2 PROPOSED DEVELOPMENT

2.1 Proposed Development Location

This chapter considers and assesses the effects of the proposed development at Hollywood Great, Nag's Head, Naul, Co. Dublin (Irish Transverse Mercator Easting: 715736, Northing: 758036), approximately 3km west of the Junction 5 (Balbriggan South) of the M1 and approximately 14km north of Dublin Airport, on the ecological environment. Potential environmental impacts for the proposed development and approved infrastructural changes are assessed and mitigation measures are recommended, where appropriate.

2.2 Proposed Development Background

Under the terms of the current planning permissions and the Waste Licence (Ref. W0129-02), only waste which meets the criteria for inert landfill as set out in the Landfill Directive (Directive 1999/31/EC) may be landfilled at the site. The current cap on the waste volumes accepted at the site is restricted to 500,000 tonnes per annum both by the existing planning consents and the Waste Licence.

In addition to the landfilling operation, IMS undertakes a number of other circular economy activities to generate secondary aggregates for the construction sector. This includes an 'end of waste' permitted operation for the reuse of crushed concrete and an aggregate recovery operation to facilitate the reuse of aggregates in the construction sector.

2.3 Proposed Development Overview

Integrated Materials Solutions Limited Partnership (IMS) is the owner of the proposed development site, which is located at Hollywood Great, Nag's Head, Naul, Co. Dublin. The site is located approximately 3km west of the Junction 5 (Balbriggan South) of the M1 motorway and approximately 14km north of Dublin Airport. The site layout is shown in **Figure 2.1** with the red line boundary showing the extent of the application (circa 54.4 hectares).

The site was a former shale and limestone quarry which operated until 2007 and is now licensed by the Environmental Protection Agency (EPA) as an engineered landfill for the purpose of infilling and restoration of the quarry to natural ground levels. Under the terms of the current planning permission (F19A/0077) and the Waste Licence (Ref. W0129-02), only waste which meets the criteria for inert landfill as set out in the Landfill Directive (Directive 1999/31/EC) may be landfilled at the site. The current cap on the waste volumes accepted at the site is 500,000 tonnes per annum both by the existing planning consent and the Waste Licence.

In addition to the landfilling operation, IMS undertakes a number of other consented circular economy activities on site to generate secondary aggregates for the construction sector. This includes an 'end of waste'[1] operation for the reuse of crushed concrete and an aggregate recovery operation to facilitate the reuse of aggregates in the construction sector.

IMS is now seeking consent to develop a Circular Economy (CE) Campus and an integrated waste management facility at the Hollywood site which will service national waste management requirements and assist in providing a self-sufficient waste management solution for the State. The proposal will enhance and expand the established waste and recovery operations at the Hollywood site in line with circular economy principals and the waste hierarchy. The proposal consists of permission for a 25-year lifetime of operation with waste intake capped at a rate of 500,000 tonnes per annum as per the existing operation. The proposed CE Campus includes a number of proposed changes as follows:

- Broader waste acceptance types to include non-biodegradable non-hazardous and inert wastes generated by a range of sectors (construction, commercial, industrial and waste processing);
- Expanded waste treatment activities including:

[1] Under Article 28 of the European Waste Framework Directive 2008/98/EC (Waste Framework Directive) and regulated by the EPA. Link: https://www.epa.ie/publications/compliance--enforcement/waste/end-of-waste-criteria-recycled-aggregates.php

  - Development and re-profiling of the landfill void to accommodate specially engineered landfill cells for non-hazardous wastes in addition to the existing engineered inert cells;
  - Enhancement of the existing aggregate recovery processing on site including upgrading the aggregate recovery operations which produces low carbon, recovered sands and aggregates from various granular wastes by removing residues and other trace contaminants and separating the resulting aggregates into various size fractions;
  - Manufacture of secondary materials including enhanced soils and low-energy bound materials (e.g. concrete);
  - Additional waste recovery activities including soil/concrete batching and blending;
- Repurposing of an existing structure on site as a testing laboratory unit for the research, development and testing of recovered materials;
- A leachate management system including a leachate collection system and a storage tank prior to tankering off site for treatment at a suitably licensed WWTP with provision for a future on-site leachate treatment facility;
- Surface water management infrastructure for the landfill to capture, attenuate and treat storm water prior to discharge;
- A mobile enclosure for the maturation of Incinerator Bottom Ash (IBA);
- An internal un-paved road network serving the deposition areas from the reception area which will be modified throughout the development phasing;
- Relocation of the existing artificial peregrine falcon *(Falco peregrinus)* nesting box to a proposed elevated pole-mounted location to the southwest of the site; and
- Restoration of the site to natural ground levels.

2.4 Current Operations

2.4.1 Site Layout

The former shale and limestone quarry site is currently being used for the purpose of infilling and restoration of the quarry to land for the purposes of agriculture. The current site layout is shown in **Figure 2-1**. The site entrance, buildings and other infrastructure are located on the western boundary of the site. Haul roads and ramps have been constructed within the site to allow vehicles access the active cell areas. Other features include stockpiles of topsoil and subsoil at the northern boundary.

2.4.2 Plant and Operations

The primary activity carried out on site is the recovery of the former quarry via deposition of wastes into engineered landfill cells. Only waste which meets the criteria for inert landfill as set out in the Landfill Directive (Directive 1999/31/EC) may be accepted and is subject to strict Waste Acceptance Procedures approved by the EPA and contained in the site's Environmental Management System which are detailed in the following section.

Schedule A.4 of the Waste Licence sets out the leaching limit values for pollutant content for inert waste landfills that apply to the site and all waste accepted at the site must comply with these limits. On the 31st January 2019 the EPA consented to the modification of the waste acceptance limits for waste at the facility (referred to as Technical Amendment C to the Waste Licence Register No. W0129-02). This consent was subject to Appropriate Assessment and the EPA made the determination based on the fact that the proposed amendment would not result in a material change to the nature of the discharges from the activity.

If the pre-acceptance (Level 1) characterisation testing of any particular waste source shows concentrations that are satisfactory, the waste is cleared for acceptance. Accepted material is brought to site by a permitted waste haulier and on arrival it is verified on site to ensure it is as described and the accompanying waste paperwork matches the Level 1 characterisation data. Once the material has been verified (Level 3) it is directed to the appropriate tipping area in a landfill cell and its position in the cell recorded. On site compliance testing (Level 2) occurs for 1 in 100 loads of a particular waste whereby a randomly selected load is sent to the quarantine area which it is sampled and tested by an independent accredited laboratory. If

a load fails Level 2 or Level 3 checks it is rejected in accordance with the relevant procedures and licence conditions.

The restoration work is completed on a phased basis through the construction of suitably lined landfill cells. The design and construction of the landfill cells have been in accordance with the EPA's Manual on Landfill Site Design (2000) and the Waste Licence. Waste cells are constructed as follows:

- Cells are designed and a Specified Engineering Works report is submitted to the EPA for approval;
- Excavate and fill base to required formation level;
- Place and compact layers of Engineered Clay over base to a minimum 1m thickness;
- Place and compact Engineered Clay perimeter bund wall (in 2m lifts);
- Inspect, test and certify the Engineered Clay liner via a Construction Quality Assurance report which is submitted to the EPA;
- Placement of waste materials in a structured manner within the cell to allow for a management infilling programme;
- Processing of concrete waste by crushing to ensure that the void space is maximized or for use as an engineering material in site infrastructure; and
- Capping of all cells is carried out in accordance with the EPA's Manual on Landfill Site Design and consists of the following:
    - A subsoil layer of minimum depth 850mm of subsoil (not screened) to complete the minimum 1m of soils above the waste; and
    - A topsoil layer of circa 150-300mm.

Engineered clays are taken from the current site stockpiles or imported from external sources if deemed suitable by a qualified engineer and documented in a borrow source audit report. When required mobile plant or machinery operate to break or crush concrete into smaller manageable sizes for refilling into the active cells or to be used in site engineering works (e.g. haul roads). The facility operates Monday to Friday (0700–1900) and Saturdays (0700–1700). Waste is only accepted at the facility between the hours of 0800–1800, Monday to Friday and between the hours of 0700–1600 on Saturdays. These hours of operation are in line with planning permission for the site (Planning Reference: F19A/0077).

The existing operation has consent to import up to 500,000 tonnes of waste material per annum and this planning application will retain that limit of annual input. The site operating at full operational capacity will result in circa 120 trucks arriving to the site on a typical full working day. This corresponds to a total daily movement of circa 240 trucks generated onto the local road network.

2.5 Detailed Description of the Proposed Development

IMS is seeking consent to develop a number of enhancements at the Hollywood site to provide additional sustainable waste solutions in line with CE principals and the waste hierarchy and to continue the operation of the existing facility. The proposed development includes for an enhanced aggregate recovery operation at the site to meet the demand for secondary aggregates in line with European and National Circular Economy policy. The primary focus of the site will move from disposal to recovery with any suitable materials undergoing processing to extract any recoverable materials (e.g. aggregates and sand) prior to disposal. The recovery process can treat a range of suitable non-hazardous wastes including construction and demolition materials, waste processing fines, glass processing fines, street sweeping residues and dredging spoil. Waste already deposited on site could also be processed and aggregates and sand recovered leaving the silt to be landfilled on site.

In addition, the enhancements include accepting a more diverse mix of waste streams to meet the demands of a number of business sectors including construction, industrial, commercial and waste processing. The proposed development will assist in providing a self-sufficiency waste management solution for the State. The proposal is to retain the existing inert waste operation at the site and supplement this with a broader mix of wastes including non-biodegradable non-hazardous wastes. The mix of wastes has been selected based two key factors; the national capacity requirements for specific materials (e.g. non-hazardous non-inert waste landfill capacity) and the Hollywood site's environmental setting.

The proposed non-hazardous waste streams will require development of engineered cells that differ from the existing inert engineered cells and meet the requirements of the Landfill Directive (Directive 1999/31/EC). This includes mandatory performance requirements for base liners, capping, leachate management, etc. that must be developed in line with the EPA landfill design requirements. The proposed non-hazardous waste streams include contaminated soil and stone from construction, other construction wastes, incinerator bottom ash (IBA), stabilised fines.

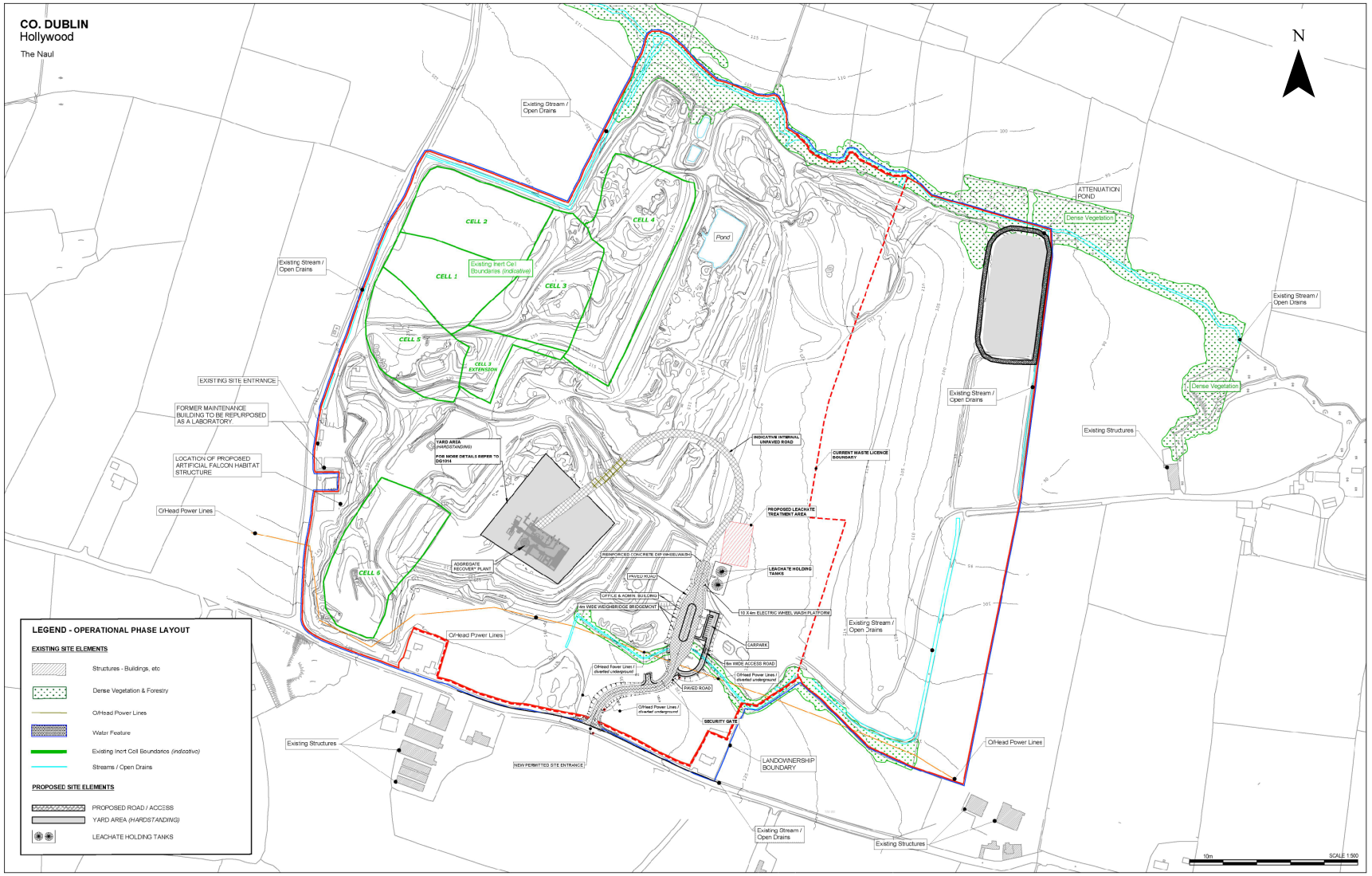
One of the non-hazardous waste streams proposed for landfilling (incinerator bottom ash or IBA) will require a level of treatment prior to the infilling of this material into the proposed cells. Bottom ash is generated when the non-combustible fraction of municipal solid waste charged to the furnace in waste to energy plants forms a residue (ash). Prior to landfilling, IBA must be matured to make the material suitable for infilling and this process is proposed in line with best practice.

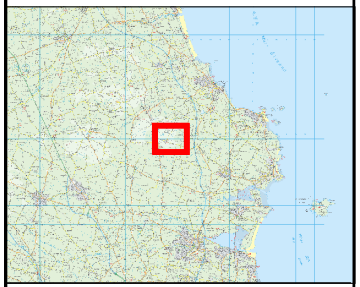
The only new waste activities proposed at the site are the maturation of incinerator bottom ash and the enhancement of the existing aggregate recovery unit to allow for the further removal of residues and other trace contaminants from processed waste aggregates. The proposal consists of a 10-year permission for a 25-year lifetime of operation to develop engineered landfill cells on the site to landfill this mixture of non-hazardous and inert wastes at a rate of 500,000 tonnes per annum as per the existing operation.

The site operating hours, location, environmental monitoring and the general operation will remain unchanged under the proposed development. The proposed development will operate subject to requirements under any Industrial Emission (IE) Licence (Reference W0129-04), if granted by the EPA, to replace the existing Waste Licence, which governs all associated enforcement and regulation from when operations commence. The proposed development sought under this application comprises the following:

- Broader waste acceptance types to include non-biodegradable non-hazardous and inert wastes generated by a range of sectors (construction, commercial, industrial and waste processing);
- Expanded waste treatment activities including:
  - Development and re-profiling of the landfill void to accommodate specially engineered landfill cells for non-hazardous wastes in addition to the existing engineered inert cells;
  - Enhancement of the existing aggregate recovery processing on site which includes upgrading the aggregate recovery operations which produces low carbon, recovered sands and aggregates from various granular wastes by removing residues and other trace contaminants and separating the resulting aggregates into various size fractions;
  - Manufacture of secondary materials including enhanced soils and low-energy bound materials (e.g. concrete);
  - Additional waste recovery activities including soil/concrete batching and blending;
- Repurposing of an existing structure on site as a testing laboratory unit for the research, development and testing of recovered materials;
- A leachate management system including a leachate collection system and a storage tank prior to tankering off site for treatment at a suitably licensed WWTP with provision for a future on-site leachate treatment facility;
- Surface water management infrastructure for the landfill to capture, attenuate and treat storm water prior to discharge;
- A mobile enclosure for the maturation of Incinerator Bottom Ash (IBA);
- An internal un-paved road network serving the deposition areas from the reception area which will be modified throughout the development phasing;
- Relocation of the existing artificial peregrine falcon nesting box to a proposed elevated pole-mounted location to the south west of the site; and
- Restoration of the site to natural ground levels.

Each of the above elements is presented in **Figure 2-1**. In addition to the site infrastructure changes, IMS is seeking to regularise the licence boundary with the landownership boundary and hence, the development boundary presented in **Figure 2-1** reflects the extent of IMS land ownership in the area.





Client
Integrated Materials Solutions (IMS) Limited Partnership

IMS Hollywood 2022 Update

Title

Figure 2-1: Operational Site Layout

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Issue Details

File Identifier:
MDR1492A-RPS-00-XX-DR-Z-AG-0009

Status:	Rev:	Model File Identifier:
S0	P02	

Drawn: MV	**Date:** 19/10/2022
Checked: SA	**Scale:** N.T.S. @A4
Approved: PC	**Projection:** ITM

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As the range of processes to be carried out, types of waste to be accepted and site waste management infrastructure will be materially altered, a Licence Review is required by the EPA. Under the revised First Schedule to the EPA Act 1992, as amended, the classes of activity listed in **Table 2-1** are relevant to the proposed development.

Table 2-1 Classes of Activity sought under the Industrial Emission Licence

Class	Description
Class 11.1	The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.
Class 11.4	(a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. 254 of 2001) apply): (ii) physico-chemical treatment; (iv) treatment of slags and ashes; (b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply): (iii) treatment of slags and ashes;
Class 11.5	Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicenced Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.

2.5.1 Waste Streams

The proposed wastes to be accepted at the site are listed in **Table 2-2** showing the range of construction, household, commercial and industrial wastes including residual fines to be accepted. As with Schedule A of the existing waste licence, IMS will seek to retain the capacity to manage inert mineral extraction wastes arising from quarrying activities at the facility and material imported for engineering or landscaping purposes without any annual cap on this material.

Table 2-2 Proposed Waste Streams to be accepted at the Site

Description	Typical Source	EWC	EWC Description
Bottom ash, boiler ash and other ash/dust deemed to be non-hazardous	Power stations and combustion plants	10 01 01	Bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
		10 01 02	Coal fly ash
		10 01 03	Fly ash from peat and untreated wood
	EfW facilities	19 01 12	Bottom ash and slag other than those mentioned in 19 01 11
		19 01 14	Fly ash other than those mentioned in 19 01 13
		19 01 16	Boiler dust other than those mentioned in 19 01 15
		19 03 07	Solidified wastes other than those mentioned in 19 03 06
Soils (low-level contamination)	Construction and development sites	17 05 04	Soil and stones other than those mentioned in 17 05 03
		17 05 08	Track ballast other than those mentioned in 17 05 07
Dredge spoil & drilling muds	Dredging of waterways	01 05 04	Freshwater drilling muds and wastes
		17 05 06	Dredging spoil other than those mentioned in 17 05 05
Sludges	Water and Wastewater treatment plants	06 05 03	Sludges from onsite effluent treatment other than those mentioned in 06 05 02
		19 08 02	Waste from desanding

Description	Typical Source	EWC	EWC Description
		19 08 05	Sludges from treatment of urban waste water
		19 08 12	Sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
		19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05
waste processing fines	Waste treatment	19 12 05	Glass
		19 12 09	Minerals (for example sand, stones)
		19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
Plaster Waste	Casting of nonferrous pieces	10 10 08	Casting cores and moulds which have undergone pouring, other than those mentioned in 10 10 07
Waste from the shredding of ELV'S & White Goods	Waste management facilities	19 10 04	Fluff-light fraction and dust other than those mentioned in 19 10 03
Stabilised or solidified wastes	Waste management facilities	19 05 99	Wastes not otherwise specified
		19 03 05	Stabilised wastes other than those mentioned in 19 03 04
Other Municipal Waste	Street Cleaning	20 03 03	Street-cleaning residues
Waste Resulting from Quarrying and Physical Treatment of Minerals	Quarrying wastes	01 01 02	Wastes from mineral non-metalliferous excavation
		01 04 12	Tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11
		01 04 09	Waste sand and clays
		01 04 99	Wastes not otherwise specified
Construction and Demolition Wastes	Construction and development sites	17 01 01	Concrete
		17 01 02	Bricks
		17 01 03	Tiles and ceramics
		17 01 07	Mixture of concrete, bricks, tiles and ceramics
		17 02 02	Glass
		17 03 02	Bituminous mixtures
		17 05 04	Soil and stones
		17 05 06	Dredging spoil
		17 05 08	Track ballast other than those mentioned in 17 05 07
		17 06 04	Insulation materials
		17 09 04	Mixed construction and demolition wastes
Other Waste	Construction and development sites	10 10 06	Casting cores and moulds which have not undergone pouring
	Water treatment plants	19 09 02	Sludges from water clarification
	Industrial	19 09 04	Spent Activated Carbon
	Treatment wastes	19 13 02	Solid wastes from soil remediation other than those mentioned in 19 13 01
Similar wastes to those listed above as agreed with the EPA under the IE Licence.			

2.5.2 Waste Acceptance

Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment established mandatory best practice for the waste sector in relation to operational matters. This BAT will be applied by the EPA in setting conditions for any licence granted.

It is noted that BAT 2 states that: *'In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below'* and follows a series of best practice measures including:

> *Acceptance procedures aim to confirm the characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection and analysis. Waste acceptance procedures are risk- based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).*

The existing waste acceptance procedures at the site are highly robust and exceed the requirements of BAT above and the existing Waste Licence to ensure maximum traceability and protection for the environment. For the proposed development, the various waste streams will undergo a similar three tier waste acceptance procedure as follows:

- Level 1 Basic Characterisation Testing – Level 1 testing constitutes through determination of the short and long-term behavioural properties of the waste (laboratory testing);
- Level 2 '1 in 100' Compliance Testing – Level 2 testing constitutes periodical testing (every 1 in 100 loads) of a select set of parameters identified by Level 1 basic characterisation, to further verify the level 1 laboratory results; and
- Level 3 On-Site Verification Testing – Level 3 on-site verification may consist of visual and odour inspection at the site before and after unloading at the site.

The Level 2 Compliance Testing may be modified under agreement with the EPA for a varied periodical testing for some waste streams. For example, non-hazardous waste loads may be subject to a more frequent periodic test to inert waste streams. The scale and frequency of testing will be dictated by the EPA and regulated through the IE Licence.

All wastes delivered to the site will typically be via circa 20-tonne rigid HGVs and uncovered to allow for the Level 3 On-Site Verification Testing through CCTV at the weighbridge. The exception is incinerator bottom ash which will be delivered to the site through similar 20-tonne rigid HGVs but all trucks will be covered to ensure no potential for dust generation during transport.

All waste deliveries will be via the new site entrance and will have to report to reception in the Administration Building via the weighbridge and the following will be mandatory:

- Waste shall only be accepted at the facility from holders of valid waste collection permits issued under the Waste Management (Collection Permit) Regulations 2007, as amended, unless exempted or excluded;
- Waste shall only be accepted at the facility from known pre-cleared customers;
- The documentation of waste arriving at the facility shall be checked at the point of entry to the facility. Subject to its verification, the waste shall be weighed, recorded and directed to the waste acceptance/quarantine area as appropriate; and
- A designated quarantine area will be maintained. Waste will be stored under appropriate conditions in the quarantine area to avoid odour nuisance, the attraction of vermin and any other nuisance or objectionable condition.

Site records will maintain details of all shipments to the site and the following will be recorded on site records in line with typical licence requirements:

- The tonnages and LoW Code for the waste materials imported and/or sent off-site for disposal/recovery;
- The names of the agent and carrier of the waste, and the waste collection permit details, if required (to include issuing authority and vehicle registration number);

- Details of the ultimate disposal/recovery destination facility for the waste and its appropriateness to accept the consigned waste stream, to include its permit/licence details and issuing authority, if required;
- Details of any rejected consignments;
- The results of any waste analyses required under the licence; and
- The tonnage and LoW Code for the waste materials recovered/disposed on-site.

All of the above records will be maintained in site to facilitate EPA inspection with annual reporting to the EPA through the Annual Environmental Report (AER).

2.5.3 Cell Layout

The proposed layout of cells at the site is shown in **Figure 2-2** and identifies the footprints of the following:

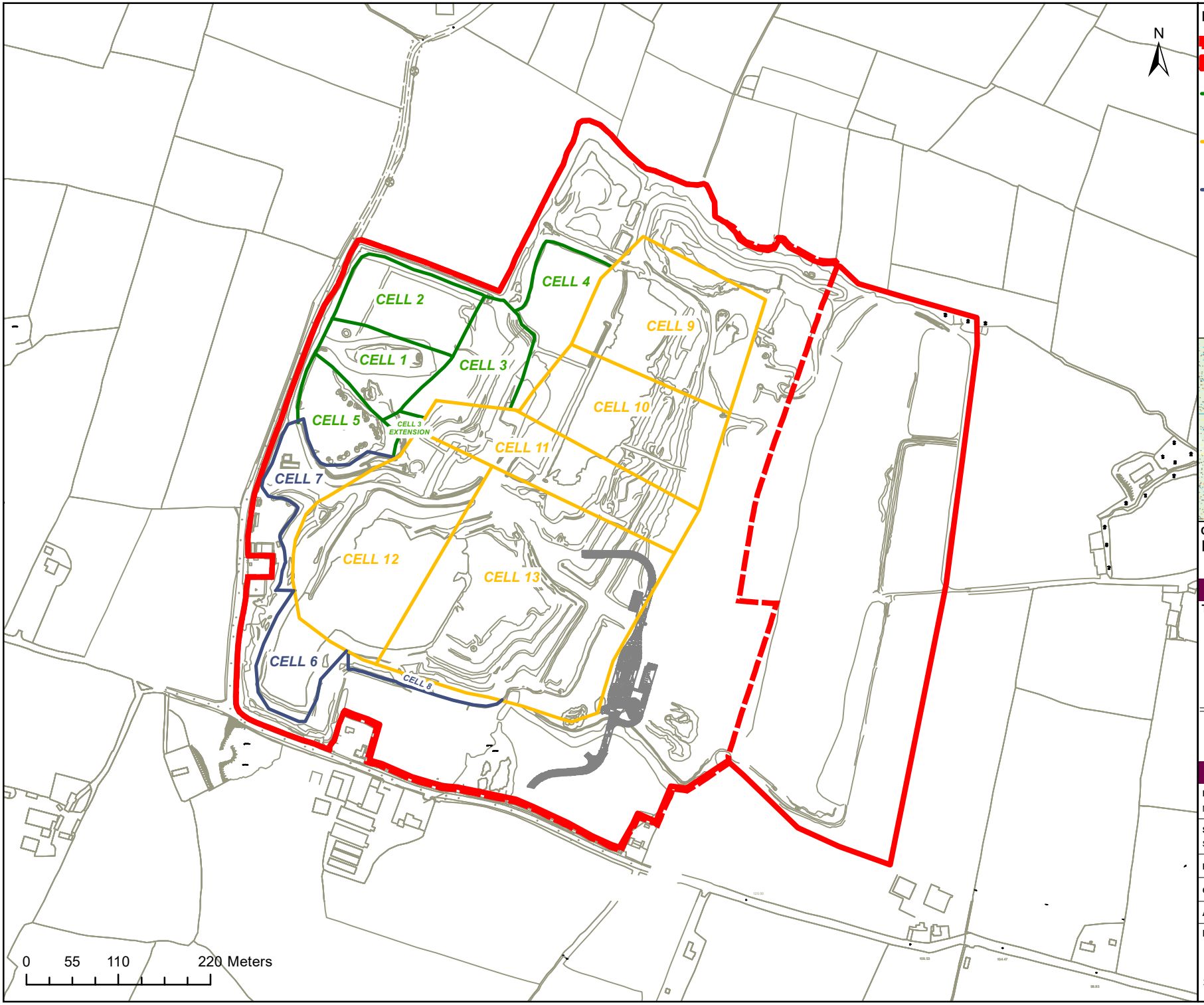
- The existing inert cells which have been largely capped and restored (Cells 1 to 5);
- The proposed inert cells (Cells 6 to 8); and
- The proposed non-hazardous cells (Cells 9 to 13).

The inert cells are specifically located on the southern sections of the site where the underlying groundwater body (i.e. the Loughshinny Formation) is less protected. This body is identified as locally important and extremely vulnerable and hence the cell layout is proposed to minimise any potential leachate risk to this groundwater body. The north of the site is underlain by a poor aquifer with much greater natural protection and lower vulnerability, so the non-hazardous waste cells are located in this area.

As noted earlier, in order to allow operational flexibility to meet the market demands for waste capacity, the cell layouts and capacities shown are indicative. For example, in the event that there is a greater demand for inert waste in any given year, IMS retain the option to convert some or all of one or more of the non-hazardous cells to an inert cell or expand the capacity of one of the existing inert cells into the non-hazardous cell areas. This is required to meet the evolving demands of the construction sector. All cell design and construction will need to be pre-approved by the EPA under the Specified Engineering Works (SEW) requirements of the licence.

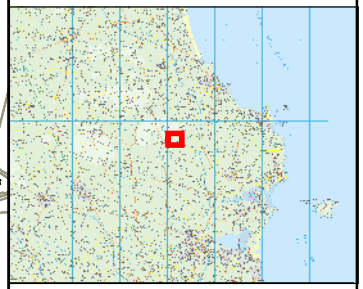
It is important to note that the converse scenario will not apply, and no inert cells will be converted to non-hazardous cells. This is to ensure groundwater protection of the Loughshinny Formation and only inert waste will be landfilled in this area.

Inert cells will be subject to the same liner, capping and construction requirements as for the current operation.



Legend

- Waste Licence Boundary
- Proposed Planning Boundary
- Existing Cell Boundaries (Indicative)
- Proposed Non-Hazardous Waste Cell Boundaries (Indicative)
- Proposed Inert Cells Boundaries (Indicative)



Client

Integrated Materials Solutions (IMS) Limited Partnership

IMS Hollywood 2022 Update

Title

Figure 2-2: Cell layout for the Proposed Development

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Issue Details

File Identifier: MDR1492A-RPS-00-XX-DR-Z-AG-0012		
Status: S0	**Rev:** P01	**Model File Identifier:**
Drawn: MV		**Date:** 22/09/2022
Checked: SA		**Scale:** 1:6,000 @A4
Approved: PC		**Projection:** ITM

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2.5.4 Non-Hazardous Waste Cells

The Landfill Directive simply defines non-hazardous waste as *waste which is not covered by paragraph (c)*, and paragraph (c) defines hazardous waste as any waste which is covered by Article 1(4) of Council Directive 91/689/EEC of 12 December 1991 on hazardous waste. It is proposed that the non-biodegradable non-hazardous waste streams are to be landfilled at the site at a series of engineered cells (Cells 9 to 13).

Phasing of these cells will be numerically with Cell 9 filled first and Cell 13 filled last as per the indicative phasing. This phasing is proposed to allow for the delivery of either of the following project completion stages:

- The planned demolition of the processing yard before infilling Cell 13 at the end of the project lifetime prior to restoration; or
- The retention of the processing yard and access road and the cessation of waste infilling once Cell 12 has been fully capped.

Annex I of the Landfill Directive requires that for non-hazardous waste cells, the landfill base and sides shall consist of a mineral layer which satisfies the following permeability and thickness requirements:

- $K \leq 1.0 \times 10^{-9}$m/s; and
- Thickness ≥ 1m,

In addition, the Directive requires the installation of a liner and drainage layer on all non-hazardous cells. The proposed engineered liner for the non-hazardous cells at the Hollywood site will consist of a composite clay and geo-membrane liner installed on the base and side walls which complies with the following EPA requirements:

- A minimum 0.5m thick leachate collection layer having a minimum hydraulic conductivity of 1×10^{-3} m/s;
- The upper component of the composite liner must consist of a flexible membrane liner. At minimum a 2mm HDPE or equivalent flexible membrane liner should be used; and
- The lower component of the composite liner must consist of a 1m layer of compacted soil with a hydraulic conductivity of less than or equal to 1×10^{-9} m/s constructed in a series of compacted lifts no thicker than 250mm when compacted or a 0.5m artificial layer of enhanced soil or similar giving equivalent protection to the foregoing also constructed in a series of compacted lifts no thicker than 250mm when compacted.

Figure 2-3 shows the typical arrangement for a basal liner for the proposed non-hazardous cells.

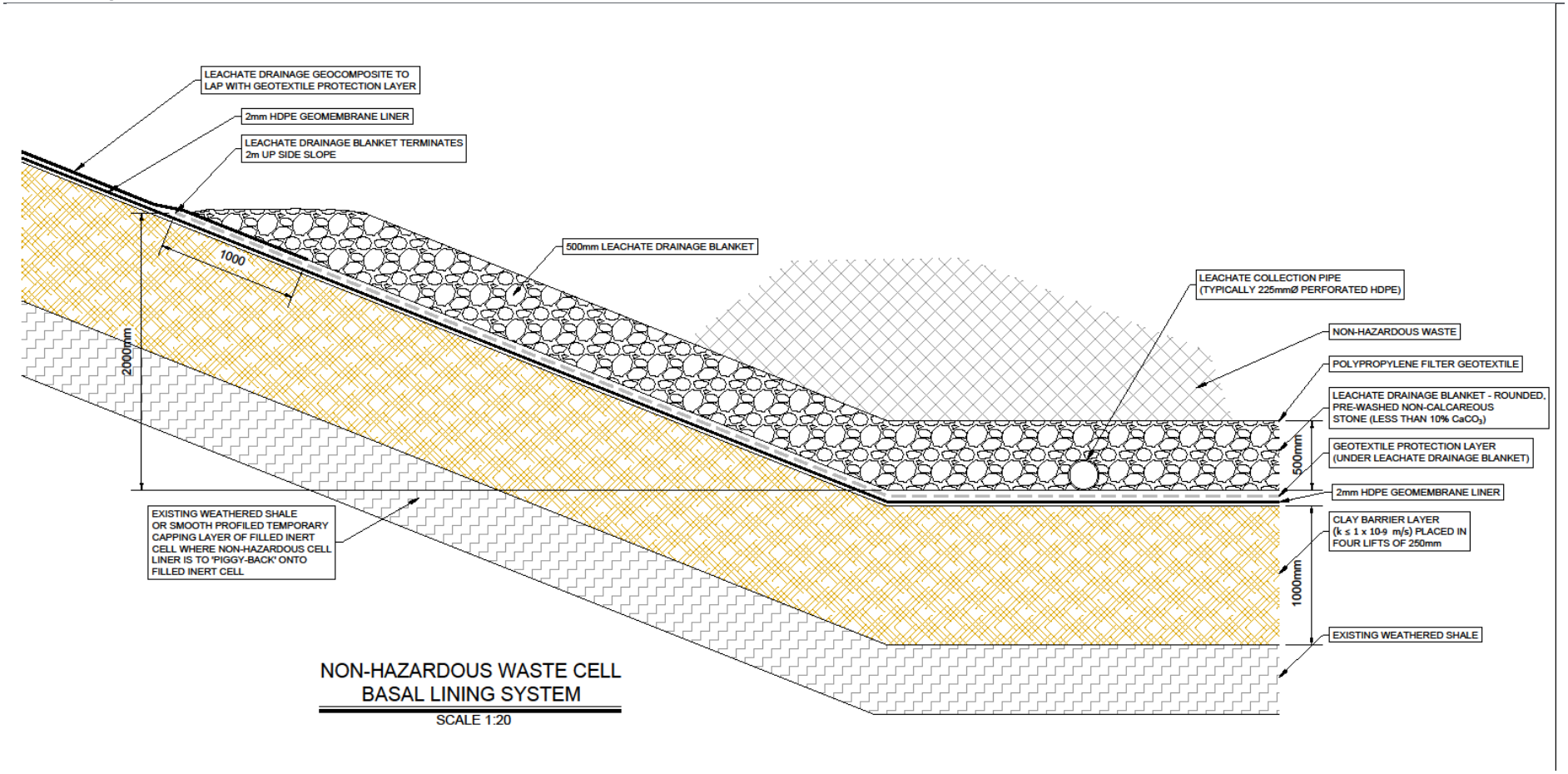


Figure 2-3 Basal Liner details for Non-hazardous Cells

2.5.5 Incinerator Bottom Ash (IBA) Maturation

One of the non-hazardous waste streams proposed for landfilling (incinerator bottom ash or IBA) will require a level of treatment prior to the infilling of this material into the proposed cells. Bottom ash is generated when the non-combustible fraction of municipal solid waste charged to the furnace in waste to energy plants forms a residue (ash). There are two municipal waste to energy plants operating within the State (Poolbeg and Carranstown) with further recommended in national policy. Each of these plants generate IBA at a rate of circa 200-250kg of IBA per tonne of waste combusted.

IBA from municipal solid waste combustion typically contains circa 10-12% ferrous metals and 2-5% non-ferrous metals (predominately aluminium but also copper, lead and zinc). The Best Available Techniques (BAT) Reference Document for Waste Incineration (December 2018) presents the typical chemical composition of IBA from the incineration of MSW and this detail is presented in **Table 2-3**. The data shows that IBA is predominately made up of general elements such as iron, silica, calcium and aluminium dusts with trace levels of heavy metals.

Table 2-3 Chemical composition of IBA from the incineration of MSW (BAT Reference Document for Waste Incineration)

Parameter	Average Level
Chromium (ppm)	648
Nickel (ppm)	215
Copper (ppm)	2,151
Zinc (ppm)	2,383
Lead (ppm)	1,655
Al_2O_3 (%)	8.5
SiO_2 (%)	49.2
Fe_2O_3 (%)	12.0
CaO (%)	15.3

IBA contains total concentrations of elements which are a ‘high level of concern’ based on EU REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) hazard classification. The selection of elements found in MSW which are considered as High Level of Concern are set out in **Table 2-4**. This data has been collated from the EPA research paper, ‘Waste Incinerator Bottom Ash in a Circular Economy’ (EPA, 2022).

Table 2-4 Selection of element found in MSW IBA which are considered as High Level of Concern

Element	Origin in MSW
Arsenic (As)	Used in electronics and glass, wood preservative. Biocide in plastics.
Barium (Ba)	Antioxidant, colourant, filler, heat and UV stabiliser in plastics.
Bromine (Br)	Major constituent of flame retardants in plastics, foams and textiles.
Cadmium (Cd)	Heat stabiliser, antioxidant and pigment in plastics. Used in metal plating and batteries.
Cobalt (Co)	Catalyst and pigment in plastics. Widely used in magnets and metal alloys.
Chloride (Cl^-)	Plasticiser, heat stabiliser, colourant, antioxidant and catalyst in plastics. Major constituent of polyvinyl chloride (PVC). Wood preservative.
Chromium (Cr)	Catalyst and pigment in plastics. Used in metal plating.
Copper (Cu)	Biocide and pigment in plastics. Present as wiring in most electrical goods.
Lead (Pb)	Colourant, antioxidant, UV and heat stabiliser in plastics. Present in batteries, metal goods, glass, electronics.

Element	Origin in MSW
Mercury (Hg)	Catalyst, colourant, cross-linking agent, filler and biocide in plastics.
Molybdenum (Mo)	Catalyst, cross-linking agent and flame retardant in plastics.
Nickel (Ni)	Catalyst and biocide in plastics.
Antimony (Sb)	Main use is as a flame retardant in plastic, Also plastic catalyst, antioxidant and pigment.
Sulphate (SO_4^{2-})	Filler, colourant, heat and UV stabiliser in plastics.
Tin (Sn)	Biocide and antioxidant in plastics. Used as flame retardant, and in metal plate, glass, ceramics.
Vandium (V)	Antioxidant in plastic. Also, a lubricant in plastic manufacture. Level of concern = vanadium oxide.
Zinc (Zn)	Multiple uses as plastics additive: filler, heat stabiliser, flame retardant, slip agent, pigment

In addition, a number of organic chemical groups are present in bottom ash and are considered as hazardous. These are commonly known as Persistent Organic Pollutants (POPs) and micro plastics.[2]

IBA may be subject to numerous treatment techniques from metal recovery to ageing of the IBA. The proposed development is to age the IBA in a mobile maturation facility consisting of a canopy, impermeable base and suitable runoff containment system as per the example in **Figure 2-4**. This enclosure will be located within the void space designated to accommodate the non-hazardous cells for ease of infilling this waste when matured.

The maturation process is employed to stabilise the mineral fraction by uptake of atmospheric CO_2 (carbonation), draining of excess water and oxidation. The purpose of the maturation is to reduce any remaining reactivity of the IBA, to improve the technical properties and to reduce the leachability of this stream. The process of maturation simply allows the IBA to sit in stockpiles for several weeks with some ongoing management (turning, wetting, etc.) prior to landfilling.

Figure 2-4 Example of the mobile enclosure for IBA maturation

[2] [2] Waste Incinerator Bottom Ash in a Circular Economy, Research Report (EPA, 2022)

In addition, maturation mitigates the release of hydrogen gas from IBA. The high levels of aluminium in the IBA may react with calcium hydroxide ($Ca(OH)_2$) and water to form aluminium hydroxide ($Al(OH)_3$) and hydrogen gas (H_2). Hydrogen gas is explosive, and its uncontrolled release can cause engineering difficulties such as swelling of the material post infilling impacting the liner and or cap. Hence, there is a need for any hydrogen gas to be liberated by maturation prior to landfilling.

The proposed maturation and infilling of IBA at the site will be in line with the following procedure:

- Transport from the source waste to energy facilities by road by means of 20 tonne HGVs with all trailers suitably covered. All transport will be undertaken using permitted hauliers with the appropriate EWC codes. The covering of trucks will be mandatory to ensure no fugitive emissions along the haul routes;
- Once through the site weighbridge, the IBA will be temporarily stored in a series of maturation stockpiles laid out within the storage facility as required;
- The stockpiles may be wetted, if required, using a sprinkler or hose system in order to prevent dust formation and emissions and to favour the leaching of salts and carbonation if the IBA is not sufficiently wet;
- Any drained water from this process will be collected and stored in the leachate tanks prior to being tankered to a suitably licenced wastewater treatment plant under agreement with Irish Water. Alternatively, the collected water may be re-used to humidify the stockpiles if the leachate quality is suitable;
- The stockpiles may be turned regularly to ensure the homogeneity of the processes that occur during the ageing process and to reduce the residence time. The typical residence time within the stockpiles will be circa 6-10 weeks;
- Following maturation, the IBA will be brought to the active non-hazardous cell (Cells 9 to 13) where the trailers will be tipped at designated areas prior to compaction by mobile plant. As required, water misting sprays and bowsers will be employed to mitigate dust generation; and
- All active faces will be maintained to the smallest possible areas and will be subjected to daily cover to create a barrier to mitigate potential for generation of dust.

Commission Implementing Decision the (EU) 2019/2010 of the 12th of November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration, states that best practice for IBA is to engage in some level of treatment and BAT 36e is generally applicable as follows:

> *In order to increase resource efficiency for the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below based on a risk assessment depending on the hazardous properties of the slags and bottom ashes.*
>
> *(e) Ageing*
>
> *The ageing process stabilises the mineral fraction of the bottom ashes by uptake of atmospheric CO_2 (carbonation), draining of excess water and oxidation. Bottom ashes, after the recovery of metals, are stored in the open air or in covered buildings for several weeks, generally on an impermeable floor allowing for drainage and run-off water to be collected for treatment. The stockpiles may be wetted to optimise the moisture content to favour the leaching of salts and the carbonation process. The wetting of bottom ashes also helps prevent dust emissions.*

The proposed IBA maturation process is now mandatory for consideration as best practice for the proposed development and will be incorporated into the IE Licence application.

Note that BAT 36d includes for the recovery of ferrous and non-ferrous metals through magnetic separation for ferrous metals, eddy current separation for non-ferrous metals and induction all-metal separation. This metal recovery of the IBA may be undertaken on site in a future date under agreement with the EPA.

2.5.6 Materials Balance

While there is a significant void space on the site from the former quarrying operation, there are also numerous stockpiles of glacial till (blue clay that may be used as liner for inert cells), other topsoils/subsoils and a range of other aggregate materials. Annual topographical surveys are undertaken to monitor and report on the remaining void space in the Annual Environmental Report (AER) to the EPA.

However, the existing topography and site layout requires some modification to accommodate cell design and construction. This may include movement of material, grading of side slopes, reprofiling, etc. across the site to allow for the installation of the cell layouts. To this end, a geotechnical assessment of the existing materials on site has been undertaken to assess the material balance for construction of cells and identify the levels of material importation and excess associated with the proposed development. This material balance is shown in **Table 2-5** with the breakdown for the inert and non-hazardous elements clearly presented. Note that a negative value illustrates a material deficit while a positive value illustrates a material surplus.

Approximately 830,000m^3 of material will need to be cut from in order to shape Cells 9-13 for in the non-hazardous cells. In addition, a further 97,000m^3 will be cut from the inert Cells 6-8 footprint to maximise the void and regularise the slopes on which the liner will be placed. At present there is approximately 65,000m^3 of clay material already available on site.

In order to fill the cells to shape for basal liner and provide the capping requirements for the non-hazardous cells approximately 400,000m^3 of material is required. Similarly, the shape the base and cap the inert cells approximately 290,000m^3 of material is required.

In line with the principles of sustainability, it is proposed to utilise the site won existing and cut material from the construction of cells as the fill material required for lining and capping. The material has been tested and approved by the EPA as suitable for this purpose on site. The results of the balance indicate that the proposed cell construction and capping will result in a material surplus on site of the order of 299,420m^3 of material. This material may be used in landscaping on site, processed in the aggregate recovery plant or exported off site as engineering material for use other construction sites under agreement with the EPA.

Table 2-5 Materials Balance Estimates

Site Area	Material Requirements	Volume (m^3)
Inert Cells	Existing clay stockpile to north of site	65,000
	Filling of Cells 6-8 to 104.5	-153,209
	Cut to shape for basal liner	97,349
	Fill to shape for basal liner	-20,894
	Clay required for basal liner	-84,378
	Temporary Capping Layer (300mm)	-15,127
	Subsoil required for Capping (850mm)	-16,692
	Topsoil required for Capping (150mm)	-2,946
Non-Hazardous Cells	Cut to shape for basal liner	834,157
	Fill to shape for basal liner	-11,792
	Clay required for basal liner	-186,397
	Temporary Capping Layer (300mm)	-30,195
	Subsoil required for Capping (850mm)	-149,138
	Topsoil required for Capping (150mm)	-26,318
Surplus Material		**299,420**

2.5.7 Leachate Management System

Leachate produced in a landfill is a liquid which has percolated through the waste, picking up suspended and soluble materials that originate from, or are products of, the degradation of waste. The Landfill Directive requires the following appropriate measures to be undertaken at landfills with respect to leachate:

- Control water from precipitations entering into the landfill body;
- Prevent surface water and/or groundwater from entering into the landfilled waste;

- Collect contaminated water and leachate. If an assessment based on consideration of the location of the landfill and the waste to be accepted shows that the landfill poses no potential hazard to the environment, the competent authority may decide that this provision does not apply; and
- Treat contaminated water and leachate collected from the landfill to the appropriate standard required for their discharge.

It is noted that the Directive states that the above provisions may not apply to landfills for inert waste and hence do not apply to the current operations at the site. Notwithstanding this exemption, the current operations include an engineered landfill with a low permeability basal liner that collects leachate from the inert cells (Cells 1 to 6).

While the inert and non-hazardous wastes proposed for the development are non-biodegradable, all of these wastes have the potential to generate leachate. The levels of leachate generation depend on a number of factors including the effective rainfall, the size of the cell, the extent of capping and other factors such as the absorptive capacity of the waste.

Based on the cell layouts and the proposed phasing the levels of annual leachate projected for the site are presented in **Table 2-6** and **Figure 2-5**. These projections have been carried out in accordance with the Water Balance Calculation guidelines set out in the EPA Manual on Landfill Site Design as per the following:

$$Lo = [ER(A) + LW + IRCA + ER(I)] - [aW]$$

where:

- Lo = leachate produced (m^3);
- ER = effective rainfall (use actual rainfall (R) for active cells) (m);
- A = area of cell (m^2);
- LW = liquid waste (also includes excess water from sludges) (m^3);
- IRCA = infiltration through restored and capped areas (m);
- I = surface area of lagoons (m^2);
- a = absorptive capacity of waste (m^3/t); and
- W = weight of waste deposited (t/a).

The results are presented as the breakdown between inert and non-hazardous leachate as well as total leachate.

The projected levels vary annually depending on the nature of the works and the extent of capping. The maximum levels on inert waste leachate are generated in 2032/2033 with the maximum non-hazardous waste leachate generated later in 2045. The maximum total generated leachate is in 2033 at 37,240m^3.

It is noted that upon cessation of landfilling at the site after 25 years, the waste body will continue to generate low levels of leachate. This is projected to be circa 7,985m^3 per year. This ongoing leachate generation may reduce in quantity and/or levels of constituents will no longer pose a risk to the environment. Only at that point the licence surrender process may commence with the EPA who will be the regulator for any change in licence requirements.

Table 2-6 Projected Water Balance for Leachate Generation

Year	Inert Cells - Leachate Production (m^3)	Non-Hazardous Cells - Leachate Production (m^3)	Total Leachate Production (m^3)
2023	10,684	0	10,684
2024	6,934	0	6,934
2025	13,373	0	13,373
2026	14,514	0	14,514
2027	10,764	22,400	33,164
2028	7,014	18,650	25,664
2029	10,467	5,970	16,437

Year	Inert Cells - Leachate Production (m^3)	Non-Hazardous Cells - Leachate Production (m^3)	Total Leachate Production (m^3)
2030	10,047	20,343	30,390
2031	3,056	16,702	19,758
2032	15,543	12,952	28,495
2033	15,543	21,697	37,240
2034	804	14,002	14,806
2035	804	20,794	21,598
2036	804	29,312	30,116
2037	804	26,983	27,787
2038	804	26,917	27,721
2039	804	16,359	17,163
2040	804	8,338	9,142
2041	804	27,743	28,547
2042	804	33,842	34,646
2043	804	23,841	24,645
2044	804	28,395	29,199
2045	804	34,520	35,324
2046	804	27,020	27,824
2047	804	27,020	27,824
2048	804	23,270	24,074
2049	804	10,046	10,850
2050	804	10,297	11,101
2051	804	9,456	10,260
2052-2082	804	7,181	7,985

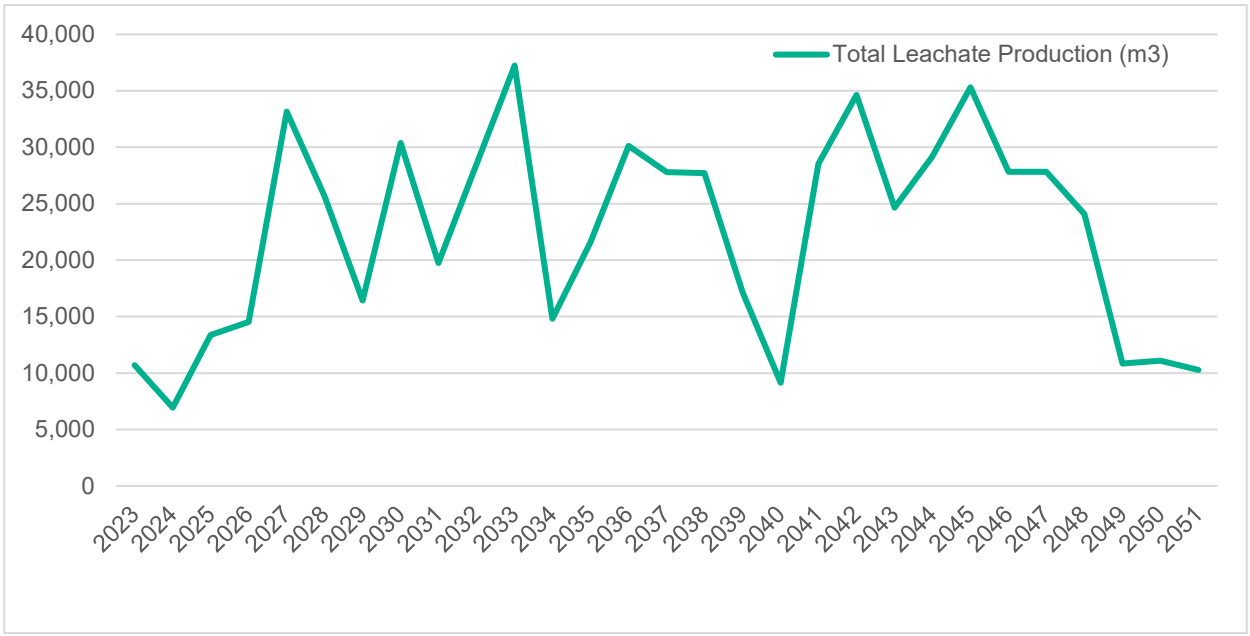


Figure 2-5 Estimated Leachate Generation

The leachate management on site will consist of the following requirements which are mandatory for a non-hazardous landfill cell:

- A drainage layer constructed of a 500mm leachate collection stone layer (non-calcareous, less than 10% $CaCO_3$) with a minimum hydraulic conductivity of $1x10^{-3}$ m/s;
- A network of perforated smooth bore leachate collection pipes (minimum diameter 300mm and 200mm HDPE) within the drainage blanket laid to a self-cleansing gradient to collect leachate and carry it to a sump or collection header pipe;
- A network of leachate monitoring points and inspection chambers; and
- A set of twin leachate collection and storage tanks where leachate will be stored temporarily prior to tankering off site.

Based on a maximum leachate generation rate of circa 102m^3 per day (based on a maximum 37,240m^3 in 2029), a total of seven days of storage capacity is required in accordance with the EPA Landfill Operation Manual. Based on a seven day capacity a minimum storage capacity of 714m^3 is required for the leachate holding tanks on the site.

In order to accommodate this volume, a set of twin 532m^3 tanks have been proposed for this purpose. These will be vertical cylindrical tanks of 12.8m diameter and 4.27m high. These tanks will be located in a fully bunded area surrounded by a 1m high concrete wall capable of containing 110% capacity of the largest tank (i.e. 532 x 110% = 585m^3). Overall, the footprint of the bunded area with the tanks amounts to circa 720m^2 and these tanks will be located on the east of the new access road adjacent to the wheel wash.

All leachate collected in sumps and chambers will be pumped to these holding tanks to maintain levels of leachate within the landfill cells. The leachate will be transferred from the holding tank to enclosed 23m^3 road tankers for transport to a suitably licensed wastewater treatment plant under agreement with Irish Water.

There are five large licensed (population equivalent or p.e. greater than 10,000) wastewater treatment plants in the GDA and these are listed in **Table 2-7**. In addition, Irish Water was granted permission in November 2019 by ABP (Case reference: PL06F.301908) for a new regional wastewater treatment facility at Clonshaugh which will have a capacity of 500,000 p.e. If granted, this plant will provide additional regional capacity at circa 20km from the Hollywood site. This new site has yet to apply for a WWDA from the EPA so is not included in **Table 2-7**.

Table 2-7 Licenced WWTP in the north Dublin Area

Registration Number	Agglomeration Name	Design Capacity (p.e.)
D0021-01	Malahide	20,000
D0023-01	Balbriggan	70,000
D0024-01	Swords	90,000
D0034-01	Ringsend	1,640,000
D0114-02	Portrane, Donabate, Rush, Lusk	65,000

IMS will engage with Irish Water to establish an agreement to accept the leachate volumes projected and one or more the licensed WWTP within the north Dublin area. The nearest plant to the site is the Balbriggan WWTP and the maximum daily leachate from the site (estimated 102m^3/day maximum) to the Balbriggan plant represents circa 1% of the current hydraulic load to that plant (8,951m^3/day on average reported in 2021, source: 2021 AER). Furthermore, the Balbriggan plant has a design capacity of 16,100m^3/day hydraulic load (dry weather flow) illustrating the headspace available at this plant and significant availability to treat the volumes from the proposed development.

The agreement with Irish Water will be a requirement of the IE Licence and will be subject to quality criteria for acceptance. In terms of quality, indicative leachate quality data has been collated for the various waste streams and this is presented in **Table 5-11**. This data has been collated from the existing inert cell monitoring data, laboratory data on these waste stream and other literature sources.

Table 2-8 Landfill Leachate Waste Stream Estimate Quality

Parameter	Unit	Inert Waste[1]	IBA	C&D Fines
pH	pH Units	8.93	12.27	
Ammoniacal Nitrogen	mg/lNH_4-N	6	-	-
Chloride	mg/l	269	382	47
Fluoride	mg/l	-	2	1
Bromide	mg/l	-	1	-
COD	mg/l	89	-	-
List I & II Substances	mg/l	-	-	-
Organic Carbon Dissolved	mg/l	32	-	88
TOC	%	-	5	1
Sodium	mg/l	235		-
Sulphate	mg/l	789	51	1,622
Aluminium	µg/l	-	18,878	-
Sulphur	µg/l	-	12,722	-
Arsenic	µg/l	-	10	8.5
Barium	µg/l	-	3,556	77
Cadmium	µg/l	-	1	ND
Calcium	µg/l	-	571,111	-
Chromium	µg/l	-	7	2.6
Cobalt	µg/l	-	5	-
Copper	µg/l	-	473	ND
Iron	µg/l	-	10	-
Lead	µg/l	-	5,432	ND
Manganese	µg/l	-	10	-
Molybdenum	µg/l	-	43	12
Nickel	µg/l	-	10	13
Potassium	µg/l	47,000	72,345	-
Thallium	µg/l	-	20	-
Vanadium	µg/l	-	10	-
Zinc	µg/l	-	1,083	46
Antimony	µg/l	-	3	-
Selenium	µg/l	-	1	-
Tin	µg/l	-	2	-

Notes: 1. From existing leachate analysis of the inert cells 1 to 6 on the Hollywood site

While in the short term leachate tankering is proposed, the proposed development also includes provision for potential on-site leachate treatment infrastructure to be developed once more detailed information on leachate volumes and concentrations are available. Any development of this on-site treatment infrastructure will be subject to the SEW process approval with the EPA.

The system will include the following infrastructure in addition to the two holding tanks noted earlier:

- A prefilter to trap particulate matter from entering the treatment system;

- One or more Reverse Osmosis (RO) modular treatment systems – these RO systems will be designed to target the key contaminants listed in **Table 2-8** and separate these contaminants from the leachate by using pressure to push the leachate through a specialized membrane;
- The high concentration leachate generated through the RO systems will then be stored in an assigned holding tank to await removal off site by tanker to an Irish Water WWTP – this option increases the concentration of the leachate but reduces the volume to be treated off site;
- The remaining hydraulic load has a low contaminant concentration and may be recirculated through the landfill, used for on-site processes (such as aggregate recovery) or may be diverted to a secondary treatment system such as an integrated constructed wetland (ICW). If required, this ICW would be developed as part of the attenuation pond to the north of the site under agreement with the EPA.
- The treated water would then discharge to the Ballough Stream at greenfield run off rates and monitored through the licence monitoring regime. The EPA will require any discharge to the Ballough Stream to comply with the requirements of the Surface Waters Regulations (S.I. No. 272 of 2009) as well as the relevant Best Available Technique (BAT) reference document or conclusions for the sector.

This on-site treatment system will be located to the south of the site directly adjacent to the leachate holding tanks.

2.5.8 Stormwater Management System for the Landfill

Currently there are two silt settlement ponds located along the northern part of the site. These ponds regulate the discharge of surface water runoff from the landfill to the stream running along the northern boundary of the site. For cell development, any water ponding at the base of the quarry cell may be pumped to the two settlement ponds, left to settle and allowed to discharge to the stream at Licence Emission Point SWD3 in line with the Waste Licence requirements. The lands outside the quarry void drains naturally to the stream at the northeast via existing open drains along the boundaries.

In the short term, these drains will be diverted to the existing settlement ponds to the north of the site which will provide attenuation and treatment (settlement) prior to monitoring discharge (Licence Emission Point SWD3) to the stream that bounds the north of the site.

The proposed surface water drainage system is designed to collect and transport run off from the landfill and surrounding area to drains at the periphery of the landfill for attenuation and discharge. The collection system will be a network of perimeter drains at the boundary of the landfill footprint as shown in **Figure 2-2**. The drains will be designed to minimise run off entering the waste body for active cells and capture the runoff from the drainage layers of the capped cells.

The surface water design has been carried out in accordance with requirements of BS 752; the GDSDS and the '*Recommendations for Site Development Works for Housing Areas*' – published by the Department of the Environment. It is proposed to re-use water in the surface water attenuation pond for a number of purposes, namely:

- Supply of water for waste management processes (such as aggregate processing or IBA maturation);
- Supply of water for firefighting requirements; and
- Supply of water for operation and maintenance requirements (such as dust minimisation).

Implementing the design standards of the GDSDS, the surface water drainage system takes into account the recommendations of the GDSDS and utilises SuDs (sustainable urban drainage) devices where appropriate. The principle behind SuDs is to reduce the quantity of discharge from developments to predevelopment flows and also to improve the quality of runoff from proposed developments. In this case, it is proposed to decrease the quantity of runoff to greenfield rates by providing a surface water attenuation pond and utilising some of the stored water in IBA maturation, dust suppression and general onsite operations.

Applying this SuDs in conjunction with site specific rainfall data, an allowable outflow from the landfill footprint of 5.24 l/s/ha was calculated. It is proposed to limit outflow from the site through the attenuation pond, controlled by way of actuated valves such as a hydro brake.

Bearing in mind the requirements of the GDSDS and in order to avoid flooding of the site, a storage volume for a 1 in a 100-year storm event was used with provision included for a climate change factor of 20%. This results in a storage requirement of 15,000m^3 including a climate change factor of 20% for the site. This

storage for a 1 in 100 year will be achieved through provision of 1m of freeboard in the pond. The attenuation pond will be located in the north-eastern section of the site as shown in **Figure 2-2**.

Surface water runoff will be discharged through a perforated pipe laid in crushed stone to a water course. The crushed stone allows infiltration into the ground but also provides the required attenuation for the worst-case scenario, i.e. assuming that there is no infiltration. This runoff will pass through oil interceptors, as required, prior to reaching the surface water attenuation pond.

The drainage pipe network has been designed to incorporate gravity flow where feasible. The majority of the surface water flow comes from the landfill cover. This runoff will be collected by the proposed drainage pipes and gravitate to the surface water attenuation pond.

In short, the surface water discharge system was designed as follows:

- The surface water storage pond will cater for the 1:100 year storm event;
- The surface water storage pond will have a minimum free board of 1m; and
- Outflow will be at greenfield runoff rates (5.24 l/s/ha).

The quality of the runoff from the proposed development will be improved by the following measures:

- Runoff will pass through oil interceptor prior to discharge to the stream. These oil interceptors will retain any hydrocarbons in the runoff and thereby improve the quality of the runoff; and
- Surface water storage ponds will also act as settlement ponds to reduce the levels of suspended solids in the surface water.

This new infrastructure will result in a new discharge point in the IE licence. This discharge will be from the attenuation pond will be at greenfield run off rates through the use of flow control unit via a monitoring chamber to the stream that bounds the site to the north. This new emission point will be referenced as SWD8 within this NIS and the licence application to the EPA. All discharges from this new emission point will be required to comply with the limits set out in the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No 272 of 2009).

2.5.9 Landfill Gas Management System

Landfill gas (LFG) is generated from the degradation of organic and biodegradable wastes. As the proposed development consists only of non-biodegradable wastes, there is no potential for LFG generation at the Hollywood site. As such, there is no proposed LFG management infrastructure included in the proposed development.

2.5.10 Other Infrastructure

It is proposed to repurpose the existing storage building on the western perimeter of the site (adjacent to the existing site entrance) as a laboratory to facilitate on site testing of materials (wastes and secondary aggregates). The external bulk and form of the building will remain unchanged with only internal works proposed to fit out the structure with standard laboratory infrastructure such as benches, sinks, offices and specialist equipment.

The proposal also includes for the relocation of the existing artificial peregrine falcon nesting box installed on the cliff face in 2020 as part of the Peregrine Falcon Management Plan to a proposed elevated pole-mounted location to the south west of the site. This nest box will contain a sheltered nesting ledge and will be monitored regularly as per the mitigation.

2.6 Construction Phase

It is important to note that the proposed development relates to the development of landfill cells and associated infrastructure (e.g. drainage and leachate). These cells will be developed as required through the lifetime of the project. As noted earlier, the development of all cells will be subject to the standard licence requirement for Specified Engineering Works (SEW). This SEW protocol is required for all cell development and potentially other development on site (leachate management, surface water management, etc.) at the discretion of the EPA. For clarity, these cell developments are considered as standard landfill operations within this application and do not constitute a construction phase or construction ‘works’ as typically referred

to within planning. Cell development and construction constitute the operation phase of this development and is not included in the following paragraphs.

However, there are a number of new structures and features that will be constructed at the site during the construction phase/works and these include the following:

- Leachate holding tanks, bund and treatment area; and
- Surface water attenuation pond.

The construction phase of the proposed development will be undertaken simultaneously with the ongoing infilling operation at the site. Both phases will run concurrently to allow for the complete restoration in the 25-year timeframe sought under this application. The construction phase will proceed as per standard construction phasing including the following elements:

- Detailed design of the infrastructure based on the drawings presented in this application by a suitably qualified design team;
- Site investigation works including any additional boreholes or trial pits required to inform the design phase;
- Site preparation works including a temporary works compound to be established in the vicinity of the proposed new infrastructure area, removed from any watercourse or drainage ditch;
- Site clearance will be undertaken through the removal of topsoil and overburden in the area of the proposed works. Excavated material (subsoil / topsoil) will be retained on site and replaced during reinstatement. No material will be taken offsite and all material will be retained on site to minimise construction traffic; and
- Any utilities required (e.g. SCADA systems) will be installed prior to the main construction works being implemented on site.

An estimate of 12 to 18 months is proposed for the construction phase.

Construction traffic will be minimised through the retention of all soil and stone waste on site (as authorised under the licence) and the use of on-site quarried aggregates for sub-grade and base material. Construction traffic will be limited to the importation of the specialist equipment for the pond, concrete and ancillary equipment as well as construction staff.

All construction works will be required to comply with the mitigation and monitoring stipulated in the EIAR accompanying this application (RPS, 2022), mitigation stipulated in the NIS and any condition imposed in the IE licence. All of these mitigation and monitoring requirements will be incorporated into the site EMS. All construction works undertaken on the site are regulated by IMS through implementation of all works within the site's EMS procedures for surface water, spills, dust, noise, traffic, complaints and incident management.

2.7 Project Phasing

In relation to general site infrastructure other than landfill cell development, it is proposed that all such infrastructure will be constructed and operational within 18 months of grant of permission and the IE Licence from the EPA. The construction phase for new infrastructure will run concurrent with the ongoing operational phase as outlined below for landfilling operations.

Since the infilling works at the site commenced on grant of the first Waste Licence in 2002, the cells have been developed and infilled in a phased basis. To date Cells 1, 2, 3 (and Cell 3 extension), 4 and Cell 5 have been fully infilled and capped. Restoration of the lands is partially complete and some of this area is currently being used for agricultural pasture.

The indicative phasing of the cell development is outlined in **Table 2-10** for the inert cells – Cells 6, 7 and 8. The indicative phasing illustrates the anticipated year of cell construction (in yellow), the period of infilling (in green) and the timeframe for final capping (in blue). Note that cell construction on Cell 6 is complete under the current planning permission and Waste Licence and infilling in this cell commenced in 2020 under agreement with the EPA.

It is noted that under the indicative phasing, Cells 6, 7 and 8 will be fully infilled and capped within the first ten years of operation. This is anticipated because of market demand and the need to complete these cells to allow for the construction of the adjacent non-hazardous cells (Cells 12 and 13).

Assuming a year of commencement of 2026, the indicative phasing of the non-hazardous cell development is outlined in **Table 2-10** (for the period 2026 to 2038) and **Table 2-11** (for the period 2038 to 2051). Note that filling rates are dependent on market demand and this phasing is indicative and subject to change.

The void space proposed for non-hazardous cells is larger than for the inert cells and hence the timeframe to complete infilling in longer with a projected completion at circa the 25-year timeframe of the proposed development. The final cell to be completed will be Cell 13 which is the largest cell as this cell will sit on the side slopes of the adjacent cells and thus requires a longer infilling period.

It should be noted that the permitted hardstand is to be located in the area shown in **Figure 2-2** and this location is broadly within the footprint of Cell 13. It is proposed that the hardstand will be constructed in the proposed location under the existing planning permission.

At circa 2043, Cells 6 to 12 will have been fully infilled (and in most cases restored). As noted earlier, this phasing is proposed to allow for the delivery of either of the following project completion stages:

- The planned demolition of the yard and infrastructure before infilling Cell 13 at the end of the project lifetime prior to restoration; or
- The retention of the yard and access road and the cessation of waste infilling once Cell 12 has been fully capped.

In the event that Cell 13 is to be infilled the following works will be undertaken:

- Any structures will be fully decommissioned with the removal of all plant items, waste material, tank contents, fuels, or any other substance or object that may pose a risk to the environment;
- Any structures will undergo a planned deconstruction and any material may be reused elsewhere on other sites or disposed of or recovered as waste at a suitably licensed facility;
- The concrete base will be either used as a base liner for the cell (under agreement with the EPA under the IE Licence and through the SEW) or demolished with the material crushed to a suitable grade and used as infill within the cell; and
- All of the above will be regulated by the EPA as a Closure, Restoration & Aftercare Management Plan (CRAMP) which is a requirement of the IE Licence.

Once the structures and hardstand are fully removed from the area, the construction of Cell 13 can be completed and the infilling of this cell will continue through the projected period of 2044 and 2049 prior to the restoration phase. An indicative phasing plan is shown in **Figure 2-6.**

In the event that Cell 13 is not infilled all side slopes of other cells will be maintained and managed as appropriate under agreement with the EPA through the CRAMP process.

Table 2-9 Indicative Filling Plan for Inert Cells (in tonnes)

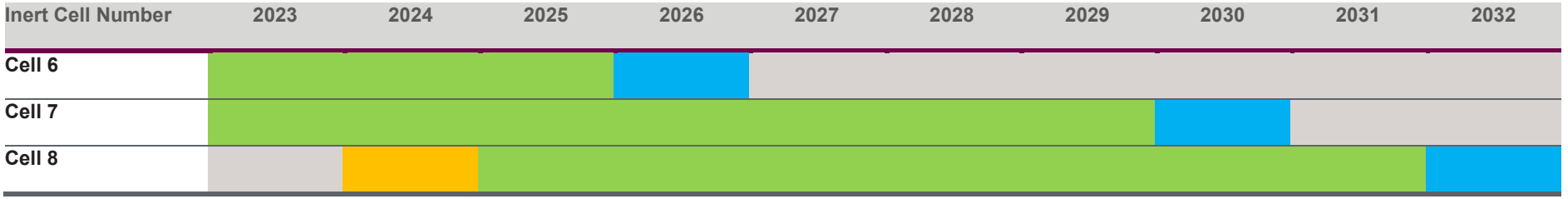


Table 2-10 Indicative Filling Plan for Non-Hazardous Cells (in tonnes) – 2026 to 2038

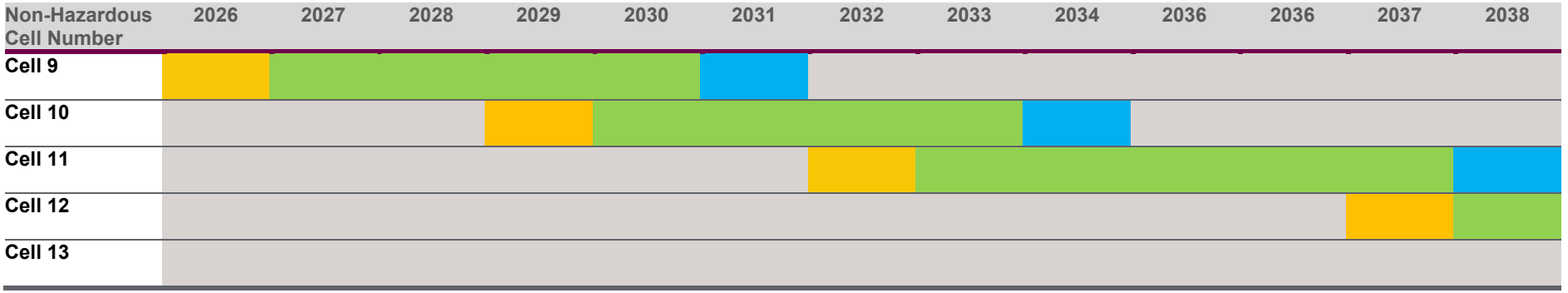
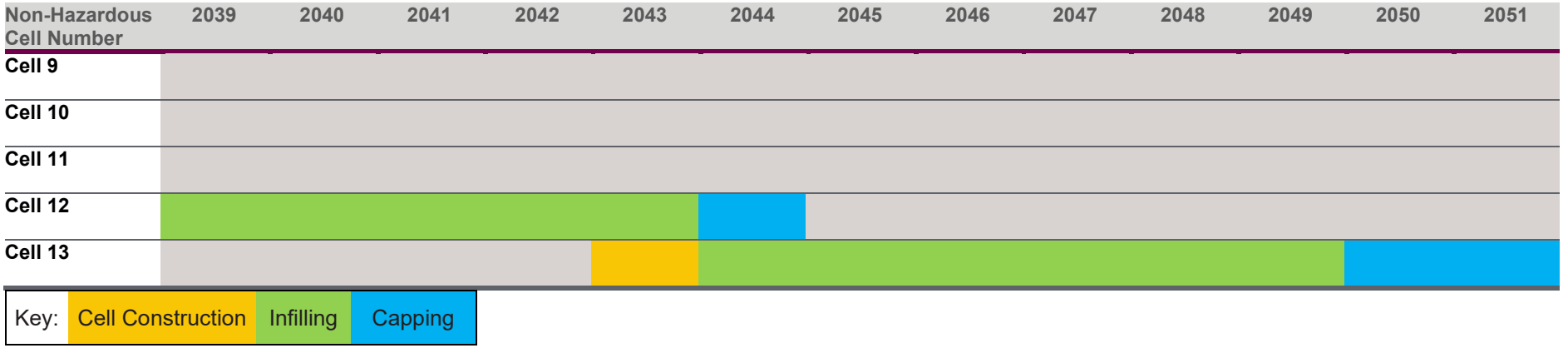
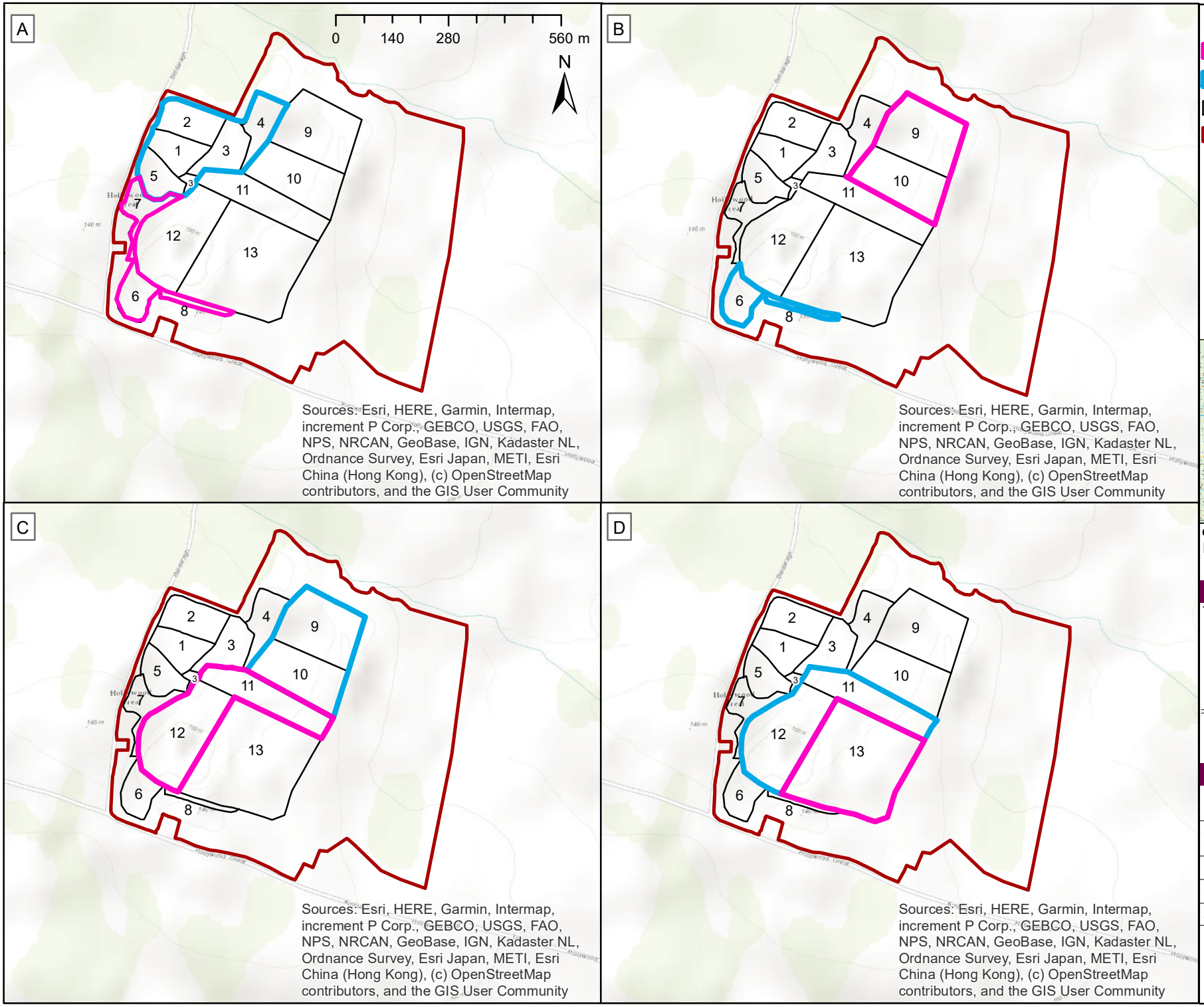


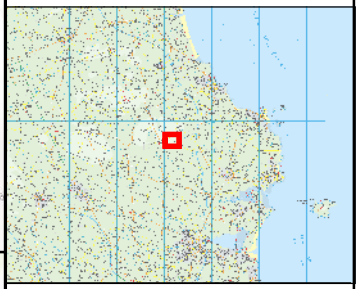
Table 2-11 Indicative Filling Plan for Non-Hazardous Cells (in tonnes) – 2039 to 2051





Legend

- Infilled
- Restored
- Cells
- Site Boundary



Client

Integrated Materials Solutions (IMS) Limited Partnership

IMS Hollywood 2022 Update

Title

Figure 2-6
Indicative Project Phasing

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Issue Details

File Identifier: MDR1492A-RPS-00-XX-DR-Z-AG-0010		
Status: S0	**Rev:** P01	**Model File Identifier:**
Drawn: MV		**Date:** 22/09/2022
Checked: SA		**Scale:** 1:12,500 @A4
Approved: PC		**Projection:** ITM

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2.8 Site Restoration

2.8.1 General Site Restoration

The overall purpose of the proposed development is to allow for the infill of the former quarry to facilitate the restoration of the site to natural levels. After completion of the infilling the site will be capped and landscaped to allow for the site to be restored for future use. This restoration will be sympathetic to the surrounding land uses and the designation of the area as 'High Amenity' and the protected views along the local road network.

The following conditions are contained within the current Waste Licence and IMS will be obliged to comply with a set of similar conditions in relation to the ultimate restoration of the site within the revised IE Licence:

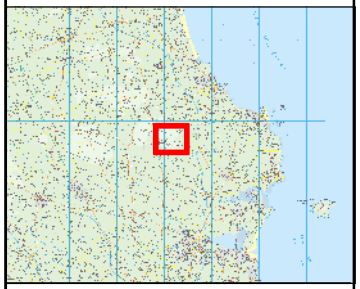
> *10.1 The final profile of the facility shall tie in the facility to the surrounding land levels and shall be as shown on Figure 4.2 Phasing of Restoration of the Environmental Impact Statement (March 1999). The final height shall not exceed 149.0 mAOD Malin.*
>
> *10.2 The facility shall be restored as described in Attachment G.1 Restoration Scheme of the application for W0129-01 and Section 4.7 Landscaping Plan of the Environmental Impact Statement (March 1999) subject to the following:*
>
> *10.2.1 The final capping shall consist of the following:*
>
> *(i) Top soil (150-300mm); and,*
>
> *(ii) Subsoils, such that total thickness of top soil and subsoils is at least 1m.*
>
> *10.3 The licensee shall restore the facility on a phased basis as per Figure 4.2 Phasing of Restoration of the Environmental Impact Statement (March 1999). Unless otherwise agreed, filled cells shall be permanently capped within 24 months of the cells having been filled to the required level.*

It should be noted that Figure 4.2 of the 1999 EIS was superseded in the 2007 planning application and EIS, however, the associated licence condition was not updated accordingly. This application proposes a revised set of restoration contours for the proposed development and these are shown in **Figure 2-7**. These revised contours are required to ensure that the final infilling restores the land to a smooth provide with the existing levels to the east and west of the site. It should be noted that while the contours vary, the final height remains at 149.0mAOD to mitigate any potential landscape impact.

Furthermore, as the licensee IMS is obliged to prepare and maintain a fully detailed and costed plan for the closure, restoration and aftercare of the site or part thereof, including details of the final profile. This closure, restoration and aftercare will provide details for the phased restoration of cells, demolition of existing structures and the broader procedures for leaving a site in a 'satisfactory state' in advance of a licence surrender.

This application seeks to further refine the final contour levels and to this end a final contour layout of the fully restored site is presented in **Figure 2-7**.

It is also noted that upon cessation of landfilling at the site the waste body will continue to generate low levels of leachate at a rate of circa 7,985m^3 per year. The management and transport/disposal of this leachate volume will still be required during the restoration and aftercare phases of the development and the liability for the cost of same will be covered by IMS through the financial provision requirements that will be imposed by the EPA through the IE Licence.



Client
Integrated Materials Solutions (IMS) Limited Partnership

IMS Hollywood 2022 Update

Title

Figure 2-7: Final Restoration Levels

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Issue Details

File Identifier:
MDR1492A-RPS-00-XX-DR-Z-AG-0011

Status:	Rev:	Model File Identifier:
S0	P01	

Drawn: MV	**Date:** 21/09/2022
Checked: SA	**Scale:** N.T.S. @A4
Approved: PC	**Projection:** ITM

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2.8.2 Peregrine Habitat Management

Peregrine falcon has a historic presence on site and was recorded in bird surveys undertaken at the site in 2018 to 2020. The peregrine is listed in Annex I of the Birds Directive (Directive 79/409/EEC, amended to Directive 2009/147/EC) and is protected by the Wildlife Act (1976, amended in 2000). Both legal implements bind the State to maintain and create habitats for this species along with providing the species with legal protection against disturbance, especially during breeding season.

In response to a Requested for Further Information (Reg. Ref. F19A/0077), a Peregrine Falcon Management Plan was prepared for the site and is included in **Appendix F**. This plan is currently being implemented on site and will continue to operate through the proposed development. However, the most recent surveys as part of this monitoring did not record any peregrines onsite.

In 2019, the scraped depression used by peregrines to nest was identified as located in a zone at the southwestern corner of the site within one of the vertical cliffs in this area. The project ornithologists recommended the installation and development of an alternate suitable nesting site at higher elevations on this northeast facing cliff face. This alternate nesting site was installed in February 2020 in advance of the breeding season and a photo showing the box is presented in **Figure 2-8**. During the site visit in 2022, this nest was found to be unsuitable due to the ongoing infilling operations, see **Figure 2-9**, and is proposed to be moved as part of this application.

The artificial nests and other management measures are subject to annual breeding surveys and reporting which are undertaken by a suitably qualified ornithologist. In addition, there will be ongoing consultation with the NPWS and the local biodiversity officer.

Figure 2-8 View of peregrine falcon artificial next box installed in February 2020, prior to infilling

Figure 2-9 Imagine from August 2022 of artificial next box for the peregrine falcon, post infilling (as approved by Reg. Ref. F19A/0077) approx. 3.5m from ground