OCM's assessment was based on information in the Environmental Impact Assessment Report (EIAR) prepared in support of the licence review application and the results of the on-going groundwater monitoring carried out in accordance with the licence requirements.

3. STAGE 3 - SITE OVERVIEW

3.1 Installation Location

The site is in a rural area, approximately 1.5 km north of the village of Kentstown and 7 km south of Slane. The surrounding land use is predominantly agricultural, comprising a mix of tillage and pasture, with farmhouses and detached residential single-family dwellings.

3.2 Installation Layout

The licensed area encompasses 135.2 ha. The landfill footprint, where residual waste is currently deposited in engineered landfill cells, is in the centre of the site. A buffer of at least 100 m is maintained between this area and the site boundary, as required by Condition 3.13. 1 (W0146-02).

The initial phase, which was completed in 2004, involved the construction of four engineered landfill cells and an access road from the N2, the provision of the supporting infrastructure including the waste reception area, leachate holding lagoon and site offices, groundwater and surface water control measures, forestry planting and initial landscape works.

Subsequent phases involved the construction of additional engineered cells, provision and progressive expansion of the active gas management and flaring system, landscape works and the capping and restoration of the completed landfill cells.

The proposed development, which is the subject of the licence review application, forms the final development phase and involves:

- The construction of an IBA 'Weathering Area' and five dedicated storage cells;
- The construction of a biological treatment plant for the treatment of organic fines recovered from residual solid wastes;
- The expansion of the leachate management system to accommodate additional leachate volumes and future on-site treatment, and
- The provision of additional surface water controls.

3.3 Landfill

3.3.1 Layout

The residual waste and stabilised and inert landfill will, when fully developed, comprise 28 Cells, as shown on Drawing LW14-821-01-P-0000-003. To date residual waste Cells 1-12 (approximately 96,000 m^2) have been permanently capped. There is an intermediate cap on Cells 13 and 14. Landfilling is on-going in Cells 15, 16, 17 and 18. Cells 19 and 20 are being constructed.

LEGEND

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary

Note: MW17D, MW18D and MW19D were Installed in 2016 for baseline monitoring for proposed development

Site 2

Permitted Stream Diversion

Permitted Cell Development

Area under construction

Existing Cattle Underpass

Existing Underpass

Existing Landfill Offices

Existing Wheel Wash

L1-Existing Leachate Lagoon

Existing Landfill Gas Compound

Existing Screening Berm

Existing Southern Surface Water Attenuation & Wetland

Quarry

CR 384

Ruin

TUITERAT

KNOCKHARLEY

220kv

PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
PHASE 7

CELL 1
CELL 2
CELL 3
CELL 4
CELL 5
CELL 6
CELL 7
CELL 8
CELL 9
CELL 10
CELL 11
CELL 12
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CELL 23
CELL 24
CELL 25
CELL 26
CELL 27
CELL 28

Scale 1:3750

Scale 1:500

Scale 1:10000

	Dust		
D Dx	D1	297278.00	267774.00
	D2	297744.00	267560.00
	D3	297831.00	267285.00
	D4	297648.00	266862.00
	D5	297030.00	267194.00
	D6	296964.00	267575.00
	D7	297587.00	266678.00
	D8	298081.00	267565.00
	Groundwater		
W MWx	MW1D	296689.00	267649.00
	MW2D	297191.00	267988.00
	MW3D	297562.00	267742.00
	MW5D	297712.00	267102.00
	MW6D	297377.00	266718.00
	MW7D	297054.62	266875.60
	MW16D	297678.00	264143.00
	MW17D	297833.46	267424.35
	MW18D	297677.66	267190.15
	MW19D	297646.03	266580.16
	Noise		
N Nx	N1	297290.00	267999.00
	N2	297901.00	267565.00
	N3	297858.00	267207.00
	N4	296921.00	267882.00
	Surface Water		
W SWx	SW1	296706.00	267600.00
	SW2	297464.00	267862.00
	SW3	298087.00	267634.00
	SW5	297764.00	267116.00
	SW6	297663.00	266562.00
	SW7	297510.00	266525.00
	SW8	297916.00	266029.00
	SW9	297587.00	266621.00
	PM10		
W PMx	PM1	297030.00	267909.00
	PM2	297833.00	267591.00
	PM3	297656.00	266894.00
	PM4	297656.00	266630.00
	PM5	297035.00	267170.00
	PM6	298454.00	267576.00
	Landfill Gas		
W LGx	LG01	297555.00	267031.00
	LG02	297554.00	267018.00
	LG03	297559.00	266975.00
	LG04	297563.00	266928.00
	LG05	297572.00	266874.00
	LG06	297581.00	266831.00
	LG07	297513.00	266815.00
	LG08	297472.00	266806.00
	LG09	297418.00	266799.00
	LG10	297376.00	266789.00
	LG11	297319.00	266781.00
	LG12	297271.00	266777.00
	LG13	297220.00	266772.00
	LG14	297190.00	266793.00
	LG15	297181.00	266843.00
	LG16	297170.00	266895.00
	LG17	297095.00	266894.00
	LG18	297088.00	266942.00
	LG19	297084.00	266991.00
	LG20	297140.00	267041.00
	LG21	297134.00	267090.00
	LG22	297126.00	267140.00
	LG23	297120.00	267188.00
	LG24	297114.00	267238.00
	LG25	297107.00	267289.00
	LG26	297105.74	267341.66
	LG27	297099.98	267400.01
	LG28	297092.61	267453.32
	LG50	297570.00	267107.00
	LG51	297564.00	267158.00
	LG52	297556.00	267205.00
	LG53	297541.00	267253.00
	LG54	297532.00	267302.00
	LG55	297527.01	267427.57
	LG56	297512.97	267427.57
	LG57	297499.86	267461.47
	LG58	297721.89	267613.59
	Biological		
SiteX	Site 1	297751.28	266193.21
	Site 2	296164.36	267498.06
	Site 3	300118.26	264757.42
	Site 4	297817.74	265030.67
	Leachate		
L LPx	LP-1	297217.00	266895.00
	LP-2	297523.00	266943.00
	LP-3	297216.00	266904.00
	LP-4	297520.00	266962.00
	LP-5	297200.00	267006.00
	LP-6	297505.00	267051.00
	LP-7	297197.00	267107.00
	LP-8	297501.00	267072.00
	LP-9	297196.00	267106.00
	LP-10	297194.00	267112.00
	LP-11	297180.00	267137.00
	LP-12	297482.00	267183.00
	LP-13		
	LP-14	297463.00	267304.00
	LP-S	297612.00	267263.00
	Air		
G KHx	**LFG Plant**		
	KH01	297589.09	266889.81
	KH02	297595.61	266890.81
	KH03	297602.14	266891.81
	KH04	297608.74	266892.81
G Fx	F1	297571.54	266916.10
	F2	297572.56	266908.08
	F3	297577.64	266895.34

Rev.	Drawn	Chk'd	App'd	Date	Description
A		CJC	BG	Cork 10.07.18	Issue For Planning Application

Revision History: A — EIAR

Name of Client

KNOCKHARLEY LANDFILL LTD.

Name of Job

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

Title of Drawing

EXISTING MONITORING POINTS

Scales Used: 1:3750

This Drawing was printed to A1-

Dwg. No.: LW14-821-01-P-0050-001

Rev.: A

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3.3.1 Lining System

The landfill is designed as a containment facility where wastes are deposited in engineered landfill cells provided with the lining system specified in Condition 3.12 (W0146-02). The lining system design comprises: -

- A composite liner consisting of a 1 m layer of compacted soil, or equivalent (bentonite enhanced sand) with a hydraulic conductivity of less than or equal to $1x10^{-9}$ m/s overlain by a 2 mm thick high density polyethylene (HDPE) layer;
- A geotextile protection layer placed over the HDPE layer;
- A 500 mm thick drainage layer placed over the geotextile layer with a minimum hydraulic conductivity of 1x10-3 m/s;
- The side walls are designed and constructed to achieve an equivalent protection.

A comprehensive independent construction quality assurance report is prepared for each phase of cell construction and is submitted to the Agency for approval prior to waste acceptance.

3.3.2 Landfill Cell Capping System

The final profile will be a maximum of 85 m Ordnance Datum (OD) and be a domed shape. When the final fill level is reached in each cell it is temporarily capped for 12 months to allow settlement pending the installation of the final cap.

The final cap design, which has been agreed with the Agency comprises an under liner geocomposite for the management of gas and / or leachate, a 1 mm fully welded low density polyethylene (LDPE) liner, sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers is 1 m.

3.3.3 Leachate Management

The landfill is designed to minimise leachate generation. Surface water run-off and groundwater flow is directed away from the fill area by means of interceptor drains installed outside the landfill cells. The cells are designed as fully contained areas.

The leachate collection system comprises a granular collection layer incorporating 160 mm and 200 mm leachate collection pipework laid at gradients of 1:150 and 1:100. The system drains by gravity to leachate collection sumps connected to the main (200 mm) drainage pipe, in each of the landfill cells. It is pumped from the sump via a sloping shaft side riser to the leachate storage lagoons.

The leachate lagoons are sized to provide a 72-hour storage capacity based on water balance calculations completed in accordance with the guidance presented in the EPA Landfill Manual on Landfill Site Design and are fitted with floating covers.

Annual water balance calculations are completed during the preparation of the Annual Environmental Report (AER) and are based on recorded rainfall data and the volumes of leachate removed from the site. The calculations form the basis for the assessment of the suitability of the current leachate management capacity.

The leachate lagoons are provided with the lining system specified in the licence, which requires: -

- a composite liner consisting of at a minimum a basal soil clay layer of at least 1 m in thickness with a permeability of less than 1x 10-9 m/s overlain by a 2 mm thick high HDPE liner, unless otherwise agreed with the Agency.

- A concrete spill pad at the lagoon loading bays. The road tankers used to remove the leachate are parked in the bay while leachate is pumped from the lagoon. The pad is graded to direct any spills that might occur during the removal operations to flow back to the lagoon.

All on-site leachate management structures are inspected and certified fit for use on an annual basis by an independent and appropriately qualified chartered engineer.

KLL has prepared written procedures for the proper handling of leachate at the site (EMS-OP-11), as specified in Condition 11.4.1 (W0146-02). KLL maintains an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spill at the installation and site staff are provided with appropriate training to deal with any such incidents.

3.3.4 Fuel & Chemical Storage

Diesel for the mobile plant is stored in a 6,000 litre tank provided with a containment bund. The chemical storage tanks in the leachate treatment facility will also be bunded. The bund design meets the specification in Condition 3.11 (W0146-1). Small quantities of lubricating and hydraulic oils used in plant maintenance are stored in a bunded pallet inside the plant shed.

4. SITE HISTORY

Prior to development as a landfill the lands were in agricultural use. The initial phase, which was completed in 2004, involved the construction of four engineered landfill cells and an access road from the N2, the provision of the supporting infrastructure including the waste reception area, leachate holding lagoon and site offices, groundwater and surface water control measures, forestry planting and initial landscape works.

Subsequent phases involved the construction of additional engineered cells, provision and progressive expansion of the active gas management and flaring system, landscape works and the capping and restoration of the completed landfill cells.

The landfill will, when fully developed, comprise 28 Cells, as shown on Drawing LW14-821-01-P-0000-003. To date residual Cells 1-12 (approximately 96,000 m^2) have been permanently capped. There is an intermediate cap on Cells 13 and 14. Landfilling is on-going in Cells 15, 16, 17 and 18. Cells 19 and 20 are being constructed.

In 2016 there was a minor fuel spill on an unpaved area adjacent to the bunded diesel tank. The spill was identified immediately and a clean-up was carried out in a manner that met with EPA approval.

5. ENVIRONMENTAL SETTING

5.1 Hydrology

The site is the Nanny River catchment, close to the divide with the River Boyne catchment. The Nanny catchment is characterised by sudden high flows coinciding with high rainfall periods, with particularly low flows in the drier summer months.

There is a surface water dived running east to west roughly through the centre of the site. Drainage from the area north of the divide (63.3 ha) is towards the Knockharley (or Flemingstown) Stream, while drainage south of the divide (73.7 ha) is towards the Kentstown Stream, which joins the Knockharley Stream.

Baseline surface water quality monitoring in the Kentstown and Knockharley Streams completed before the construction of the landfill began identified elevated naturally occurring hardness and iron levels. Superimposed on these were the effects of agricultural practices and the use of septic tanks, reflected in elevated and variable Biochemical Oxygen Demand, Chemical Oxygen Demand, nitrate, and nitrite levels.

5.2 Geology & Hydrogeology

The subsoil consists of a locally thick and continuous glacial till (10 >20 m thick). The till comprises boulder clay made up of bedrock debris set in a silty clay matrix, with minor sand content. The permeability ranges from $1x10^{-9}$ m/s to $4.9x10^{-11}$ m/s, which places it at the lower range of permeability values for Irish tills.

The underlying bedrock comprises a fine grained light coloured sandstone (65%) and a darker coloured siltstone/mudstone (35%). The top of the rock is weathered to 0.3 to 0.5 m and the shallow fractures are clay filled to a depth of 1 m.

Although poorly permeable the till is water bearing. The water table is generally within 1.5 m of the ground surface, which is consistent with the poor permeability and the poor drainage conditions. In-situ permeability measurements, in conjunction with the groundwater gradient across the site, indicates a groundwater flow rate of <1 m/year.

The bedrock has a relatively poor permeability, is classified as a Poor Aquifer and the yield is less than 10 m^3/day. The direction of groundwater flow is to the south-east. The thick layer of low permeability till acts as a confining layer for the bedrock aquifer and also protects it from contamination. The vulnerability of the aquifer to pollution is Low.

6. SITE CHARACTERISATION

6.1 Conceptual Site Model

Figures 6.1 and 6.2 are schematics of Conceptual Site Model in Plan and Section respectively. The site is situated at an elevation of between 96 and 98m Ordnance Datum (OD). It is relatively flat with a gentle slope toward the river Nanny to the south of the site. The Knockharley Stream, which is a tributary of the Nanny, flows around the northern and eastern site perimeter before joining the Nanny River c2km to the southeast.

Waste is only disposed in the engineered landfill cells, which are provided with a lining and leachate collection system. The base of the landfill cells are at least 10m above the bedrock. Those cells that have reached capacity are covered with a low permeability capping system.

The glacial till subsoils at the site range in thickness from 10 to 20m and have a very low permeability ($1x10^{-9}$ m/s to $8.1x10^{-11}$ m/s). The underlying Namurian sandstone from the Balrickard Formation is characterised as a Poor aquifer with very low yield (c.$10m^3$/day). The aquifer vulnerability is Low and the groundwater in the bedrock is confined by the overlying low permeability till.

The bedrock aquifer typically has very short flow paths (10s to 100s of metres with discharge to nearby surface water streams and rivers. In the winter period because this aquifer type has very limited storage, groundwater tends to rise into subsoil and /or discharge to the surface water drainage system. However at Knockharley, the very thick subsoil cover inhibits the upward movement of water, meaning there is no pathway to the streams that flow around the north and east of landfill.

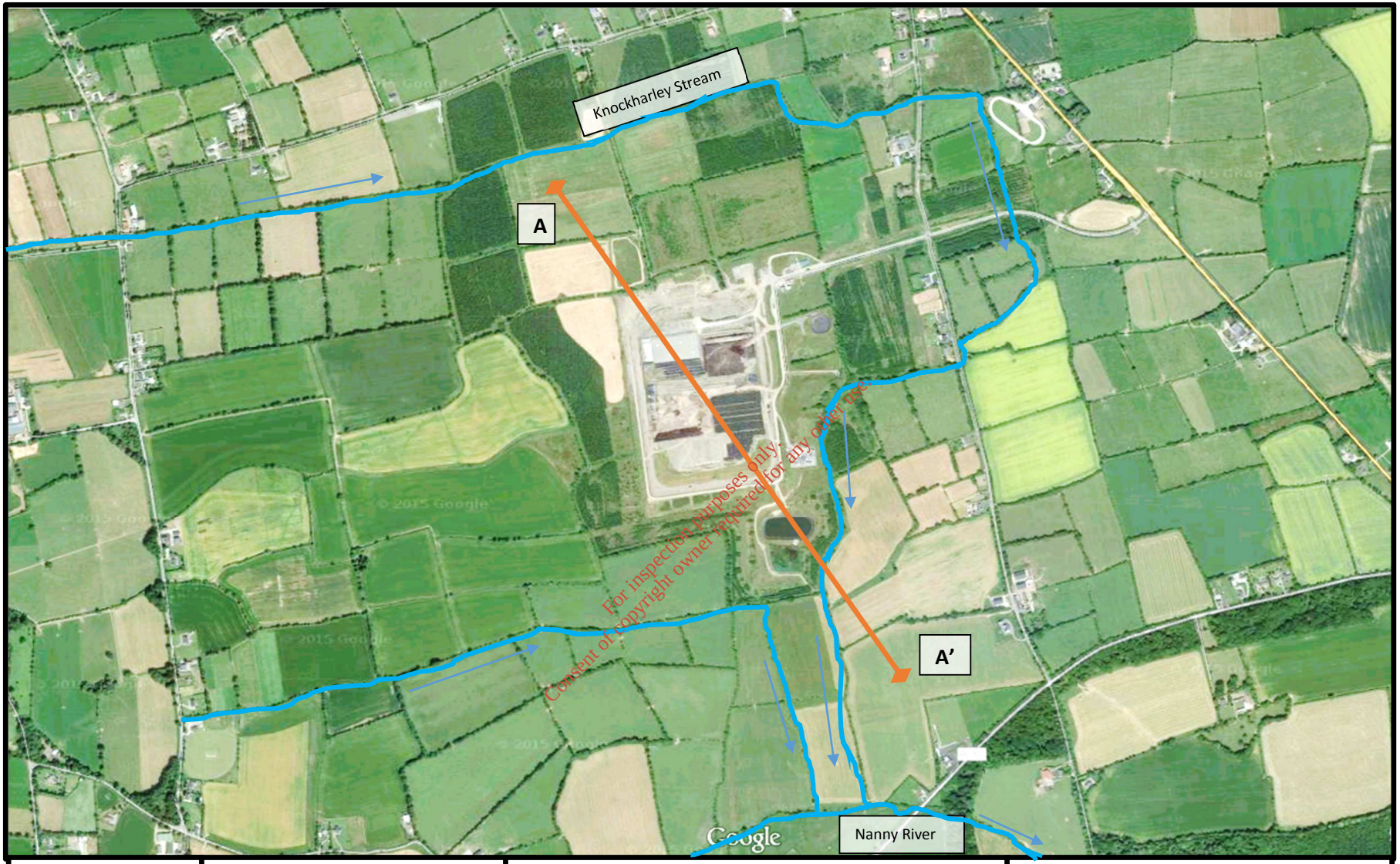
6.2 Groundwater Quality

Groundwater quality monitoring has been undertaken since 2003, before waste activities commenced. The licence requires monitoring in eight (8 No.) groundwater monitoring wells specified in the Waste (MW-1d, MW-2d, MW-3d, MW-5d, MW-6d. MW-7d, MW-16d and MW-17d). The locations are shown on Drawing LW 14-821-01-P-0050-001. MW-1d, MW-2d, MW-3d and MW-7d are up-gradient of the landfill, while MW-5d, MW-6d, MW-16d and MW-17d are down-gradient.

In 2011 the Agency approved revised trigger levels for parameters that are indicative of leachate contamination (pH, ammonia, chloride, sodium, potassium, TOC and phenols) and these are in Table 6.1.

Table 6.1 Trigger Levels

Parameter	pH	NH_3 (N)	Cl	Na	K	Total Organic Carbon	Phenols
Units	pH Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
All wells	>8.28	>1.98	>31.28	>112.3	>6.25	>12.99	>0.02



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Title:

Conceptual Site Model – Plan View

Legend:

Streams

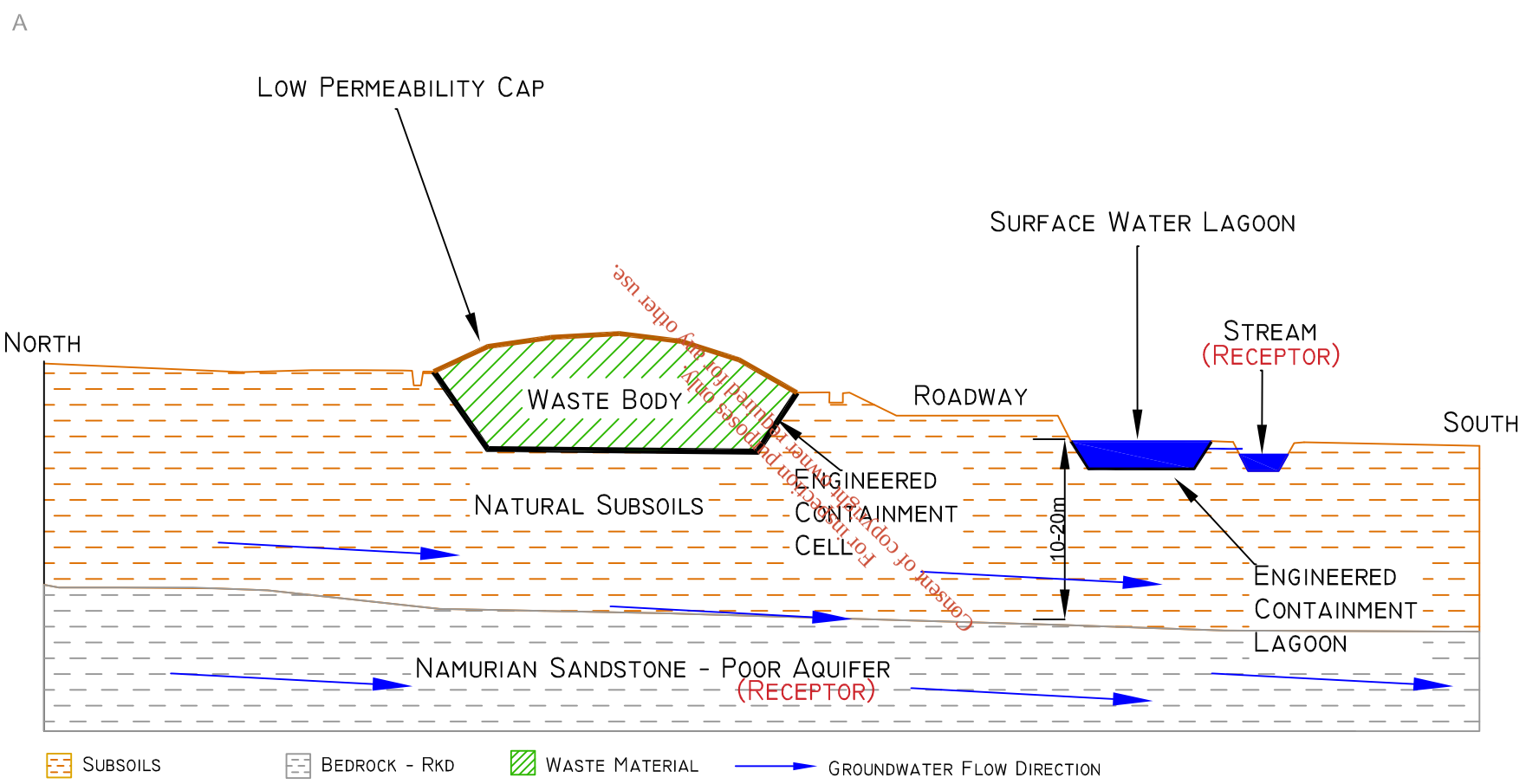
Stream Flow Direction

Client:

AGB Ltd

Ref:

Figure 6.1



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environmental management for business

CLIENT

AGB Ltd

details

Figure No. 6.2

TITLE

Conceptual Site Model - Cross Section

SCALE NTS

REV. A

The r results are also screened against and interpreted with reference to the relevant Interim Guideline Values (IGV) and Threshold Values (TV) for groundwater quality (TV). The IGVs represent typical background or unpolluted conditions; however levels higher than an IGV can occur naturally, depending on the local geological and hydrogeological conditions.

The TVs were introduced by the European Communities Environmental Objectives (Groundwater) Regulations 2010 S.I. No 9 of 2010, as amended. While the TVs are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in groundwater.

The groundwater monitoring results from 2011 – Quarter 3 2018 are in Appendix 11.2, Volume 3 of the EIAR. The results of Q4 2018 and Q1 and Q2 2019 monitoring are in Appendix 1 of this report. Elevated ammonia levels are present in almost all the wells. While occasionally they exceed the TV, the trigger level has never been exceeded. Given that the highest levels are in the up gradient wells (MW-1d and MW-7d), the ammonia is not associated with the landfill and is naturally occurring. The results are considered to be representative of baseline conditions.

In 2015 Agency, a Tier 3 Groundwater Risk Assessment was completed in accordance with the Guidance on the Authorisation of Discharges to Groundwater (2011). The assessment concluded there was no evidence that the landfill has impacted on groundwater quality down gradient of the site and the engineered landfill liner and 10-20m of low permeability subsoil provides sufficient protection to ensure that the groundwater resource, albeit of limited value, is protected from future impacts.

The groundwater monitoring data confirms that the requirements of the EC Environmental Objectives (Groundwater) Regulations 2010, S.I. No. 9 of 2010, as amended are being achieved.

6.3 Soil Quality

There is no data on soil quality.

APPENDIX 1

Groundwater Results Q4 2018 (Quarterly Parameters)

Parameter	Units	Upgradient Wells				Downgradient Wells				Trigger Level	IGV	TV
		MW-1d	MW-2d	MW-3d	MW-7d	MW-5d	MW-6d	MW-16d	MW-17d			
Temperature	***℃***	*10.0*	*10.4*	*10.4*	*11.0*	*10.2*	*9.3*	*11.0*	*10.6*	-	**25**	-
pH	*Units*	8.03	7.93	7.85	7.77	7.90	8.15	7.97	7.96	**8.28**	**<6.5 &>9.5**	-
Electrical Conductivity	*µS/cm*	*663*	695	803	713	647	635	659	671	-	**1,000**	**800 - 1,875**
Dissolved Oxygen	mg/l	8	8	6	6	7	7	9	8	-	**NAC**	-
Ammonia (N)	mg/l	0.06	0.12	0.43	0.33	0.38	0.43	0.51	0.99	**1.96**	**0.15**	**0.065 - 0.175**
Chloride	mg/l	23.6	19.3	25.9	20.9	19.1	16.6	18.4	15.3	**31.28**	**30**	**24 - 187.5**
Iron	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	**0.2**	-
Sodium	mg/l	42.6	39.1	50.4	24.8	26.1	26.0	27.4	40.5	**112.3**	**150**	-
Potassium	mg/l	3.5	2.4	3.3	2.5	2.4	2.6	2.8	3.9	**6.25**	**5**	-
TON	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5		**NAC**	-
TOC	mg/l	<2	<2	<2	<2	<2	<2	<2	<2	**12.99**	**NAC**	-
Phenols	mg/l	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	**0.02**	**0.0005**	-
Total Coliforms	cfu/100mls	>100	0	>100	0	>100	14	15	>100	-	**0**	-
Faecal Coliforms	cfu/100mls	0	0	0	0	0	14	0	0	-	**0**	-

Temperature, pH and Electrical Conductivity are field results.

Groundwater Results Q1 2019 (Quarterly parameters)

Parameter	Units	Upgradient Wells				Downgradient Wells				Trigger Level	IGV	TV
		MW-1d	MW-2d	MW-3d	MW-7d	MW-5d	MW-6d	MW-16d	MW-17d			
Temperature	*°C*	*10.5*	*10.4*	*10.0*	*9.5*	*10.0*	*10.6*	*10.0*	*9.6*	-	**25**	-
pH	*Units*	*7.74*	*7.18*	*6.97*	*6.81*	*7.09*	*7.15*	*7.01*	*6.97*	**8.28**	-	-
Electrical Conductivity	*µS/cm*	*642*	*612*	*778*	*657*	*591*	*469*	*549*	*580*	-	**1,000**	**800 - 1,875**
Dissolved Oxygen	mg/l	8.5	8.4	8.5	8.5	8.4	8.4	8.5	8.5	-	**NAC**	-
Ammonia (N)	mg/l	Laboratory Error								**1.96**	-	-
Chloride	mg/l	29	21	30	25	22	20	20	17	**31.28**	-	-
Iron	mg/l	0.280	0.510	0.380	0.320	0.390	0.250	0.290	0.200	-	**0.2**	-
Sodium	mg/l	48	38	43	24	29	16	30	44	**112.3**	-	-
Potassium	mg/l	3.8	2.5	2.7	2.4	2.6	2.2	3.1	4.3	**6.25**	-	-
TON	mg/l	0.21	< 0.20	< 0.20	0.43	< 0.20	0.29	< 0.20	< 0.20		**NAC**	-
Phenols	mg/l	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	**0.02**	-	-
Total Coliforms	cfu/100mls	9	0	8	0	0	0	2	4	-	**0**	-
E.Coli	cfu/100mls	2	0	0	0	0	0	0	0	-	**0**	-

Temperature, pH and Electrical Conductivity are field results.

Groundwater Results Q2 2019 (Quarterly parameters)

Parameter	Units	Upgradient Wells				Downgradient Wells				Trigger Level	IGV	TV
		MW-1d	MW-2d	MW-3d	MW-7d	MW-5d	MW-6d	MW-16d	MW-17d			
Temperature	*°C*	*13.1*	*10.7*	*11.1*	*10.2*	*10.8*	*11.0*	*11.2*	*10.9*	-	**25**	-
pH	*Units*	*7.30*	*6.88*	*6.84*	*6.78*	*6.83*	*7.10*	*6.95*	*6.95*	**8.28**	-	-
Electrical Conductivity	*µS/cm*	*626*	*644*	*744*	*675*	*581*	*519*	*548*	*616*	-	**1,000**	**800 - 1,875**
Dissolved Oxygen	mg/l	8.5	8.5	8.5	8.5	8.6	8.6	8.5	8.5	-	**NAC**	-
Ammonia (N)	mg/l	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	**1.96**	-	-
Chloride	mg/l	26	22	29	23	21	18	20	16	**31.28**	-	-
Iron	mg/l	1.1	1.2	1.9	1.2	1.4	0.59	1.2	0.490	-	**0.2**	-
Sodium	mg/l	41	36	45	21	30	18	25	36	**112.3**	-	-
Potassium	mg/l	3.3	2.3	3.1	2.0	4.6	2.3	2.5	3.9	**6.25**	-	-
TON	mg/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20		**NAC**	-
Phenols	mg/l	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	**0.02**	-	-
Total Coliforms	cfu/100mls	6	0	2	225	9	2	0	1	-	**0**	-
E.Coli	cfu/100mls	0	0	0	0	0	0	0	0	-	**0**	-

Temperature, pH and Electrical Conductivity are field results.