C578-BPA-ESSD

Conceptual Site Model & Environmental Setting Site Design (ESSD)

Land off Woodland View, Wroughton, Swindon, SN4 9AE

Issue 2: 29/04/2026 **(First Issue: 21/01/2026)**

Updates made after EA Validation comments dated 15/04/2026

Chapter Updated	Updates
Site Context	More detailed reference to sensitive receptors within 500m of site
Phasing of Works	Text unaltered but moved to standalone chapter earlier in report for better clarity
Sources – Proposed Activity	Additional content added on waste acceptance criteria, inspection & testing, and associated information
Outline Engineering Plan	Additional content added on separation of recovered waste from historic landfill.
Stability Risk Assessment	Additional content added on monitoring.
Pathway & Receptor	Additional content added relating to leachate generation and management, reed bed design capacity and water balance changes.
Hydrogeology	Groundwater flow direction and levels confirmed with associated plan identified
Perched Water	Additional commentary on Soilfix works with respect to ground layer thicknesses, excavation extents and leachate management
Receptor – Amenity Nuisance	Reference to requirement for standalone DEMP

Updated text has been highlighted in green for expedience of review

Contents

Structure and purpose of this report

The objective of developing the Conceptual Site Model (CSM) and Environmental Site Setting and Site Design (ESSD) is to identify potential sources of pollution, receptors that may be affected and the pathways that link the two. This is the Source – Pathway – Receptor relationship / linkage. For there to be a risk all three components need to be present. If one is not, then a risk is not present. As such risks can be screened out. Initially a Qualitative Risk Assessment is carried out, then dependent up the risks identified a more detailed Quantitative Risk Assessment (DQRA) is required.

The structure of this document generally follows guidance set out by the Environment Agency . The guidance states:

"Your CSM must:

- *consider the location of your site in relation to any groundwater and surface water*
- *establish that you can develop your site to protect the environment*
- *establish background conditions at the site*
- *identify the potential impact of your site on local people and the environment*
- *develop a monitoring programme to confirm that there are no environmental impacts from emissions from the site and to confirm that your control measures will be effective*
- *develop the engineering design for your site, including how you will manage any risks"*

The guidance goes on to state:

- *"You must use your CSM to gather enough information to provide risk assessments and landfill design for your site.*
- *Use the environmental setting and site design report guide to develop your CSM for landfills for inert waste.*
- *You must complete your groundwater risk assessment based on your CSM"*

It is assumed that this also relates to permanent deposit of waste to land in a recovery operation. From an engineering perspective the main difference is that "geological barriers" as required by the Landfill Regulations does not apply to such recovery operations. However, the EA require an Attenuation Layer for them.

The Conceptual Site Model is tabulated on the final pages of this document.

Site Setting

This document has been prepared by Soilfix, who is the applicant and will be the permit operator / holder, in support of an Environment Permit for the permanent deposit of waste to land as a recovery operation (Deposit for Recovery, DfR), at the former (closed) Wroughton Landfill.

This document includes various information from relevant Stantec (formerly Hydrock) reports, which are referenced and should be referred to for more detailed information.

Site Context

The site is at: Land off Woodland View, Wroughton, Swindon, Wiltshire, SN4 9AE.

The approximate National Grid Reference is SU 14740 81760.

The site is currently accessed via a track off Swindon Road in the southeast corner of the Former Landfill Area. The site is closed off by fencing and a locked gate.

The site is covered by rough grasses and vegetation. The site is heavily overgrown along the northern and western boundaries with hedges, brambles and mature trees.

The site contains the Former Wroughton Landfill. The site in relation to the overall development has been split into zones to distinguish between the former landfill and non-landfill footprints of the site. Zone A is the Greenfield Area, Zone B relates to Recent Construction Waste (over Landfill Waste) and Zone C relates to Landfill Waste. (**Hydrock drawing ref. 11229-G018** enclosed refers).

The site is to be developed with the erection of 104 no. dwellings, traffic roundabout, access roads, a cricket pitch and pavilion, areas of Public Open Space (POS) and associated works.

The development site has Planning Permission from Swindon Borough Council. The Planning Application site boundary is shown on **ProVision drawing ref. 1313 / P01** enclosed (replicated on Soilfix drawings **C578-BPA-DWG-SB and C578-BPA-DWG-RRSL** also enclosed).

The site boundary for the purpose of this bespoke DfR permit application is only a section of the Planning Permission site boundary.

The proposed DfR site boundary is approximately 2.3 hectares (23,000m^2) and is represented by the green boundary line on Soilfix drawings **C578-BPA-DWG-SB and C578-BPA-DWG-**

RRSL enclosed. The DfR site boundary covers the area of the proposed highways and service corridors where DfR operations are proposed.

The DfR site within 500m is bordered as follows:

- **To the North:** New-build residential properties on Clevedon Gardens, residential properties including farm and farmhouse off Woodland View with agricultural grazing land beyond, former landfill area within the wider site boundary, the M4 Motorway
- **To the east & northeast:** Residential properties including Clyde Cottages gardens directly backing onto DfR land, residential properties off Woodland View and Swindon Road main access road (A4361) with agricultural grazing land beyond
- **To the south:** Greenfield Area within development boundary in front of existing public amenity space and residential properties Lister Road and The Mountings.
- **To the southeast:** Existing playing field (Wroughton Juniors FC) with play area on the adjoining boundary
- **To the west:** Former landfill area, with school playing fields beyond (The Ridgeway School and 6th Form College), Ridgeway Leisure Centre. Wroughton Junior Scholl is situated to the west of the school playing fields.

The nearest sensitive human receptors are users of public open space to the south/east as well as residential properties to the south, east and northeast.

The prevailing wind direction is from the southwest, towards the residential receptors on the eastern and northern boundary. These are considered the most sensitive receptors due to the school and playing fields outside of the western boundary being upwind of the prevailing wind direction.

The Former Landfill Area has been built up by the process of landfilling, evident by its raised topography and sloping nature of its northern, western and southern flanks. The centre lies at approximately 113m above Ordnance Datum (AOD), with the base of the slopes at approximately 104m AOD. The Greenfield Area comprises two open fields sloping from 109m AOD (east) to 104m AOD (west).

There are no statutory sensitive environmental receptors within 1km of the site boundaries, as shown on drawing **C578-BPA-SS1KM**.

There are five Grade II listed structures within 1km of the site, the nearest being the North Wroughton Phone Box which is a historical monument and is situated within the Planning application boundary opposite the main site entrance.

The site does not fall within an EA Groundwater Source Protection Zone, and there are no licensed surface water abstractions within 1km of the site.

The site is bordered to the north and west by drainage ditches, with the ditch along the western boundary known as the Wroughton Ditch. This flows northwards to its confluence with the Wroughton Brook approximately 1.3km downstream, and eventually to the River Ray.

An engineered reed bed is located in the northwest corner of the site, which intercepts and treats the surface water flowing along the adjacent drainage ditches along the north and west before flowing off site. This is discussed in more detail later within this document.

Flooding and Climate Change

The desk study information indicates the proposed development is in a EA Flood Zone 1 (low probability of flooding).

The site has been assessed to satisfy Swindon Borough Council's planning conditions (planning reference S/OUT/20/0556/TB) for flooding and climate change. Drainage calculations have taken into account climate change and a 1/100 flooding occurrence, with mitigation detailed within drainage plans to include surface water drainage and SuDS (storage basins) as well as a future drainage maintenance plan for the site.

Proposed Development

The site is to be developed with the erection of 104 no. dwellings, traffic roundabout, access roads, a cricket pitch and pavilion, areas of Public Open Space (POS) and associated works. The proposed development layout is shown on **Pro Vision drawing ref P1-01.**

The development site has Planning Permission from Swindon Borough Council. The Planning Application site boundary is shown on **Pro Vision drawing ref. 1313 / P01** enclosed (replicated on Soilfix drawings **C578-BPA-DWG-SB and C578-BPA-DWG-RRSL** also enclosed).

The proposed works under this DfR Permit includes the sustainable reuse of site won material, to minimise waste to landfill and the requirement to import quarried material as a natural resource. Soilfix will process landfilled waste material, to render them compliant for reuse under a DfR permit, as engineered fill in compliance with an Earthworks Specification (EWS) and approved Remediation Strategy (RS).

Phasing of Works related to Application

The proposed sequence of the enabling works which involve the preparation of the Former Landfill Area and subsequent excavation and handling of the Landfill Waste and Recent Construction Waste is as follows:

- **Step 1** - Strip off existing topsoil across the residential area, the cricket pitch and any additional areas across the POS (including entire landfill area) required to facilitate the development
- **Step 2a** - Reduced level excavation of non-waste capping layer to 800 mm below final development level across the Former Landfill Residential Area footprint
- **Step 2b** Partial filling across the Greenfield Area to 600 mm below proposed final level
- **Step 2c** Further reduced level excavation of the Former Landfill Residential Area footprint to 1000 mm of development level i.e. another 200 mm – INTO LANDFILL WASTE MATERIALS
- **Step 3i** - Reduced level excavation of non-waste capping layer to 600mm below final development level across the Cricket Pitch (within Former Landfill Area footprint)
- **Step 3i**i – Remaining filling across Greenfield Area to 600 mm below proposed level –uses non-waste materials from Cricket Pitch Cut.
- **Step 4a** – Excavation of landfill to 400 mm below drainage system in Landfill Residential Highway Corridors – INTO LANDFILL WASTE MATERIALS
- **Step 4b** – Subsequent processing of landfill waste to recover geotechnically suitable material for reuse (deposition)
- **Step 5** – Cut Attenuation Ponds in Greenfield Area and create embankments
- **Step 6** - Reinstatement of Landfill Residential Highway Alignment (to 1,000 mm of development level) – **USE OF SUITABLE RECOVERED LANDFILL WASTE AS ENGINEERED FILL**
- **Step 7** - Installation of clean cover system across site (variation in depth dependant of final use)

The site phasing sequence above is shown on **Hydrock drawing ref. 12248-HYD-XX-XX-DR-G-1001-S2-P2** and is documented in further detail in the **Hydrock Waste Recovery Plan.**

Sources - historical activity

Site History

The majority of the site was brickworks and an associated clay pit from prior to 1900 until the 1940s, after which the clay pits filled with water. The earliest Ordnance Survey (OS) mapping of the area from 1900 indicates that a brick works and clay pit were already present on the site in its northeastern quadrant. The western half and the southern portion of the site remained as agricultural land whilst several small buildings and a kiln are shown in the centre of the site. The 1923 OS mapping indicates that the pit has been extended approximately 40m to the east by that time.

The Former Landfill Area was historically used for the extraction of clay from pits excavated into the underlying natural geology of the Kimmeridge Clay Formation (the “Kimmeridge Clay”). This was followed by the landfilling of wastes (and some non-waste materials i.e. haul road and restoration soils) that were deposited into the unlined former clay pits. The maximum depth that waste materials have been encountered during intrusive ground investigation is approximately 10m below ground level (bgl).

The EA Historic Landfill Sites database lists two relevant historical landfills for the site:

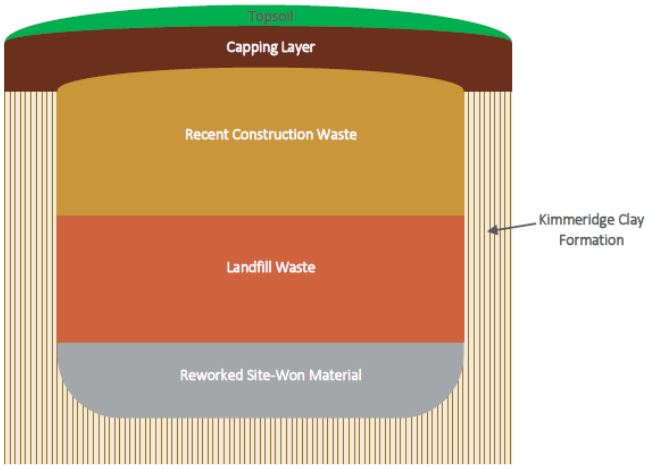
1. EAHLD32395 Pre-licence Commercial Landfill operated by Hills between December 1951 and February 1971
2. EAHLD13665 Under license Inert/ Industrial/ household/ Special (including asbestos)/ Liquid Sludge Landfill operated by Hills Aggregates Ltd issued July 1977 and surrendered February 1994. Prior to 1977 material was inputted from June 1959

There are no other waste management sites recorded within 500m of the site.

As part of the landfill restoration, a predominantly cohesive capping layer has been placed across the majority of the Former Landfill Area, comprising clay with rare to occasional brick fragments and concrete (i.e., it is largely free of any anthropogenic materials and asbestos has not been identified). This distinct layer is interpreted as being the final capping layer of the former landfill and was deposited with a predetermined use and, most significantly, was not discarded as waste. The overlying topsoil is understood to have been imported prior to 1998 to complete the profiling works and was similarly deposited with a predetermined use and is not a waste.

Ground Conditions

A simplified conceptual model of ground conditions within the former Landfill Area is shown below (copied from previous Hydrock reports).



Waste streams collectively referred to as 'Pits Backfill' (deposited prior to 1974) comprise:

- **Reworked Site-Won Material**, which is essentially ‘quarry discards’ and was formerly called 'Brick Works Clay Waste' in historical reports, comprising blue-grey (almost back) silty clay, with occasional gravel of brick and concrete, and pockets of peat encountered to a maximum proven depth of 7.1 m bgl; and
- **Landfill Waste**, formerly called 'Domestic Landfill Waste' in historical reports, comprising a variable material of grey-black sandy gravelly clay or clayey gravelly sand, including significant anthropogenic materials (e.g., brick, concrete, ash, metal, plastic, wood, textiles, glass, ceramic and asbestos) encountered to a maximum proven depth of 10.0 m bgl.

Recent construction waste stream deposited between 1974 and license surrender (early-1990s) comprise:

- **Recent Construction Waste**, formerly called 'Builders Waste' in historical reports, comprising a variable material of brown to grey sandy gravelly clay or clayey gravelly sand, typically with fragments of brick and concrete, occasional metal, plastic and wood, and includes rare asbestos encountered to a maximum proven depth of 6.8 m bgl.

Made Ground deposited above the waste streams (not as a waste) to complete the profiling as part of the site closure, comprise:

- **Capping Layer:** a cohesive landfill cap comprising brown silty CLAY with occasional brick and concrete (asbestos has not been identified) encountered to a maximum depth of 2.3 m bgl; and
- **Topsoil:** comprising sandy organic CLAY encountered to a max depth of 0.4 m bgl.

Ground Contamination

Previous site investigations have indicated that the made ground below the capping layer contains local elevated concentrations of soil contaminants (lead, boron, various PAHs, visible asbestos containing materials as well as soil-bound fibres), and deleterious anthropogenic materials (brick, concrete, metal, glass). No significant amounts of putrescible material have been observed in the Landfill Waste or Recent Construction Waste. The Recent Construction Waste has recorded several significant exceedances of Hydrock Generic Assessment Criteria (GAC) for Human Health 'residential with plant uptake', notably benzo(a)pyrene at a concentration of 13.7 mg/kg. In addition, visual ACM and asbestos fibres have been encountered within the material. This represents an unacceptable level of risk with respect to human health for the proposed development.

No potential off-site sources of contamination have been identified as part of previous SI and desk study reports.

Ground Gas

The Hydrock Remediation Strategy states *"Ground gas concentrations of up to 18.4% methane and 16.8% carbon dioxide have been recorded by volume, however, the highest recorded ground gas concentrations are in the west of the site and outside of the proposed residential footprint in the east. Gas flow rates from the monitoring wells have always been minimal, usually being below the limit of detection of the instrument (i.e.<0.3 litres/hr)".*

A ground gas risk assessment has been carried out based on site and laboratory data. The Landfill Area has been assigned a precautionary Characteristic Situation 2 (CS2) and the Greenfield Area a Characteristic Situation 1 (CS1) classification.

No unacceptable risk to off-site properties from ground gas migration has been identified, and laboratory testing has confirmed the landfill materials have a low gas generating potential.

Sources - Proposed activity

Proposed Activity

The proposed activity involves the excavation, temporary stockpiling (with or without treatment under a Mobile Plant Licence) and deposition for reuse of the ‘secondary material’ landfill waste (both pre-licence and under license).

Excavation of the full volume of existing Landfill Waste is not proposed. Excavation of Landfill Waste will only be taken in the areas and depths required to enable the proposed development. Primarily, this is creating a re-engineered formation along proposed highway corridors, for future road and drainage infrastructure. As such, the majority of the Landfill Waste on the wider site will be left insitu.

Risk assessments in the various Hydrock reports conclude that the wastes proposed for recovery are chemically suitable for use (with respect to no unacceptable risks to human health or the environment arising from soil contaminants), for the purpose of constructing a safe and stable development landform, that will not cause pollution.

Following the excavation, screening, separation and treatment of the waste arisings from the former landfill, and prior to reuse as an engineered fill, the treated material will also undergo verification testing. Only materials determined to be suitable for their intended use will be reused under the DfR Permit (refer to the later Waste Acceptance Criteria section). Any materials found to be unsuitable (and if further treatment is not feasible to make them suitable), will be disposed off-site as waste under Duty of Care, and suitable replacement material sourced.

Recovered materials rendered suitable for reuse as engineered fill will be reinstated within the Former Landfill Area and primarily within excavations required for proposed highways and deep service corridors, to improve and provide a formation of suitable engineering properties for construction of these features.

Proposed Waste Volume & Codes

The proposed volume of waste materials that will be recovered (reused) as an engineered fill under this DfR permit is:

- 16,356 m^3

(volume as per Section 4.4.2 of the **Hydrock Waste Recovery Plan (WRP) ref. 12248-HYD-XX-XX-RP-GE-1002 (2024)**).

The proposed waste types (and respective EWC Codes) to be recovered (reused) as an engineered fill under this DfR permit are:

- 19 13 02 (non-hazardous); Solid wastes from soil remediation, other than those mentioned in 19 13 01*
- 19 13 01* (hazardous); Solid wastes from soil remediation containing dangerous substances (refer to ***Note 1*** below).
- 19 12 12 (non-hazardous); Crushed bricks, tiles, concrete and ceramics (including mixtures of materials), from mechanical treatment of waste (i.e. crushing)

Note 1: *The majority of the site investigation testing on the former landfill waste soils classifies as non-hazardous waste under EA WM3 guidance. A small proportion of individual samples classify as hazardous waste under WM3, due to elevated heavy metal concentrations. It is expected that after remedial treatment the soils generated for use as engineering fill will classify as non-hazardous waste as a single characterised material. However the possibility remains that occasional individual sample results may classify as hazardous waste. The remedial measures proposed under the Hydrock Remediation Strategy will suitably mitigate risks from any localised hazardous concentrations of soil contaminants. Therefore recovery (reuse) of 19 13 01*, as well as 19 13 02, is included in the list of proposed wastes.*

Waste Acceptance Criteria

Waste Acceptance Criteria for the proposed recovery are provided in Table 1 below:

Table 1: Waste Acceptance Criteria

Criteria	Relates to	Acceptable Limit	Reasoning
Earthworks Material Classification	Engineering	**Class 1 or Class 2 (soils), or Class 6 (crush)**, as per Hydrock Earthworks Specification	To provide physically suitable materials for engineered fill.
Deleterious	Human Health & Engineering	Deleterious* content **<3% w.w.** (median average) (*e.g. glass, metal, plastic, wood, textile etc. Excludes concrete, brick, asphalt)	To reduce potential harm to construction workers to as low as reasonably practicably. To provide physically suitable materials for engineered fill.
Asbestos	Human Health	**No visible*** Asbestos Containing Materials (ACMs) (*to human eye)	To reduce potential harm to construction workers to as low as reasonably practicably.
Organic Matter	Human Health & Engineering	Total Organic Carbon **<3%** (median average)	To reduce the content of degradable materials to prevent any enhanced ground gas risk and mitigate future settlement of infrastructure.

No other chemical criteria proposed.

Human health: New pollutant linkage to construction workers during highways construction, short term only – risks controlled via standard practices inc. good hygiene, avoid dust generation, PPE. Recovered waste placed at depth ie. below a subsequent future clean capping layer to protect development end users.

Controlled waters: Existing pollutant linkages being managed by presence of underlying Kimmeridge Clay as aquitard, and permitted reed bed treatment for surface water discharges. No new pollutant linkages being created. Fill placement will be largely in same locations as the (untreated) waste was excavated from. Fill compaction will create low permeability, which will significantly reduce water infiltration compared to current condition. Additional interceptor drainage and dams are being installed as part of remedial measures for permanent works, to capture perched groundwater/leachate and transfer to the reed bed treatment.

The majority of the historic Landfill Waste on site will remain insitu, unexcavated and untreated, surrounding (laterally and below) the recovered waste. The Hydrock Controlled Waters risk assessment concluded that no unacceptable risks are present either in the existing or proposed scenarios (summarised in Section 4.5.3 of Hydrock WRP). Therefore, chemical criteria for the reuse (recovery) of a proportion of the (treated) Landfill Waste is not required, considering also there is no remedial action or chemical criteria required for the historic Landfill Waste.

Waste Acceptance Inspection & Testing

The proposed inspection and testing for the Waste Acceptance Criteria are provided in Table 2 below:

Table 2: Inspection & Testing Plan for Waste Acceptance Criteria

Criteria	Site	Laboratory
Earthworks Material Classification	Continuous visible inspection (daily during recovery works) to confirm suitable engineering grading and properties (e.g. no oversize)	1 sample per 1000 m^3, tested at UKAS-accredited laboratory against Earthworks Specification (primarily particle size distribution etc.)
Deleterious	Continuous visible inspection (daily during recovery works) to confirm deleterious content is low / incidental 1 sample per 1000 m^3 for on-site manual segregation and weighing of residual deleterious content, tests recorded.	
Asbestos	Continuous visible inspection (daily during recovery works) to confirm no ACMs	N/A
Organic Matter	Continuous visible inspection (daily during recovery works) to confirm visible organic/ putrescible content is low/ incidental	1 sample per 1000 m^3, tested at UKAS-accredited laboratory for Total Organic Carbon
Other Chemical Criteria	Continuous visible inspection (daily during recovery works) to confirm no visible free product hydrocarbons or other gross contamination	N/A

Potential Physical Modification of Waste prior to Recovery

The Earthworks Material Classification testing will include moisture content and other parameters, which may indicate that certain materials require physical modification prior to use as engineering (general) fill. Modification typically includes bringing soils closer to Optimum Moisture Content (either by wetting with water, or drying by exposure/ lime / cement). Modification will be undertaken only as required to conform with the Earthworks Specification.

Engineered End Product Criteria & Performance Criteria for Recovered Waste

The Hydrock Earthworks Specification sets out engineering-based end-product criteria and performance criteria for the recovered waste, after placement as fill. These criteria are to ensure the recovered waste is suitable for use from an engineering / geotechnical perspective. The criteria include relative compaction, bearing capacity, and settlement. Testing will be carried out to demonstrate compliance as per the Earthworks Specification.

Pathway and receptor – geology and groundwater quality

Geology

The underlying geology is reported in the Hydrock reports as:

- Topsoil then Made ground (as both non-waste and waste material); overlying,
- Kimmeridge Clay, which is an over-consolidated claystone sequence with subsidiary limestone or clayey limestone bands. Stress relief and weathering near the surface produce a profile of stiff clay becoming softer closer to the surface.

There are no records of significant Superficial Deposits within the site or surrounding area.

Summary of Ground Conditions from Hydrock Updated Ground Conditions Report

Table 5.1: Strata encountered

Former Landfill Area					
Stratum		Description	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m) range
Top soil & Capping Layer	Topsoil (Made Ground)	Grass over reworked topsoil (asphalt TP10 only).	0-0	0.05-0.4	0.05-0.4
	Capping Layer** (Made Ground)	Firm silty CLAY with occasional brick fragments.	0.05-0.35	0.4-2.4	0.2-2.3
Recent Construction waste (1974-1998). Formerly called 'builders waste'. (Made Ground)		Sandy gravelly CLAY/clayey gravelly SAND with minor timber, brick, plastic bags, metal fragments and occasional concrete rubble. Asbestos present although minor quantities identified.	0.05-1.5	1.3-6.8*	0.6-5.6*
Pits backfill (prior to 1974)	Landfill Waste. Formerly called 'domestic landfill waste'. (Made Ground)	Grey-black waste (Sandy gravelly CLAY/clayey gravelly SAND) comprising significant ash and glass bottles with frequent metal fragments and occasional plastic bottles, wood and tile. Asbestos present although minor quantities identified.	0.15-5.5	1.45-10*	0.55-8*
	Reworked Site-Won Material (quarry discards) Formerly called 'brick works clay waste'. (Made Ground)	Reworked dark blue-grey (almost black) very soft to firm silty CLAY with some gravel and pockets of peat. No asbestos found.	2.2-6.2	3.5-7.1*	0.2-2.3*
Natural soils, slightly weathered / unweathered.		Stiff brown, grey and yellow silty CLAY (KIMMERIDGE CLAY FORMATION)	0.8-10	Not proven	Not proven

A cross-sectional representation of the underlying geology can be found on the **Hydrock drawing 11229-G018.**

Hydrogeology

The Kimmeridge Clay formation is designated by the EA as 'unproductive' and is considered impermeable (an aquitard). (i.e. there is no classified groundwater body beneath the site).

The site is not within 500m of an EA groundwater Source Protection Zone.

The nearest recorded groundwater abstraction licences are a domestic supply approximately 1,400m to the southeast and a public water supply 1,700m to the south.

The groundwater flow trends towards the northwest of the site as shown by drawing 11229-G039 included in the Stantec controlled waters risk assessment report.

Perched Water

There is no engineered containment of the landfilled materials, nor does the former landfill contain any engineered drainage layer, therefore, a proportion of the rain will infiltrate the cover and become leachate on contact with the underlying waste materials. This is not technically considered to be a 'groundwater' body but instead can be considered as 'perched water', contained/held within the excavations created by the former clay pits.

Perched water strikes during SI trial pitting varied between 2.9 m bgl and 8m bgl across the landfill footprint. The depths and general flow of the leachate within the landfill mass are shown on drawing 11229-G039 included in the Stantec controlled waters risk assessment report.

Typically, leachate levels have been reported as being 2-3m below existing ground level.

Perched water will accumulate in the waste deposits, mainly from infiltration of rainwater, plus a very small proportion from biodegradation of the relatively low percentage of putrescible material identified during the ground investigations to date. Substantially, it will not enter the Kimmeridge Clay formation but will gradually fill the pore spaces within the waste material until the water level reaches the lowest lip of the former clay pits from where it will flow out into the surface water system. The perched water generally flows towards the northwest as outlined in the Stantec report. There has been evidence of leachate outbreaks observed within the surrounding drainage ditch network, however the engineered reed bed was constructed in 2012, with subsequent improvements made in 2017 and 2019

The reed bed was installed and subsequently improved to treat outbreaks of landfill effluent at the site.

The permit for the discharge consent indicates that the maximum permitted daily flow is 9.9 cubic meters.

Perched water during remediation and enabling works

New perimeter drainage is proposed around the north, west and southern periphery of the landfill boundary. Soilfix anticipate to carry out installation of this drainage prior to the commencement of any works which penetrate the full depth of the landfill cap, discussed further below.

The new drainage channels will ensure any surface breakout is captured and directed to the existing reed bed for treatment. Flows to the reed bed will be controlled by a flow meter, penstock valve or similar if required.

The remediation and enabling works will require excavation of some of the landfill cap, however the full depth will not be excavated across the entire landfill.

The Stantec supplementary SI report indicates an average topsoil thickness of 0.2m and an average landfill cap thickness of 0.8m. across the landfill area in drawing 02753-HYD-XX-XX-DR-GE-1009,

As per steps 1, 2A, 2B and 3 of the phasing plans included in the Stantec remediation strategy, topsoil and some capping material are proposed to be removed to a depth of 800mm below existing ground level in the east of the site (steps 1, 2A and 2B) and 600mm below existing ground level in the area of the proposed cricket pitch (step 1 and 3).

In all cases for the steps above, the base of excavation does not fully penetrate the landfill clay capping layer.

Step 2C and 4 outline further excavation works in the east of the site only, which are expected to penetrate the full depth of the landfill clay cap.

Typically, leachate levels have been reported as being 2-3m below existing ground level, therefore the majority of the excavation works required to facilitate the above steps are not expected to liberate leachate into excavation bases.

Works will be sequenced using a “treatment train” methodology, whereby deeper excavations below the groundwater level are excavated and backfilled sequentially, to minimise the size of the open excavation as far as practicable, and returning levels to above perched groundwater level as soon as reasonably practicable.

As per the Stantec Geotechnical Design Report (GDR) report, large scale dewatering is not anticipated.

During Soilfix works, any waters within excavations will be directed to sumps, strategically located and constructed within excavations. Where required to facilitate continuation of the works, perched water in excavations will be pumped and directed through a silt interceptor prior to discharge to the existing reed bed. Dependant on the volume of water encountered, water removed from excavations may be temporarily stored in a buffer tank on site prior to discharge, to facilitate efficient dewatering and ensuring the capacity of the reed bed is not exceeded.

The volume of water being discharged to the reed bed will be monitored by a flow meter to ensure the maximum flow rate of the discharge consent is not exceeded.

Works below groundwater level and into the deeper landfill areas will be completed during spring/summer where possible which will reduce the likelihood of rainwater ingress into excavations and the landfill material; and should generally align with lower groundwater levels than during wetter periods of the year.

In light of the above, the perched leachate level is not expected to fundamentally change from the current condition. Treatment and reinstatement of the landfill materials is also likely to have a positive effect on ongoing leachate parameters by removing deleterious materials.

Following completion of the remediation works, areas of the site where the full thickness of the landfill cap will been removed, primarily in the east of the site, can be covered by layers of lapped impermeable DPM. This will direct water to existing perimeter drainage systems and limit infiltration into the landfill wastes.

DPM will also be used to cap any localised areas where the full thickness of the cap has been excavated, for example in the cricket pitch where locally shallower thicknesses of capping material are present than expected. This will similarly prevent or limit groundwater ingress and direct surface water towards perimeter drainage.

Controls to manage groundwater and leachate during the deep drainage installation will be managed by the drainage contractor. Given the level of leachate indicated, works are likely to be above the leachate levels in most areas. Any areas where installation is below the leachate level are expected to be managed by measures such as dams as identified in the Stantec reports.

Pathway and receptor –surface water

Hydrology

There are no main rivers within 500m of the site.

The site is bordered to the north and west by drainage ditches, with the ditch along the western boundary known as the Wroughton Ditch. This flows northwards to its confluence with the Wroughton Brook approximately 1.3km downstream, and eventually to the River Ray.

The former landfill footprint is within a Flood Zone 1 (with a low probability of flooding).

There is a small area with a 1 in 30 annual likelihood of surface water flooding within the Greenfield Area (i.e. within the wider site development boundary, but outside the DfR operations boundary) as well as outside of the development boundary within the playing fields to the west of the site.

There is no interaction of the surface water bodies with any protected / designated sites (e.g. SSSI).

There are no licensed surface water abstractions within 1,000m of the site.

Surface water drainage

Landfill leachate with elevated concentrations of iron and ammoniacal nitrogen seeps out of the ground periodically into the perimeter drains of the site.

The site is bordered to the north and west by drainage ditches, with the ditch along the western boundary known as the Wroughton Ditch. There is a small pond on the boundary between the Former Landfill Area and the Greenfield Area to the south, and another adjacent to the western boundary of the greenfield area.

The Wroughton Ditch along the western boundary is considered as Controlled Water by the Environment Agency. This flows along the western boundary, through an engineered reed bed in the northwest of the site and eventually discharges into the Wroughton Brook then River Ray.

Surface Water Quality & Treatment

Perched water boreholes installed as part of intrusive site investigations were sampled, alongside the drainage ditch, and water tested for a range of contaminants and water quality parameters. Soil leachate testing was also carried out of landfill and recent construction wastes for the same water testing suites. Contamination was identified as metals and ammoniacal, with no PAHs or VOCs detected and only one detection of hydrocarbons (BH101), pH was confirmed as neutral (around pH 7) and Chemical Oxygen Demand (COD) <100 mgO_2/l. Water quality data formed part of the assessment to determine the requirement of a reed bed and associated Discharge Consent.

In consultation and agreement with the Environment Agency and Swindon Borough Council, the original leachate and surface water monitoring report (October 2009) concluded that a polishing reed bed was required to mitigate the risks to Controlled Waters as a result of the leachate breakouts into the adjacent drainage ditches.

A reed bed was subsequently designed and installed by others in accordance with an Environmental Permit for surface discharge.

The perched water flow direction has been confirmed to be towards the northwest, and so any breakout along the northern and western boundaries is picked up by the adjacent drainage ditches and is intercepted and treated by the reed bed, prior to flowing off site.

As the reed bed is operated and maintained in accordance with an Environmental Permit, the risk to Controlled Waters is considered to be low.

Hills Waste Solutions, as holder and operator of the EA Discharge Consent, undertake regular monitoring and sampling of the surface water network across the site, including upstream of the reed bed, at the outlet of the reed bed, and downstream of the reed bed. The samples are analysed for the contaminants listed within the Discharge Consent and compared against the consented limits.

The analytical data has been compared against thresholds as stipulated in the consent, and for parameters without thresholds, has been compared against Environmental Quality Standards (EQS).

Upgradient of the reed bed the water quality exceedances relate to iron (total and dissolved), ammoniacal nitrogen and lead. Generally, the discharge location and downgradient of the reed bed are complaint, with occasional exceedances of iron, ammoniacal nitrogen and suspended solids.

Based on the laboratory data collected to date, notably soil, groundwater, soil leachate and surface water, the waste materials at the site do not appear to be significantly impacting on the water environment, and no contaminant linkage with respect to Controlled Waters has been identified.

Receptor – amenity nuisance

Vibration

Given the nature of the standard earthmoving mobile plant to be mobilised to the site for the proposed recovery works, vibration is not considered to be a significant issue for general earthworks.

Backfilling operations for deep highways and drainage corridors within the DfR operations area have the potential for ground vibration to reach the eastern and north eastern boundary, immediately beyond which are residential properties.

Basic mitigation measures will prevent any detrimental impacts.

Proposed mitigation and monitoring measures for ground vibration are set out in the separate Emissions Mitigation & Monitoring Plan (**C578-BPA-EMMP).**

A dedicated / more detailed Vibration Management Plan is not deemed required based on the above.

Odours

No highly odorous contamination has been identified as part of site investigations however due to the nature of the site there is potential for odour generation in the deeper landfill material if pockets of contamination or organic material (typically domestic waste) is encountered.

Previous site investigation has reported an anoxic odour in a localised area, but a 'domestic waste landfill' type of odour, that commonly leads to nuisance and complaints adjacent to landfill areas, was not encountered. Hydrock carried out a screening assessment of the landfill waste composition from a trial pit sample, with low fractions of putrescible material generally detected. Up to 85% of the total fraction was recoverable material of oversize >100mm, granular and cohesive fill. The remaining 15% consisted of timber, plastic, glass, metal, and other content. A watching brief will be carried out during excavation activities for any signs of contamination (staining, sheens, odours) or organic/ putrescible material.

Proposed mitigation and monitoring measures for odours are set out in the separate Emissions Mitigation & Monitoring Plan **(C578-BPA-EMMP).**

A dedicated / more detailed Odour Management Plan is not deemed required based on the above.

Noise

Given the nature of the standard earthmoving mobile plant to be mobilised to the site for the proposed recovery works, noise is not considered to be a significant issue.

The DfR works will be coincident with a range of other (non-permitted) site enabling / construction site works.

The whole site will be managed in accordance with a construction environmental management plan and the Swindon Borough Council Planning conditions, to ensure noise emissions do not cause nuisance to site neighbours.

Proposed mitigation and monitoring measures for noise are set out in the separate Emissions Mitigation & Monitoring Plan **(C578-BPA-EMMP).**

A dedicated / more detailed Noise Management Plan is not deemed required based on the above.

Dust and fibres

Potential particulate sources of dust emissions are from earthmoving plant traversing the site and bare dried soil ground, and stockpile surfaces being entrained by the wind.

Risk assessment of risk is based on:

- The nature of the dust;
- The distance between receptor and source;
- Prevailing meteorological conditions;
- Frequency of winds affecting the receptor; and,
- Frequency of rainfall providing natural suppression.

The most important climatic parameters governing the release and dispersal of dust are:

- Wind speed which affects the potential for dust entrainment and distance it may travel;
- Wind direction determines the broad transport of the emission and the sector of the compass into which the emission is dispersed; and,
- Rainfall will naturally suppress dust generation.

The prevailing wind direction is from the southwest as shown on drawing C578-BPA-EML. The most sensitive human receptors surrounding the site are the residential housing to the east and northeast, which are therefore down prevailing wind of the site.

Treated soils used for DfR operations will need to be kept damp (wet of 'optimum moisture consent' to achieve sufficient earthworks compaction / re-engineering). This will help mitigate any dust generation from the recovered material during its temporary stockpiling and movement on site. Reuse of soils is being carried out within deep trenches which will provide shelter from prevailing winds and further mitigate any dust generation.

Proposed mitigation and monitoring measures for dust are set out in the separate Emissions Mitigation & Monitoring Plan (**C578-BPA-EMMP).**

A dedicated Dust and Emissions Management Plan (DEMP) has been produced after comments on Issue 1 of this document and is provided as a standalone document for review. The DEMP mirrors what is detailed in the EMMP.

Dirt on Public Highways

The DfR operations comprise reusing site-won recovered materials. As such, there is no requirement for either offsite disposal, or import of materials from offsite. All material movements will be contained on site. There is therefore no significant risk of causing mud / dirt on the public highways.

The DfR works will be coincident with a range of other (non-permitted) site enabling / construction site works.

The whole site will be managed in accordance with a construction environmental management plan and the Swindon Borough Council Planning conditions, to ensure mud / dirt emissions do not occur on offsite public highways.

Proposed mitigation and monitoring measures for mud / dirt on roads are set out in the separate Emissions Mitigation & Monitoring Plan (**C578-BPA-EMMP).**

Further detail on management of dirt on public highways is included in the DEMP.

Weather Monitoring

Soilfix site management will carry out daily weather condition monitoring which includes recording wind direction, wind speed and weather conditions. Information will also be obtained from the Met Office or similar websites for local weather information, including forecasts so that site activities can be planned around any more adverse weather conditions. A weather station is situated 10 miles west of the site for accurate meteorological information. An example would be if strong westerly winds are forecast for the following day, then movement/disturbance of any dry soils near to the sites eastern boundary will be minimised or avoided whenever possible, to prevent dust emissions leaving site.

If complaints are received that are attributable to the site activities, the weather conditions at the time of the compliant will be reviewed and appropriate action taken.

Surface Water Management

The site has an existing surface water management system which includes infiltrated surface (rain) water in the form of drainage ditches and a reed bed for treatment prior to discharge to the Wroughton Ditch, under EA consent. The engineered reed bed will remain active throughout the works and Soilfix will ensure activities under the DfR operations works are not detrimental to its efficacy.

During the proposed filling operation under this permit application, surface water (rainwater) will be managed in accordance with good practice procedures such as levelling areas and sealing surfaces at the end of each shift to prevent ponding of standing water.

Visual inspection of surface water entering the drainage ditches shall be carried out and Soilfix will deploy silt mitigation measures to prevent any overloading or silting up of the water management system.

Soilfix will carry out visual inspections of surface waters, particularly near activities with potential to cause pollution (fuel storage, areas of mobile plant use, locations of stockpiled material (particularly with high fines content)) and be vigilant for visible sheens, discolouration and heavy silt content. Prevention and mitigation procedures will be in place to protect controlled waters (the Wroughton Ditch) via silt protection measures to intercept run-off, remove suspended solids from run-off and use of emergency spill equipment for any localised oil spills.

Proposed mitigation and monitoring measures for surface water are set out in the separate Emissions Mitigation & Monitoring Plan (**C578-BPA-EMMP).**

A dedicated / more detailed Surface Water Management Plan is not deemed required based on the above.

On completion of the DfR operations, the area will be handed over to the client's civils contractor who will implement similar standard controls for surface water.

Permanent works surface water drainage will be installed during the construction phase to drain rainwater from the residential properties, roadways and other areas of the site in the finished developed site.

The proposed development in the east of the Former Landfill Area will result in a reduction in infiltration in this area of the site, namely due the construction of houses, pavement/road construction and other hard surfaced infrastructure (typically, 40% will feed into the storm network and not infiltrate to ground).

The potential risk to future site users from the leachate outbreaks into the surrounding drainage ditches and also to the proposed storage basins (i.e., through direct contact) is being addressed by the proposed installation of cut-off drains along the southern, western and northern boundaries of the Former Landfill Area. These drains will feed into the existing engineered reed bed facility located in the northwestern corner.

The proposed cut-off drains are designed to intercept and prevent the breakouts from occurring at the surface. This will sever the pathway between the surface water (i.e., the source) and future site users (i.e., the receptor). This drainage will be maintained during and after DfR operations and until the DfR permit is surrendered.

Outline Engineering Plan

As part of Hydrock's Geotechnical Options Appraisal, partial excavation and engineering of the highways and deep service corridors (i.e., storm and foul drainage) across the residential footprint on the Former Landfill Area was the preferred approach.

The Hydrock reports have concluded that the processed waste soils for recovery are generally non-hazardous.

Notwithstanding this, recovered waste soils will be covered with a clean validated capping layer of minimum 1m thickness as part of the remediation measures for the site (**Hydrock Remediation Strategy refers). (**Placement of capping soils is separate to DfR permitted operations).

The Fill level for recovery of waste soils under the DfR will therefore generally be 1m below Finished Development Levels (which varies along proposed highways / drainage corridors).

The capping layer across areas of soft landscaping will break the pollution pathway between the recovered (reused) landfill waste material and human receptors.

Due to the soils cohesive content, plus the required compaction and verification in accordance with the Hydrock Earthworks Specification, the permeability of the placed and compacted soil will be very low. Furthermore, it is likely that the soils for recovery will require some form of conditioning prior to reuse to achieve the Earthworks Specification. This will be through the addition of minor amounts of lime or cement to maintain the as-placed material within range of optimal moisture content. The effect of this will be to solidify the soils and further decrease permeability. This will also act to bind the soil matrix and reduce the potential for release of soil dust and/or trace asbestos fibres during future construction-phase excavations in the material. Conditioning and compaction will significantly restrict any infiltration of water through the material into deeper insitu (untreated) former landfill waste.

This application proposes recovery of waste over and within the historic closed landfill. Separation of the recovered waste from the insitu historic Landfill Waste will be provided by placement of a basal geotextile (visual marker and to prevent upward migration of fines) followed by placement of a crushed aggregate layer. The crushed aggregate layer is shown on **Hydrock 'Sketch 0001' within Appendix 1 of the Hydrock WRP** (annotated as an Engineering Load Transfer Platform, outline design thickness 400mm). End product testing will be carried out as per the Earthworks Specification on the recovered waste (not on the insitu (historic) Landfill Waste).

The proposed development in the east of the Former Landfill Area will result in a reduction in infiltration in this area of the site, namely due the construction of houses, pavement/road construction and other hard surfaced infrastructure (typically, 40% will feed into the storm network and not infiltrate to ground).

An attenuation layer, detailed engineering plan, or CQA assurance procedure are not deemed required based on the above.

Stability Risk Assessment

Given the controlled nature of the earthworks and backfilling operations in compliance with the Hydrock Earthworks Specification, as well as the gentle gradients of the site topography as well as the proposed final contours of the proposed development, slope stability is not considered to be of concern (either in the temporary or permanent case).

Temporary slope angles during construction will be managed using standard Temporary Works procedures and designs.

A dedicated / more detailed stability risk assessment is not deemed required based on the above.

Detailed geotechnical and settlement analysis is contained within the **Hydrock Geotechnical Design Report.** The landfill materials have been in place a considerable time (decades) since the landfill closed. As such, it is expected that significant self-settlement of the materials has already occurred under the weight of the materials placed, and any movement associated with inundation is likely to have occurred already.

To mitigate excessive future movement of the ground in areas of the site where road and main utility corridors coincide with extreme thicknesses of historical landfill waste, excavation to depths of the proposed invert level of the deepest utility services along the route (minus a further 400mm) will be carried out. The excavation will then be backfilled in engineered layers with verified suitable for use fill (recovered waste material), which is the DfR operation. This will create a formation of consistent and geotechnically suitable material beneath and along the road and surrounding utilities.

There will remain insitu (unexcavated and un-engineered) landfill material below the DfR backfill, and these materials may settle over time. The magnitude of this settlement based on the proposed engineering solution is expected to be manageable, and a settlement tolerance has been assigned within the **Hydrock Geotechnical Design Report** and **Hydrock Earthworks Specification.**

Soilfix will carry out settlement monitoring during operations to confirm across the remediated landform (i.e. the highways and deep service corridors of the proposed development), to check for compliance against the specification. Performance settlement monitoring will therefore monitor both the recovered waste and the underlying insitu (historic) Landfill Waste in tandem.

A detailed stability risk assessment has already been completed by Hydrock, therefore no further assessment is deemed required as part of this permit application.

Ground Gas Monitoring

A series of ground gas monitoring programmes have been carried out within the site, on both the Landfill and Greenfield Areas, in accordance with industry guidance documents.

Within the Landfill Area these show consistent elevated concentrations of carbon dioxide and methane albeit with negligible/very low flow rates.

The lack of flow indicates that these are likely to be the result of the slow decay of organic wastes in the landfill.

Intrusive investigations have not identified significant fractions of putrescible materials in the recent construction or domestic landfilled waste. Processing of excavated landfill waste prior to recovery will involve the removal of geotechnically unsuitable material, including any decomposable material prior to recovery (reuse).

It is therefore considered that the proposed activity under this permit will not increase the risks from ground gas to the proposed development or adjacent receptors, and therefore no further (additional) ground gas monitoring is deemed necessary.

A detailed ground gas risk assessment is included in the **Hydrock Updated Ground Conditions report.**

The compiled ground gas monitoring data was reassessed by Hydrock based on updated CIRIA 2020 guidance which confirmed that basic ground gas protection measures will be incorporated into the design of the proposed residential dwellings across the Former Landfill Area, commensurate with Characteristic Situation (CS) 2.

Groundwater Monitoring

There is no classified groundwater body beneath the site due to the unproductive Kimmeridge Clay strata. There is no identified pollution pathway to groundwater and therefore no groundwater monitoring regime is currently in place for the site, or proposed as part of DfR works.

Surface water Monitoring

Surface water monitoring is already being carried out at the site. Monitoring locations are shown on the drawing extract below and comprise:

- SW1: upstream of Former Landfill Area;
- SW5 & SW6: upstream of engineered reed bed;
- Outlet: discharge point of engineered reed bed; and
- SW7 & SW9: downstream of engineered reed bed

Existing (ongoing) Surface Water Monitoring Locations (taken from Hydrock Technical Note: Summary Controlled Waters Risk Assessment, August 2022)

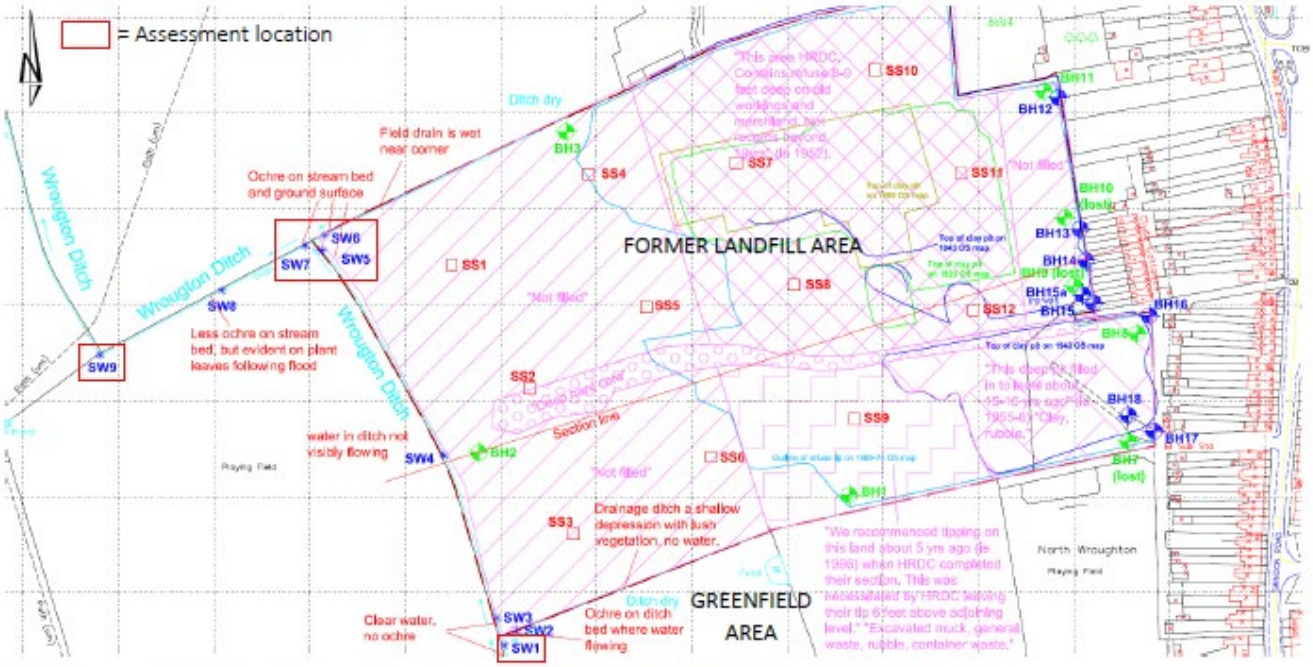


Figure 3.1: Surface water assessment locations (source: historical Hydrock exploratory hole location plan dated 2008)

Surface water monitoring between 2017 and 2022 has confirmed that the containment afforded by the Kimmeridge Clay followed by the polishing through the engineered reed bed is providing a good level of protection to the Controlled Waters receptor (Wroughton Ditch).

Providing the reed bed is protected and maintained and continually operated in accordance with the environmental permit, the risk to Controlled Waters is considered to remain low. The permit is authorised to Hills Wate Solutions who will continue the ongoing maintenance and monitoring at compliance points, to ensure the discharge of the reed bed is in compliance with conditions of the Environmental Permit.

This DfR permit application is proposing supplementary surface water monitoring at the reed bed outlet compliance point during DfR site operations, to provide additional confidence / data that the surface body is not detrimentally impacted by operations. Proposed monitoring is included in the Emissions Monitoring and Mitigation Plan (**C578-BPA-EMMP).**

Site Closure / Permit Surrender

On completion of the proposed filling under this DfR permit application, construction works will commence to build the residential properties, cricket pitch, access roads and new drainage.

In terms of the physical stability of the reused waste soil, this will have been demonstrated via verification testing against the **Hydrock Earthworks Specification.**

Post-placement monitoring is detailed within the Earthworks Specification schematic (August 2022) and details the following:

"It is the contractor's responsibility to set up settlement monitoring stations on a 10m grid along new road and service alignments and to monitor these on a regular basis on completion of earthworks. Levels must be related to a fixed station situated outside the influence of the landfill and site operations. The maximum tolerable settlement is 50mm long-term. Monitoring shall continue for a period of at least one year after construction and intervals shall vary from daily to monthly over that period to show future movement will be within tolerances."

In terms of chemical stability of the reused waste soil, Hydrock have already characterised the soil to be suitable for its intended use with no unacceptable risks to receptors identified. The waste will have been conditioned and compacted during placement, which will act to minimise infiltration, and mitigate the leachability/mobility of any residual soil contaminants. Areas of hardstanding and new surface water drainage systems as part of the development will also reduce the amount of surface water infiltration and leaching.

The process to commence 'Site closure' i.e. application for the surrender of the EA DfR permit, will be actioned after DfR filling operations are completed and verified, by production and submission of suitably detailed Completion / Verification Reports to the EA.

A dedicated / standalone Site Closure Plan is not considered to be required based on the above.

Conceptual Site Model

Conceptual Site Model for the Proposed Deposit for Recovery Operations Phase

Source	Pathway	Receptor	Comment	Documentation
Soils for recovery (post-treatment)	Infiltration	Groundwater	Kimmeridge Clay layer below site is acting as an aquitard. Placement of engineered fill for recovery will decrease permeability and decrease infiltration.	Hydrock CWRA, RS, WRP
	Surface run-off (silt/ contaminants)	Controlled Water Body (Wroughton Ditch)	Existing drainage system through reed bed system to cope with dissolved phase contaminants. Silt prevention measures to mitigate overload of silts into drainage system and reed bed.	Hydrock CWRA, RS, WRP C578-BPA-EMMP C578-BPA-ERA
	Inhalation (dust)	Humans	Good practice site controls. Emissions monitoring.	C578-BPA-EMMP C578-BPA-ERA
	Inhalation (asbestos fibres)	Humans	Good practice site controls. Emissions monitoring.	Hydrock RS C578-BPA-EMMP C578-BPA-ERA
	Odours/ vapours	Humans	Removal of putrescible material will be undertaken during remedial treatment phase (prior to DfR operations), though will remove odour-sources from the soils. Good practice site controls. Emissions monitoring.	Hydrock RS C578_BPA_EMMP
	Ingestion / Dermal contact (Solids)	Humans	Good practice site controls.	C578-BPA-EMMP C578-BPA-ERA
	Mud tracked off-site	Surrounding environment	Good practice site controls.	C578-BPA-EMMP C578-BPA-ERA
Fuel for mobile earthmoving plant	Infiltration	Ground / Wroughton Ditch	Good practice site controls.	C578-BPA-ERA
Noise	Air	Humans	Standard earthmoving plant. Controls and strategic work locations where possible. Emissions monitoring	C578-BPA-EMMP C578-BPA-ERA
Vibration	Ground	Humans Residential properties	Standard earthmoving plant. Controls and strategic work locations where possible. Emissions monitoring	C578-BPA-EMMP C578-BPA-ERA
Ground Gases	Air	Humans	Site workers to be aware of ground gas presence (CH_4 and CO_2) with potential build-up of gases when working in trenches or confined spaces. Risk assessment and personal monitoring if required.	Hydrock RS Soilfix RAMS