AtkinsRéalis

Waste Acceptance Procedures

South Tees Development Corporation

February 2025

MAM1-ATK-ENV-FDRXX-RP-EN-000003

FOUNDRY CENTRAL WEST

Notice

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This document has 32 pages including the cover.

Document history

Document title: Waste Acceptance Procedures

Document reference: MAM1-ATK-ENV-FDRXX-RP-EN-000003

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	To support environmental permit application	VW/LW	GB	AH	SB	May 2024
2.0	Boundary Update	LW	LW	AH	SB	Feb 2025

Client signoff

Client	South Tees Development Corporation
Project	FOUNDRY CENTRAL WEST
Job number	5223442
Client signature/date	

Contents

Tables

Figures

1. Introduction

AtkinsRéalis has been commissioned by South Tees Development Corporation (STDC) to apply, on their behalf, for a bespoke environmental permit for deposit for recovery. The permit is for activities associated with the treatment, storage and backfill associated with the construction of a development platform at Foundry Central West, located within the Teesworks site.

As part of the permit application waste acceptance procedures are required, these are set out within this document. These procedures have been written in accordance with the Environment Agency (EA) Guidance: Waste acceptance procedures for deposit for recovery [1].

1.1 Document Structure

This document forms part of the additional information suite that is provided as part of the Foundry Central West bespoke environmental permit for deposit for recovery application. The structure of the additional information documents is shown in Table 1-1 and is designed so that information is not duplicated across documentation where possible. To facilitate this, core information regarding the site, its setting and details of the development are provided within the Deposit for Recovery Bespoke Permit Non-technical Summary and Additional Information [2] (referred to herein as the Non-technical summary) and therefore are not duplicated here. As such it is recommended that the reader reads the Non-technical Summary prior to reading this document.

Table 1-1 - Document Suite Structure to Support Permit Application

Suggested Reading Order	Document Title	Document Reference	
1	Waste Recovery Plan [3]	RCOX-ATK-ENV-FDRXX-RP-EN-000001.P1.03	Permit Forms (Parts A, B2, B4, F1)
2	Non-technical Summary and Additional Information [2]	MAM1-ATK-ENV-FDRXX-RP-EN-000001	
3	Conceptual Site Model, Risk Assessment and Environmental Setting and Site Design Report [4]	MAM1-ATK-ENV-FDRXX-RP-EN-000002	
4	Hydrogeological Risk Assessment [5]	10047374-AUK-XX-XX-RP-ZZ-815-02	
5	Ecological Risk Assessment [6]	INCA2024-14	
6	Waste Acceptance Procedures [7]	MAM1-ATK-ENV-FDRXX-RP-EN-000003	
7	Environmental Management System Summary [8]	MAM1-ATK-ENV-FDRXX-RP-EN-000004	

Document Signpost

Required reading	This document	Permit additional information document

1.2 Objectives

The objectives[1] of the waste acceptance procedure are to make sure that waste is only accepted if it:

- Is suitable for the intended activity.
- Is allowed under the permit.
- Is considered in the risk assessments for the permit.

and to:

- Make sure that the waste does not cause pollution.
- Determine which waste will be accepted and from what sources.
- Prevent waste arriving at the site that is not authorised by the permit.
- Provide supporting evidence when preparing the permit surrender application.

[1] Reproduced from Environment Agency Guidance 'Waste acceptance procedures for deposit for recovery' [1]

2. Roles and Responsibilities

Table 2-1 defines the roles and responsibilities for all parties participating in the delivery of the works and therefore are involved with the waste acceptance procedures at the site.

Table 2-1 - Roles and Responsibilities

Organisation	Role
STDC	Landowner and legal **Operator** and waste **Producer**[2] of the permitted site. STDC (and their representative(s)) will ensure that the contractor undertaking works within the permitted site, does so in accordance with the waste acceptance procedures. They will manage communication between all parties; ensure compliance with permit conditions and have overall responsibility to liaise with the Environment Agency (as per the requirements of the permit), although day to day this is likely to be undertaken by STDCs consultants. As Producer STDC (and their representatives(s)) will ensure that waste produced is classified in accordance with Technical Guidance WM3: Waste Classification – Guidance on the classification and assessment of waste [9] and that the requirements placed upon them under the waste duty of care are met.
	Waste Activity Manager (WAMITAB Scheme) Employed by the Operator to ensure compliance with Environmental Permitting Regulations 2016 and the environmental permit. Will hold or be working towards CIWM Level 4 certified medium risk operator competence for non-hazardous waste treatment and transfer or CIWM Level 4 certificate in waste and resource management).
AtkinsRéalis	**Waste and Materials Management Consultant** representative to STDC. Responsible for: ▪ management and implementation of the waste acceptance procedure; ▪ approval for waste and materials for material recovery; ▪ oversee compliance with the environmental permit; ▪ advise STDC on legislative requirements; ▪ delegated authority to liaise the Environment Agency, regarding waste acceptance, on behalf of STDC; and ▪ maintaining material recovery records including of waste acceptance, storage, treatment, backfilling and recovery.
Arcadis	**Ground Remediation Consultant** representative to STDC. Responsible for: ▪ collection of samples and management of laboratory testing; ▪ determine whether material is suitable for use by comparison of sample results against the geotechnical and environmental re-use criteria as detailed within the Earthworks Specification [10] and Remediation Strategy [11] to demonstrate suitability; ▪ determine whether material is considered within the hydrogeological risk assessment [5]; ▪ comparison of leachate results against acceptance criteria derived from the hydrogeological risk assessment [12];

[2] Of wastes generated within the Site boundary and the wider Teesworks boundary.

Organisation	Role
	▪ groundwater monitoring and assessment as required by the Hydrogeological Risk Assessment [5]. ▪ watching brief for the works; ▪ advising the placement location of material based on results in line with the Earthworks Specification [10] and Remediation Strategy [11]; and ▪ delegated authority to liaise the Environment Agency, regarding risk to groundwater and Redcar and Cleveland Contaminated Land Officer, regarding contamination risk, on behalf of STDC.
Earthworks Contractor	**Earthworks Contractor** Responsible for: ▪ undertaking the works (excavation, treatment, storage, backfilling) in accordance with their contract with STDC, the conditions of the permit and the requirements of the Earthworks Specification [10] and Remediation Strategy [11]; ▪ communicating encounters of suspected unacceptable waste and segregating waste appropriately; ▪ completion of waste acceptance forms; ▪ completion of waste transfer notes/hazardous waste consignment notes when waste is transferred off-site; ▪ producer and holder of the CEMP, and ▪ timely provision of information to STDC and their representatives.

Table notes

Organisation colours are used throughout this document to help communicate role / activity holders noting that overall responsibility sits with the permit operator.

3. Waste Acceptance

Definitions of terms used within this document are set out within the Non-technical Summary [2]. For convenience, pertinent definitions to this report are summarised below:

Table 3-1 – Definitions Excerpt

Material Recovery	Term used to describe the permitted activity, which consists of the whole recovery operation, including preparation for backfilling (treatment, sampling and storage) and backfilling. Material Recovery has been achieved at the point of recovery.
Treatment	Term used to describe the material processing to enable its suitability for backfilling. This will be a mixture of crushing, screening, blending and stabilisation as required.
Waste	Term used to describe the excavated waste, during its excavation and storage, prior to waste acceptance.
Non hazardous	Within this document is applicable as non hazardous waste, as defined in WM3 [9].
Material	Term used to describe the material following waste acceptance which is being treated, stored or backfilled during material recovery.
Backfilling	Term used to describe the placement of material in accordance with the Earthworks Specification [10] and therefore has been accepted as suitable for its intended use as set out by the waste recovery plan.
Recovery	The point at which the waste has been placed in the ground in accordance with the Earthworks Specification[10]. At this point the material is considered to be recovered and material recovery is complete.

3.1 Overview

During this material recovery process there are several steps towards material acceptance that act as decision points in the management of waste / material. This approach is required as the suitability for the intended use of the majority of waste types will only be achieved following treatment under the Foundry Central West environmental permit.

A summary of the procedure is presented in Table 3-2.

Table 3-2 - Acceptance Procedure Summary

Step	Name	Action	Undertaken by
1	Pre-acceptance check	Visual check by contractor during **excavation** and stockpiling to confirm waste type is listed in the Waste Recovery Plan [3] and is free from visual and olfactory evidence of contamination.	Earthworks contractor

		Check that the required information regarding the characteristics and origin of the waste has been provided / collected.	AtkinsRéalis
2	Acceptance of waste (site won and / or wider Teesworks site) for material recovery	Visual check of **stockpile** by STDCs representative AtkinsRéalis to confirm waste type is listed in the Waste Recovery Plan [3] and is free from visual and olfactory evidence of contamination.	AtkinsRéalis
3	Material recovery	Preparation for backfilling including treatment (where required) including storage,	Earthworks contractor
		Sampling (undertaken by STDCs representative Arcadis), analysis and assessment against the waste acceptance procedure.	Arcadis
4	Acceptance for backfill decision	Confirmation of acceptance and subsequent backfilling with this material in accordance with the Earthworks Specification [10].	AtkinsRéalis
Recovery		Placement in the ground in accordance with the Earthworks Specification [10]. At this point the material is considered to be recovered and material recovery is complete.	Earthworks contractor

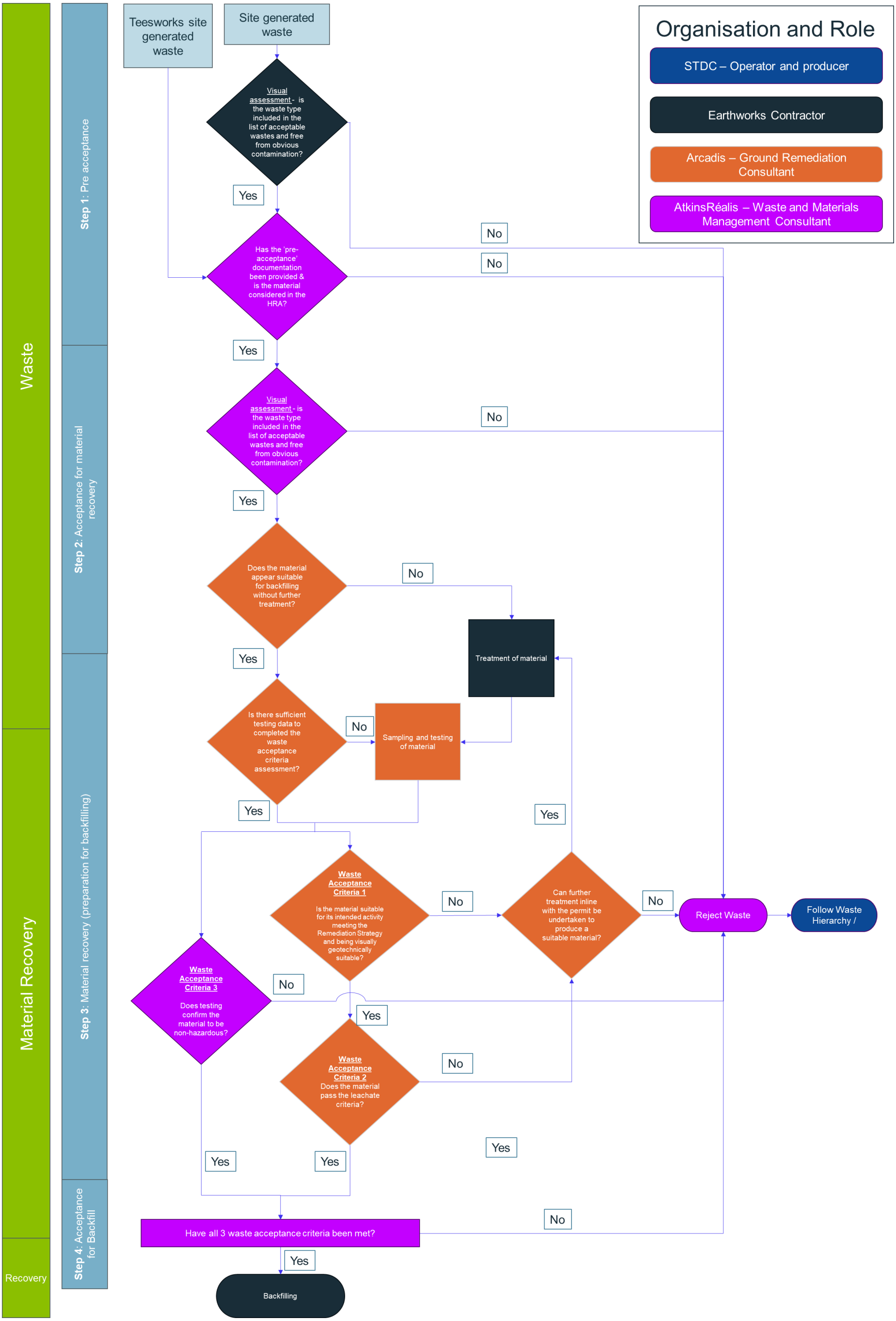
Figure 3-1 presents a summary of the waste acceptance procedure which will be followed. The acceptance of waste within the permit boundary is based on the collation of qualitative and quantitative evidence undertaken at fixed points in the waste acceptance procedures, and an established communication protocol using AtkinsRéalis Waste and Materials Management System. The evidence used as part of the waste acceptance procedure includes:

- Intrusive ground investigation data and laboratory analytical results which has been used to classify in situ wastes (prior to excavation);
- Qualitative visual assessment by experienced earthworks contractors and waste consultants;
- Laboratory analytical results and waste classification assessments on treated waste;
- Geotechnical validation of treated waste;
- Waste and Materials Management System to track waste origin and destination and to document and communicate decisions between the operator and the Contractor (detailed in Section 4).

Records required throughout the process are captured on a suite of forms associated with the Waste and Materials Management System which will be used to track waste origin and destination and to document and communicate decisions between the operator and the Contractor. These forms are summarised in Section 4.2 copy provided in Appendix A.

Note, these forms are applied to sites and material management across the Teesworks site and are subject to revision as required, as presented they show each route through the process.

Figure 3-1 – Waste Acceptance Procedure Summary Flow Diagram



3.2 Step 1 - Pre Acceptance of Waste

The Earthworks Contractor will pre-accept the waste based on a visual assessment. This is to identify that:

- the material is of a waste type included in the Waste Recovery Plan [3] (also presented in Appendix B).
- there is no indication (visual / olfactory) of gross contamination.

The Contractor's decision to pre-accept the waste is recorded via the waste and materials management system as described in Section 4.2 and presented in Appendix A. This form incudes description of the material, volumes and location of the stockpile.

This form will be submitted to STDCs waste and materials management consultant, AtkinsRéalis.

3.3 Step 2 - Acceptance of Waste for Material Recovery

3.3.1 Wastes Generated from the Site

Following receipt of the Waste and Materials Management System form from the Earthworks Contractor, the submitted information shall be factually checked, and each stockpile shall be visually inspected by STDC waste and materials management consultant AtkinsRéalis.

Following review of the submitted information and visual inspection of the stockpile by AtkinsRéalis, the waste will be compared against the basic characterisation of the waste which was undertaken in accordance with WM3 [9] using data collected during the ground investigation at the site prior to works commencing and ensuring that the information presented in Appendix C.1 is provided for the waste.

The waste may be accepted if:

- it reflects the basic characterisation which was undertaken prior to works commencing;
- the waste is of a waste type included in the Waste Recovery Plan [3], (also presented in Appendix B);
- the waste is of a type and source detailed within the Hydrogeological Risk Assessment [5]; and
- there is no indication (visual / olfactory) of gross contamination such as:
  - non aqueous phase liquids;
  - tar; and
  - any waste which by its colour or odour suggests it may be contaminated by substances requiring further investigation.

Only waste that meet the requirements of the Waste Recovery Plan [3] are to be considered for input into the material recovery operation.

If the waste meets the EWC code within the Waste Recovery Plan [3], but does not reflect the basic characterisation already undertaken, the waste can still be accepted for material recovery, but basic characterisation will be required as part of material recovery Step 3 and review of its alignment with the Hydrogeological Risk Assessment.

3.3.2 Wastes Generated within the Wider Teesworks Site

This scenario is applied to waste generated by STDC on the wider Teesworks site. The proposal to use waste from the wider Teesworks site is notified via the Waste and Materials Management System, to STDC's waste and materials management consultant AtkinsRéalis by the Earthworks Contractor, prior to importing the waste.

There are two routes for the use of waste from the wider Teesworks site:

a) As dug material that would be transported to the site and treated within the permit boundary;

b) Waste that is suitable for recovery without the requirement for treatment within the permit boundary (for example, aggregate manufactured in accordance with the WRAP Quality Protocol [13]).

Following review of the submitted information which will include the information presented in Appendix C.1, the material is visually inspected by STDC's waste and materials management consultant AtkinsRéalis.

The waste may be accepted if:

- It has undergone basic waste classification and shown to be non-hazardous in accordance with WM3 [9];
- the material is of a waste type included in the Waste Recovery Plan [3] (also presented in Appendix B);
- the waste is of a type and source detailed within the Hydrogeological Risk Assessment [5]; and
- there is no indication (visual / olfactory) of gross contamination.

Acceptance of the waste for material recovery is notified to the Earthworks Contractor via the Waste and Materials Management System.

3.4 Step 3 - Material Recovery

Step 3 encompasses the preparation for backfilling, which includes treatment (crushing, screening, blending and stabilisation as required), sampling and testing of material, and assessment against the waste acceptance criteria.

3.4.1 Treatment

Prior to starting treatment, the Earthworks Contractor will notify STDC's waste and materials management consultant AtkinsRéalis of the intention to create a new stockpile via the Waste and Materials Management System. The submission of the notification triggers the start of material recovery, and informs STDC Ground Remediation consultant Arcadis to start the sampling of the stockpile as it is being treated.

Material is to be treated, where deemed necessary by STDC Ground Remediation consultant Arcadis, in line with the permit to render it suitable for use in line with the Earthworks Specification [10]. The Contractor will screen, crush and blend and stabilise the material as required.

3.4.2 Sampling and Testing

All testing on material is to be undertaken from stockpiles when it is considered that the material is in the form suitable for its intended use. Note, physical properties that are a result of the method of fill placement and compaction are not required to have been completed to demonstrate the physical suitability of the material, for approval as material recovery.

3.4.3 Waste Acceptance Criteria

Chemical and geotechnical results will be assessed by STDC's suitably qualified consultants; AtkinsRéalis specialising in waste classification as waste and materials management consultant, and Arcadis specialising in geo-environmental ground remediation.

There are three waste acceptance criteria, as defined in the following documents, confirming the suitability of the material:

- Criteria 1 - Remediation (reuse) criteria, protective of human health [11] and Earthworks Specification [10];
- Criteria 2 – Hydrogeological Risk Assessment [5], protective of groundwater; and
- Criteria 3 - Waste classification (non hazardous) in accordance with WM3 [9] and the type of waste included within the Waste Recovery Plan [3].

For a material to be accepted for backfilling (Stage 4), the three waste acceptance criteria need to have been met.

The testing requirements within these documents comprise the waste acceptance criteria for material recovery described in the sections below. Note the material is not biological in origin and there are no biological requirements to determine that is its suitable for use other than the material being a waste type included in the Waste Recovery Plan [3]. A summary of the waste acceptance criteria is presented in Appendix C.

3.4.3.1 Chemical Suitability

3.4.3.1.1 Remediation Strategy (Criteria 1) and Hydrogeological Risk Assessment (Criteria 2)

Chemical suitability for backfilling is also to be determined through compliance with the Remediation Options Appraisal, Enabling Earthworks and Remediation Strategy [11], submitted and approved by the local planning authority, and the Hydrogeological Risk Assessment [5].

The Remediation Options Appraisal, Enabling Earthworks and Remediation Strategy [11] (referred to as the remediation strategy), presents the remediation objectives that are required to address the identified contaminant linkages in respect to human health. Material is only to be accepted for backfilling that is in compliance with the requirements of this document. This includes reuse criteria including limitations on the suitability of some materials for particular end uses such as for a surface material, a list of required determinands for analysis and screening and the frequency of soil testing (summarised in Table 3-3).

Based on the outcome of the Hydrogeological Risk Assessment [5], acceptance criteria for leachate have been generated, as presented in Appendix C.2 The leachate testing is specified at the frequency shown in Table 3-3.

Waste materials not included within the Hydrogeological Risk Assessment [5] or materials from different sources are to be assessed prior to acceptance to demonstrate they are of no greater risk than the materials included within the hydrogeological risk assessment.

Table 3-3 – Waste Acceptance Criteria Minimum Testing Frequencies

Waste types	Frequency		
	Soil Waste Classification	Soil Human Health	Leachate Groundwater
	Site derived materials		
Slag dominant made ground	One sample per 1,000 m^3	One sample per 2,000 m^3	One sample per 5,000 m^3
All other made ground types	One sample per 1,000 m^3	One sample per 1,000 m^3	One sample per 5,000 m^3
	Non-site derived materials		
All waste types	One sample per 1,000 m^3	One sample per 1,000 m^3	One sample per 5,000 m^3

Waste acceptance testing is to initially be undertaken at a rate of one in 5,000 m^3 on groundwater water resource leachate samples. Where samples exceed within a stockpile, the sampling frequency may be increased to one in 2,000 m^3 to allow further material characterisation and aid potential segregation of materials within the stockpile. Following the further higher frequency testing, an average concentration may be used to accept waste if the following conditions are met:

- The results of the additional testing demonstrate that the stockpile comprises a single material type.
- The concentration exceeding can be statistically demonstrated to fall within the maximum concentration range extents expected.

3.4.3.2 Geotechnical Suitability

3.4.3.2.1 Earthworks Specification (Criteria 1)

To ensure the materials placed meet the required engineering properties, the materials are to be assessed in accordance with the Earthworks Specification [10]. These results are to be assessed by an Arcadis suitably qualified and experienced geotechnical engineer. Note, physical properties that are a result of the method of fill placement and compaction are not required to have been completed to demonstrate the physical suitability of the material, and therefore undertaken for approval as material recovery.

3.4.3.3 Waste Classification (Criteria 3)

Compliance testing of the material is to be undertaken to check a material classification against the basic characterisation undertaken prior to excavation. Required determinands and the frequency of chemical testing is based on the outcome of the basic characterisation. This compliance testing will be used to undertake compliance waste classification of the material to confirm suitability as non hazardous waste in accordance with WM3 and the type of material aligns detailed within the Waste Recovery Plan [3]. If a new source of material is found, but it is a waste type included in the Waste Recovery Plan [3], a basic characterisation will be undertaken, and the sampling plan and testing suite will be chosen to reflect the material type, its source etc.

3.5 Step 4 – Acceptance for Backfilling

Acceptance for backfilling will be undertaken prior to backfilling and subsequent recovery in line with the objectives in Section 1.2. The acceptance of the material for backfilling is recorded and communicated to the Earthworks Contractor via the Waste and Materials Management System, which includes details of placement location.

3.6 Recovery

Recovery has been achieved upon completion of backfilling in accordance with the requirements of the Earthworks Specification [10].

3.7 Non-conforming wastes

If the material does not meet the criteria above, then the non-conformance procedure is followed which includes a record in the Waste and Materials Management System with the following details:

- date and time;
- Earthworks Contractor's details;
- description of the waste;
- volume of waste;
- waste code;
- samples taken (if required); and
- actions agreed and taken.

Waste arising from within the site that is identified as non-conforming will be quarantined, sampled, analysed and classified in accordance with WM3. If, after waste classification, the waste is still considered to be non-conforming and not suitable for acceptance at the site, the waste will be transferred to a suitably permitted waste facility in accordance with the Waste Duty of Care Code of Practice.

Any waste that has arisen from the wider Teesworks site and is identified as non-conforming following transport to the site, will be rejected at the site gate, but as acceptance for backfilling will be undertaken prior to transportation, the likelihood that this will happen is low.

4. Documentation and Records

4.1 Tracking System

For recovered materials produced by STDC within the Teesworks site, including within the Foundry Central West site, waste transfer and acceptance will follow the Waste and Materials Management System in accordance with Figure 3-1 and Section 3. This system captures the information required under the Duty of Care Code of Practice and allows for waste location and provenance to be tracked on site. Waste / material being received into the site under the environmental permit from the wider Teesworks site will also be tracked under the waste and materials management system which follows the duty of care. The required documentation is described in more detail below.

4.2 Required Documentation

Documentation required to facilitate and record the waste acceptance process will be through a suite of Microsoft Forms, with automated email confirmations to trigger actions by the relevant party, known as the 'Waste and Materials Management System'. The MS Form outputs are collated into a searchable stockpile viewer dashboard, which will be refreshed weekly as a minimum and will facilitate an efficient system for recording the outputs of the waste acceptance process. The suite of forms detailed below is the current version, and may be updated to accommodate additional information requirements as the project need arises. The form suite is presented in Appendix A. Note that branching has been included in the live forms to guide the user depending on question response, and therefore the examples presented in Appendix A are the full versions.

Table 4-1 - Waste and Materials Management System

Form Title	Form Acronym	User	Intention of Form
Stockpile Identification Number Request	SPID	Earthworks contractor	Requests a stockpile identification number and documents the waste origin, type and treatment intention. Documents Step 1 visual assessment.
Response:	*Email confirmation of stockpile ID issued. Step 2 visual assessment documented.*		
Stockpile Completion Notification	SCN	Earthworks contractor	Confirms to STDC that a stockpile has reached capacity and treatment for that stockpile is complete.
Response:	*Sampling and laboratory testing undertaken, followed by assessment against the waste acceptance criteria (Step 3).*		
Stockpile Assessment Outcome Confirmation	SC	AtkinsRéalis on behalf of STDC	Documents decision of acceptance for backfilling (Step 4) or non-conformance and confirmation of this is issued via email to the Contractor. If waste is non-conforming then further actions are detailed.
Response:	*Contractor places material as backfill.*		

Form Title	Form Acronym	User	Intention of Form
Stockpile Placement Notification	SPN	Earthworks Contractor	Confirms to STDC the placement location and method for recovered material (Recovery).

A searchable Power BI dashboard will track the movement of waste from excavation to placement. Data from the dashboard will be used for the quarterly reporting of treatment throughput, and permit compliance as a requirement of the Deposit for Recovery environmental permit.

4.3 Required records

Records that will be collected as part of the waste acceptance process include:

- completed waste acceptance forms;
- records of non-conforming wastes;
- excavation extents and depths supported by topographic survey data;
- volumetric measures of waste excavated and transferred off-site to a suitably permitted waste facility, documented in waste transfer notes or hazardous waste consignment notes, supported by weighbridge tickets;
- volumetric measures of treated waste supported by topographic survey data;
- volumetric measure of recovered waste volume (fill volume) supported by topographic survey data;
- laboratory certificates for waste samples; and
- site drawings and topographic plans will be developed by the Earthworks Contractor to demonstrate that:
  - site levels have been restored to the agreed formation levels; and
  - the location of recovered materials is documented on as-built drawings.

The records listed above will be collated on SharePoint, available to the project team.

5. References

[1] Environment Agency, “Guidance - Waste acceptance procedures for deposit for recovery,” Environment Agency, 29 June 2023. [Online]. Available: https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-acceptance-procedures-for-deposit-for-recovery. [Accessed 4 December 2023].

[2] AtkinsRéalis, “Non-technical Summary and Additional Information MAM1-ATK-ENV-FDRXX-RP-EN-000001,” 2025.

[3] AtkinsRéalis, Waste Recovery Plan RCOX-ATK-ENV-FDRXX-RP-EN-000001.P1.05, 2025.

[4] AtkinsRéalis, Conceptual Site Model, Risk Assessment and Environmental Setting and Site Design Report MAM1-ATK-ENV-FDRXX-RP-EN-000002, 2025.

[5] Arcadis, “Hydrogeological Risk Assessment 10047374-AUK-XX-XX-RP-ZZ-815-02-FCW_HRA,” 2025.

[6] INCA, Ecological Risk Assessment INCA2024-14, 2024.

[7] AtkinsRéalis, Waste Acceptance Procedure MAM1-ATK-ENV-FDRXX-RP-EN-000003, 2025.

[8] AtkinsRéalis, Environmental Management System Summary MAM1-ATK-ENV-FDRXX-RP-EN-000004, 2025.

[9] Environment Agency, “Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste,” 2015.

[10] Arcadis, “Earthworks Specification Foundry Central West: 10035117-AUK-XX-XX-RP-ZZ-907-02-FCW_Earthworks Spec. Revision 02,” May 2024.

[11] Arcadis, Remediation Options Appraisal, Enabling Earthworks and Remediation Strategy, Foundry Central West, Teesworks. 10047374-AUK-XX-XX-DR-ZZ-735-02-FCW-ROA&S, February 2024.

[12] Arcadis, “Development of Waste Acceptance Criteria: Groundwater Resource Protection,” 2025.

[13] Environment Agency, “WRAP Quality Protocol: Aggregates from Inert Waste,” 22 October 2013. [Online]. Available: https://www.gov.uk/government/publications/quality-protocol-production-of-aggregates-from-inert-waste. [Accessed 20 January 2025].

APPENDICES

Appendix A. Example Form Suite

Stockpile ID Request (SPID)

Use this form prior to creating a new stockpile. All fields must be completed. If you don't know an answer to any of the questions, please enter 'Unknown'. A stockpile reference number will be provided via email.

* Required

Select Stockpile Type

1

Contractor name (company name) *

2

Contractor contact name *

3

Contractor contact email *

4

Project name or contract name *

5

Date form submitted *

6

Anticipated stockpile volume (m3) *

7

Anticipated Location Easting (6 digits) *

8

Anticipated Location Northing (6 digits) *

9

Date stockpile creation will start *

10

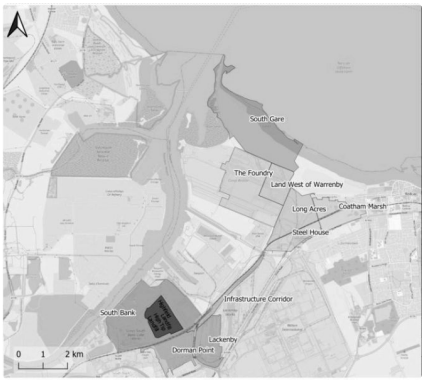
What kind of stockpile do you want to create? *

- ◯ Unprocessed / as dug material from excavation
- ◯ Unprocessed material from above ground demolition
- ◯ Processed material from a parent stockpile
- ◯ Move material from wider Teesworks site
- ◯ Imported product
- ◯ Other

Unprocessed material stockpile information - earthworks

11

Source of material (site area) *



- ◯ DMP - Dorman Point
- ◯ FOU - The Foundry
- ◯ LAC - Lackenby
- ◯ LWW - Land West of Warrenby
- ◯ MAM - Legacy
- ◯ SBW - South Bank
- ◯ SHO - Steel House
- ◯ TLA - Long Acres

12

Material origin grid square(s) *

13

Material origin depth(s) (m AOD) *

14

Material origin structure or site area description (e.g. stockhouses, adjacent to red main or project specific area) *

15

Will the stockpile be a feedstock? *

- ◯ Yes
- ◯ No

16

Material type *

- ◯ Slag dominant material
- ◯ Granular made ground
- ◯ Cohesive made ground
- ◯ Concrete
- ◯ Brick (masonry)
- ◯ Brick (masonry) and concrete
- ◯ Sinter (Generally described as a black fine gravel)
- ◯ Waste (Comprising significant amounts of waste materials including metal, wood, and plastic in addition to the Made Ground deposits.)
- ◯ Refractory brick
- ◯ Other

17

Is there an intention to process using the Factory Production Control? *

- ◯ Yes
- ◯ No

Processed material stockpile information

18

Parent stockpile ID (do not include spaces e.g FOU-SP120) *

19

Anticipated date processing will finish *

20

Material grade *

For example 1A, 6A etc.

21

Material type *

- ◯ Slag dominant material
- ◯ Granular made ground
- ◯ Cohesive made ground
- ◯ Concrete
- ◯ Brick (masonry)
- ◯ Brick (masonry) and concrete
- ◯ Sinter (Generally described as a black fine gravel)
- ◯ Waste (Comprising significant amounts of waste materials including metal, wood, and plastic in addition to the Made Ground deposits.)
- ◯ Refractory brick
- ◯ Other

22

Evidence of visual or olfactory contamination *

- ◯ Yes
- ◯ No

23

Describe the contamination *

24

Reason for processing *

- ◯ aggregate production under Earthworks Specification
- ◯ aggregate production under the Factory Production Control
- ◯ rescreen to achieve geotechnical suitability (non-hazardous waste only)
- ◯ rescreen to achieve chemical suitability (non-hazardous waste only)
- ◯ Other

25

Will the material be *

- ◯ waste (processed using an Environmental Permit or LEP)
- ◯ non-waste (processed under a Materials Management Plan (MMP))

26

Environmental Permit reference *

27

List the machinery type(s) used and associated serial numbers *

28

MMP reference *

- ◯ Prairie / Dorman Point MMP (10035118-AUK-XX-XX-RP-ZZ-0119-06)
- ◯ South Bank Quay and Priorities Area MMP (5210524-STDC-SB-MMP)
- ◯ South Bank Western Access Road MMP (5212569-STDC-SBAR-MMP-002)

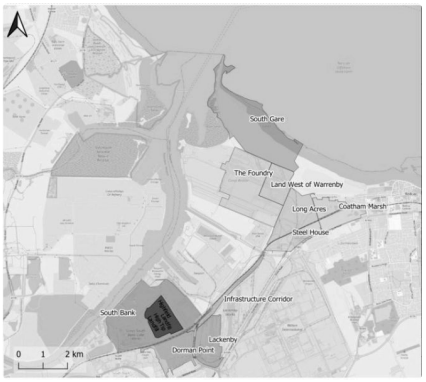
29

List the machinery type(s) used, associated serial numbers and Local Authority mobile plant permit *

Unprocessed material stockpile information - demolition

30

Source of material (site area) *



- ◯ DMP - Dorman Point
- ◯ FOU - The Foundry
- ◯ LAC - Lackenby
- ◯ LWW - Land West of Warrenby
- ◯ MAM - Legacy
- ◯ SBW - South Bank
- ◯ SHO - Steel House
- ◯ TLA - Long Acres

31

Material origin grid square(s) *

32

Material origin structure *

33

Will the stockpile be a feedstock? *

- ◯ Yes
- ◯ No

34

Material type *

- ◯ Concrete
- ◯ Brick (masonry)
- ◯ Brick (masonry) and concrete
- ◯ Sinter (Generally described as a black fine gravel)
- ◯ Waste (Comprising significant amounts of waste materials including metal, wood, and plastic in addition to the Made Ground deposits)
- ◯ Refractory brick
- ◯ Other

35

Is there intention to process under the Factory Production Control? *

- ◯ Yes
- ◯ No

Material excavation detail

36

Visual material description *

37

Is the material a waste or non-waste *

- ◯ Non-waste (excavated under Materials Management Plan)
- ◯ Waste

38

MMP reference *

- ◯ Prairie / Dorman Point MMP (10035118-AUK-XX-XX-RP-ZZ-0119-06)
- ◯ South Bank Quay and Priorities Area MMP (5210524-STDC-SB-MMP)
- ◯ South Bank Western Access Road MMP (5212569-STDC-SBAR-MMP-002)

39

Evidence of visual or olfactory contamination *

- ◯ Yes
- ◯ No

40

Describe the contamination (depth, extent, type) *

Waste input for FPC detail

Link to FPC: https://ssisteel.sharepoint.com/sites/MaterialsManagement2-StockpileManagement/Shared%20Documents/Forms/AllItems.aspx?csf=1&web=1&e=ROba4k&cid=6133d96c%2D26c6%2D4daa%2D9ecb%2Df69279f3e441&FolderCTID=0x012000A189A92E68A2EC48A542F1CB3CCB711B&id=%2Fsites%2FMaterialsManagement2%2DStockpileManagement%2FShared%20Documents%2FStockpile%20Management%2F02%5FTechnical%2F02%2E03%5FSpecification%2FPublished&viewid=c118f048%2Dbd8d%2D4ccc%2D9fb1%2D941778277229

41

Visual inspection of waste input material undertaken by (name of person) *

42

Inspection date *

43

Waste input material source and description *

44

Is the material being separated based on source (taken to be a single structure or part thereof)? *

- ◯ Yes
- ◯ No

45

Waste Code (select all that apply) *

- [ ] 01 04 09 Waste sand and clays (waste sand only, must not include contaminated sand)
- [ ] 17 01 01 Concrete (must not include concrete slurry)
- [ ] 17 01 02 Bricks (excluding refractory bricks)
- [ ] 17 01 03 Tiles and ceramics
- [ ] 17 01 07 Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 [hazardous] (excluding refractory bricks)
- [ ] 17 03 02 Bituminous mixtures other than those mentioned in 17 03 01 [hazardous] (allowed only if bituminous mixtures from the repair and refurbishment of the asphalt layers of roads and other paved areas (excluding bituminous mixtures containing coal tar and classified as waste code 17 03 01 [hazardous]), must not include coal tar or tarred products, must not include freshly mixed bituminous mixtures)
- [ ] 17 05 04 Soil and stones other than those mentioned in 17 05 03 [hazardous] (must not contain any contaminated soil or stone from contaminated sites)
- [ ] 17 05 08 Track ballast other than those mentioned in 17 05 07 [hazardous] (Allowed only if does not contain soil and stoes from contaminated sites)
- [ ] 19 12 09 Minerals (for example sand and stones) (must not contain contaminated concrete, brick, tiles, sand, stone or gypsum from recovered plasterboard.)

46

Visual Inspection: Is material compliant with waste acceptance criteria as described in the Factory Production Control? *

- ◯ Yes
- ◯ No

47

Suggested remedial action *

Imported Product

48

Product type (e.g. topsoil) *

49

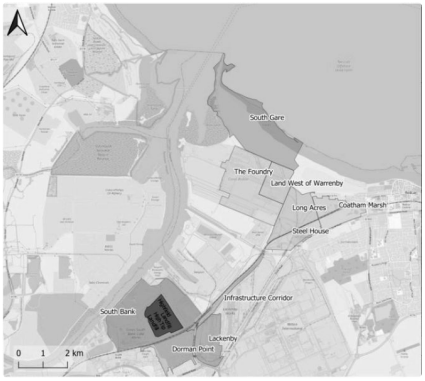
Product use (e.g. pipe bedding adjacent to SeAH plot) *

50

Product source (full address) *

51

Material destination *



- ◯ DMP - Dorman Point
- ◯ FOU - The Foundry
- ◯ LAC - Lackenby
- ◯ LWW - Land West of Warrenby
- ◯ MAM - Legacy
- ◯ SBW - South Bank
- ◯ SHO - Steel House
- ◯ TLA - Long Acres

52

Product specification obtained from supplier? *

- ◯ Yes
- ◯ No

53

Have laboratory results been obtained and uploaded here: https://ssisteel.sharepoint.com/:f:/r/sites/MaterialsManagement2-StockpileManagement/Shared%20Documents/Stockpile%20Management/02_Technical/02.08_Stockpile%20Management/Laboratory%20Data?csf=1&web=1&e=57fjti *

- ◯ Yes
- ◯ No

Transfer material from wider Teesworks site

54

Parent stockpile ID (do not include spaces e.g FOU-SP120) *

55

Parent Stockpile Location Easting (6 digits) *

56

Parent Stockpile Location Northing (6 digits) *

57

Is the parent stockpile *

- ◯ unprocessed waste
- ◯ processed waste
- ◯ unprocessed non-waste (excavated under a Materials Management Plan (MMP))
- ◯ processed non-waste (processed under a Materials Management Plan (MMP))
- ◯ product (processed using the Factory Production Control)
- ◯ Unknown

58

Material type *

- ◯ Slag dominant material
- ◯ Granular made ground
- ◯ Cohesive made ground
- ◯ Concrete
- ◯ Brick (masonry)
- ◯ Brick (masonry) and concrete
- ◯ Sinter (Generally described as a black fine gravel)
- ◯ Waste (Comprising significant amounts of waste materials including metal, wood, and plastic in addition to the Made Ground deposits.)
- ◯ Refractory brick
- ◯ Other

59

Description of the material based on visual observation *

60

Material grade *

61

Volume of material to be transferred (m3) *

62

Testing undertaken *

- ◯ Yes
- ◯ No

63

Evidence of visual or olfactory contamination *

- ◯ Yes
- ◯ No

64

Describe the contamination *

65

Confirm whether the transfer of material is *

- ◯ between two MMPs
- ◯ from an MMP area to an environmental permit boundary
- ◯ from an MMP to wider site (no environmental permit)
- ◯ between environmental permit boundaries
- ◯ from wider Teesworks site to environmental permit boundary
- ◯ between wider Teesworks plots without an environmental permit
- ◯ Other

66

EWC Code (with spaces, in the format XX XX XX) *

67

SIC code for waste-generating industry *

68

Waste carrier company name *

69

Waste carrier address and post code *

70

Waste carrier registration number *

71

Waste carrier type *

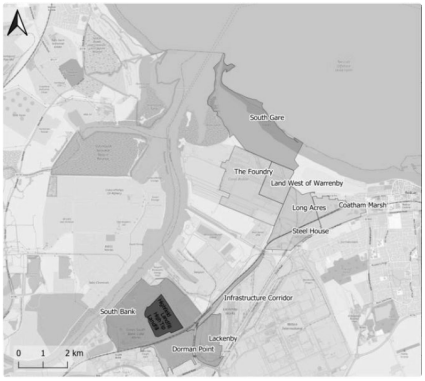
- ◯ Carrier
- ◯ Broker
- ◯ Dealer

72

Destination Environmental Permit reference *

73

Destination site area *



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- ◯ MAM - Legacy
- ◯ SBW - South Bank
- ◯ SHO - Steel House
- ◯ TLA - Long Acres

74

Start date of transfer *

75

Is the stockpile to be merged with an existing stockpile *

- ◯ Yes
- ◯ No

76

Provide the stockpile ID of the existing stockpile *

Stockpile Completion Notification (SCN)

Use this form to notify STDC of the completion of a stockpile. Upon stockpile completion (e.g. finished processing) no further material shall be added to the stockpile.

1. Stockpile ID (do not include spaces e.g FOU-SP120)

2. Stockpile completion date

3. Stockpile volume (m3)

4. Stockpile survey date

5. Stockpile survey drawing reference

6. Add link to stockpile survey file location at https://ssisteel.sharepoint.com/:f:/r/sites/MaterialsManagement2-StockpileManagement/Shared%20Documents/Stockpile%20Management/02_Technical/02.05_Surveys/Published?csf=1&web=1&e=LT9Ia7

7. Material grade (e.g. 1A, 6A)

8. Is the material

- ◯ waste
- ◯ product (processed under the Factory Production Control)
- ◯ non-waste (processed under Materials Management Plan)

Stockpile Assessment Outcome Confirmation (SC)

AtkinsRéalis to use this form to communicate to project team the outcome of testing and analysis on waste stockpiles (not required for material reused under MMP).

* Required

Stockpile details

1. Stockpile ID (do not include spaces e.g FOU-SP120) *

2. Name of person completing form *

3. Email of person completing form *

4. Contractor to be notified (email) *

5. Stockpile Volume (m3) *

6. Stockpile Location Easting (six digits) *

7. Stockpile Location Northing (six digits) *

8. The material was processed as: *

- ◯ product (under FPC)
- ◯ waste (under Environmental Permit)

9. Date form completed *

Product

10. The material is *

- ◯ FPC conforming
- ◯ FPC non-conforming

11. Suggested remedial action to achieve FPC conformance *

Arcadis confirmation

12. Has Arcadis confirmation been received (via MS Form)?

- ◯ Yes
- ◯ No

13. Does the stockpile meet the Arcadis acceptance criteria for the destination site?

- ◯ Yes
- ◯ No

Waste

14. The waste classification is *

- ◯ Non-Hazardous
- ◯ Hazardous

15. EWC codes for off-site disposal *

16. Is the EWC code(s) included in the List of Wastes in the Waste Recovery Plan for the site? *

- ◯ Yes
- ◯ No

17. Confirm the EWC code(s) *

18. Environmental permit document reference *

Confirmation

19. Suitability *

- ◯ The material is suitable for placement
- ◯ The material is not suitable for placement
- ◯ Other

20. Volume *

- ◯ Total stockpile volume to be drawndown for placement
- ◯ Partial stockpile volume to be drawndown for placement

21. Partial volume required by contractor (m3) *

22. Comment on placement location (final layer, particular remediation area) *
To be copied from Arcadis response

23. Comment on compaction method (layer thickness, no. passes, plant) *
To be copied from Arcadis response

24. Comment on further actions (if applicable) *

Stockpile Placement Notification (SPN)

Use this form to inform STDC of stockpile placement location.

1

Stockpile ID (do not include spaces e.g FOU-SP120)

2

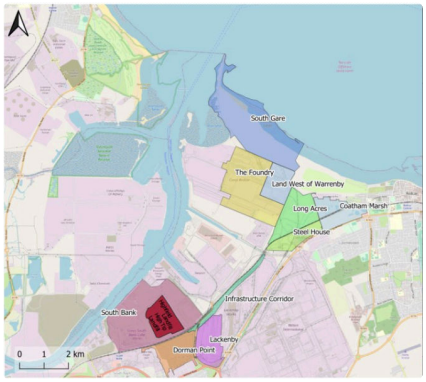
Contractor company name

3

Project name (e.g. NZT, Hinterland etc.)

4

Placement area (site area)



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- ◯ LAC - Lackenby
- ◯ LWW - Land West of Warrenby
- ◯ SBW - South Bank
- ◯ SHO - Steel House
- ◯ TLA - Long Acres

5

Placement start date

6

Placement completion date

7

Was the total stockpile volume used?

- ◯ Yes
- ◯ No

8

What volume remains? Upload survey to https://ssisteel.sharepoint.com/:f:/r/sites/MaterialsManagement2-StockpileManagement/Shared%20Documents/Stockpile%20Management/02_Technical/02.05_Surveys/Published?csf=1&web=1&e=VphekC

9

Placement location(s) (grid squares e.g. AB01)

10

Placement depth (s) (mAOD)

11

Placement layer(s) (e.g. layer 5, final layer etc.)

12

Placement layer thickness (mm)

13

Compaction method (compaction plant, number of passes etc.)

14

Placement mechanism

- ◯ Material placed as a waste
- ◯ Material placed under Materials Management Plan
- ◯ Material is a product

15

Document name or reference (e.g. permit reference, MMP name)

Appendix B. Accepted Waste Types

Table 5-1 - List of Acceptable Waste Types

Waste Code	WM3 Waste Description	Entry Type	Additional Restrictions
01 – Wastes Resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals **01 01** Wastes from mineral extraction			
01 01 02	Wastes from mineral non-metalliferous extraction	AN	
01 04 Wastes from physical and chemical processing of non-metalliferous minerals			
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 07	MN	
10 Wastes from thermal processes **10 02** Wastes from the iron and steel industry			
10 02 01	Wastes from the processing of slag	AN	Sourced from the Teesworks site
10 02 02	Unprocessed slag	AN	Sourced from the Teesworks site
16 Wastes not otherwise specified in the list **16 11** Waste linings and refractories			
16 11 04	other linings and refractories from metallurgical processes other than those mentioned in 16 11 03	MN	Limited to refractory bricks obtained from demolished structures associated with the Teesworks and also excavated as a constituent of the made ground from the Teesworks site.
17 Construction and Demolition Wastes (Including Excavated Soil from Contaminated Sites) **17 01** Concrete, bricks, tiles and ceramics			
17 01 01	Concrete	MN	
17 01 02	Bricks	MN	
17 01 03	Tiles and ceramics	MN	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	MN	
17 05 Soil (including excavated soil from contaminated sites), stones and dredged spoil			
17 05 04	Soil and stones other than those mentioned in 17 05 03	MN	

Waste Code	WM3 Waste Description	Entry Type	Additional Restrictions
19 Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use **19 12** Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified			
19 12 09	Minerals (for example sand, stones)	AN	
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	MN	
19 13 Wastes from soil and groundwater remediation			
19 13 02	Solid wastes from soil remediation other than those mentioned in 19 13 01	MN	Limited to materials listed within this table that are sourced from the Teesworks site and subsequently remediated on the Teesworks site to remove their hazardous properties

Table Notes
AN – Absolute non-hazardous
MN – Mirror non-hazardous

Appendix C. Waste Acceptance Criteria

C.1 Pre Acceptance Documentation

The following information is required to be compiled and provided by the waste producer of the waste for each waste stream at the pre-acceptance stage.

- The full address where the waste was produced.
- The identity of the producer.
- All reasonably identifiable previous uses of the producer site for excavation wastes.
- The process giving rise to the waste.
- The physical appearance of the waste including colour and texture.
- Volume of the waste and a conversion to tonnes (using a conversion factor for the volume (cubic meters) to weight (tonnes) for each waste stream.
- Evidence that the material complies with Table 5-1 including waste classification.

For material generated within the boundary of the wider Teesworks site (including material within the boundary of the permit) this information is presented in the Waste and Material Management System.

C.2 Leachate Waste Acceptance Criteria

Waste acceptance criteria for leachate have been derived, these define the upper concentration limits for the identified contaminants of concern and are based on the outcomes of the Hydrogeological Risk Assessment [5]. These are presented in the following memo:

Memo

ARCADIS

SUBJECT
Development of Waste Acceptance Criteria: Groundwater Resource Protection

TO
Jordan Gibson, Environment Agency

DATE
21 January 2025

OUR REF
10047374-AUK-XX-XX-CO-YY-1033-01-Foundry Central West WAC Memo

DEPARTMENT
Site Evaluation and Restoration

PROJECT NUMBER
10047374

COPIES TO
Julian Ingram, Environment Agency
Selina Franklin, Environment Agency
Sarah Bullock, AtkinsRéalis
Andy Hogg, AtkinsRéalis
Jonathan Miles, Arcadis
Andy Smith, Arcadis

FROM
Simon Hay

T M 07825326420 E simon.hay@arcadis.com

Introduction

Waste acceptance criteria (WAC) in respect to groundwater resource protection have been developed to support the waste acceptance procedure developed to support the permit application (reference: MAM1-ATK-ENV-FDRXX-RP-EN-000003). The groundwater resource waste acceptance criteria are to be used to assess soil leachate data. Other WAC in respect to human health and waste classification are also outlined within the waste acceptance procedures but are not discussed within this memo.

The WAC are based on the site-specific ConSim model developed in the Hydrogeological Risk Assessment (HRA) [Arcadis Report ref: 10047374-AUK-XX-XX-RP-ZZ-815-02] and have been defined for the priority hazardous and non-hazardous substances identified, including:

- Arsenic (hazardous)
- Hexavalent Chromium (hazardous)
- Lead (hazardous)
- Mercury (hazardous)
- Benzo(a)pyrene (hazardous)
- Naphthalene (non-hazardous)
- Benzene (hazardous)
- Ammoniacal Nitrogen (non-hazardous)
- Total Cyanide (non-hazardous)

The WAC developed are applicable to the seven recovered wastes assessed in the HRA, including:

- Foundry Central West Made Ground
- Foundry Central West Sand Fill
- Steel House Made Ground
- Land West of Warrenby Made Ground
- South Bank Quay Made Ground
- Concrete
- Refractory Brick

Approach

Concentrations were modelled in the HRA as a triangular distribution, representing minimum, likely and maximum measured concentrations. Modelled concentrations represented worst-case leachate concentrations across the seven recovered wastes assessed.

In line with the approached requested by the Environment Agency on 17th December 2024, maximum modelled concentrations have been used to determine WAC.

With the exception of hexavalent chromium, modelling demonstrated that worst-case leachate concentrations (defined in the HRA based on maximum concentrations across the seven recovered wastes assessed) of substances meet the requirements to prevent hazardous and limit non-hazardous substances from entering groundwater.

The highest hexavalent chromium concentrations were measured in Foundry Central West and Steel House Made Ground leachate. For the other five of the seven recovered wastes assessed (i.e. excluding Foundry Central West and Steel House Made Ground), modelling demonstrated that leachate concentrations *do* meet the requirement to prevent entry of hexavalent chromium (hazardous substance).

For Foundry Central West and Steel House Made Ground, necessary and reasonable measures to prevent entry of hexavalent chromium were further assessed. This assessment concluded that all necessary and reasonable measures have been taken and, therefore, entry of hexavalent chromium from Foundry Central West and Steel House Made Ground has also been prevented. Further, it was demonstrated that concentrations will not result in any actual pollution, or a significant risk of pollution in the future.

As such, two WAC values for hexavalent chromium are proposed based on the outcome of the HRA and assessment of necessary and reasonable measures for the two groups of materials: those demonstrated via modelling to meet the requirement to limit and prevent entry to groundwater; and, those meeting the requirement to limit and prevent following assessment of necessary and reasonable measures.

Waste Acceptance Criteria

The WAC are presented in the table below. These may be applied to the seven recovered wastes.

Substance	WAC	Units	Comment
Chromium (VI)	92	µg/l	Maximum modelled concentration (excluding Foundry Central West and Steel House Made Ground)
Naphthalene	1040	µg/l	Maximum modelled concentration (worst-case)
Benzene	58.7	µg/l	Maximum modelled concentration (worst-case)
Ammoniacal Nitrogen as N	43	mg/l	Maximum modelled concentration (worst-case)
Cyanide (Total)	177	µg/l	Maximum modelled concentration (worst-case)

Note: The results of the modelling for arsenic, lead, mercury and benzo(a)pyrene predicted no breakthrough at the compliance point (site boundary) within the 10,000yr timeframe modelled. As such, no criteria are presented as these substances.

Additionally, for Foundry Central West and Steel House Made Ground the WAC in the table overleaf may be applied to hexavalent chromium.

Substance	WAC	Units	Comment
Chromium (VI)	118	µg/l	Maximum modelled concentration (Foundry Central West and Steel House Made Ground - worst-case)

C.3 Human Health Reuse Criteria

The rationale for the Human Health Reuse Criteria and assessment of the suitability of waste for backfilling is presented in the Arcadis Remediation Strategy [11]. Criteria values are presented in the excerpt below.

STDC Remediation and Reuse Criteria

Contaminant of Concern	Units	Human Health (Commercial Worker)#	Source
Metals			
Arsenic	mg/kg	640	S4UL
Boron, Water Soluble	mg/kg	240,000	S4UL
Cadmium	mg/kg	190	S4UL
Chromium	mg/kg	8,600	S4UL
Chromium, Hexavalent	mg/kg	33	S4UL
Copper	mg/kg	68,000	S4UL
Lead	mg/kg	2,300	C4SL
Mercury	mg/kg	*58**	S4UL
Nickel	mg/kg	980	S4UL
Vanadium	mg/kg	9,000	S4UL
Zinc	mg/kg	730,000	S4UL
Cyanide, Free	mg/kg	66	DQRA
Thiocyanate	mg/kg	230	USEPA
Phenol - Monohydric	mg/kg	760	S4UL
PAHs			
Naphthalene	mg/kg	*1,900*	Wood
Acenaphthylene	mg/kg	*83000***	S4UL
Acenaphthene	mg/kg	*84000***	S4UL
Fluorene	mg/kg	*63000***	S4UL
Phenanthrene	mg/kg	22,000	S4UL
Anthracene	mg/kg	520,000	S4UL
Fluoranthene	mg/kg	23,000	S4UL
Pyrene	mg/kg	54,000	S4UL
Benzo(a)anthracene	mg/kg	170	S4UL
Chrysene	mg/kg	350	S4UL
Benzo(b)fluoranthene	mg/kg	44	S4UL
Benzo(k)fluoranthene	mg/kg	1,200	S4UL
Benzo(a)pyrene	mg/kg	77	Wood
Indeno(1,2,3-c,d)pyrene	mg/kg	500	S4UL
Dibenzo(a,h)anthracene	mg/kg	3.5	S4UL
Benzo(g,h,i)perylene	mg/kg	3,900	S4UL
Petroleum Hydrocarbons			
Aromatic C5-C7	mg/kg	*26000***	S4UL
Aromatic C7-C8	mg/kg	*56000***	S4UL
Aromatic C8-C10	mg/kg	*3500***	S4UL
Aromatic C10-C12	mg/kg	*16000***	S4UL
Aromatic C12-C16	mg/kg	*36000***	S4UL
Aromatic C16-C21	mg/kg	28,000	S4UL
Aromatic C21-C35	mg/kg	28,000	S4UL
Aliphatic C5-C6	mg/kg	*3200***	S4UL
Aliphatic C6-C8	mg/kg	*7800***	S4UL
Aliphatic C8-C10	mg/kg	*2000***	S4UL
Aliphatic C10-C12	mg/kg	*9700***	S4UL
Aliphatic C12-C16	mg/kg	*59000***	S4UL
Aliphatic C16-C35	mg/kg	1,600,000	S4UL
Aliphatic C35-C44	mg/kg	1,600,000	S4UL
BTEX and MTBE			
MTBE	mg/kg	210	USEPA
Benzene	mg/kg	27	S4UL
Toluene	mg/kg	56,000	S4UL
Ethylbenzene	mg/kg	5,700	S4UL
m & p-Xylene	mg/kg	5,900	S4UL
o-Xylene	mg/kg	6,600	S4UL
Asbestos			
Asbestos (Bulk Fill)	n/a	Visible ACM	Arcadis
Asbestos (Surface layer)	n/a	Criteria 1. 90% upper confidence level of mean <0.001% Criteria 2. <0.005% maximum concentration Criteria 3. No quantified asbestos in >80% of samples (Material proposed for use as the top 200mm layer tested at a frequency of 1 sample per 500m3 in either stockpiles or on placement.)	Arcadis

STDC Remediation and Reuse Criteria

Contaminant of Concern	Units	Human Health (Commercial Worker)#	Source
Indicative Volatile Organic Compounds - Exact suite subject to contracted environmental laboratory			
Vinyl chloride	mg/kg	0.059	S4UL
1,1-Dichloroethene	mg/kg	1,000	USEPA
Trans-1,2-Dichloroethene	mg/kg	23,000	USEPA
1,1-Dichloroethane	mg/kg	16	USEPA
Cis-1,2-Dichloroethene	mg/kg	2,300	USEPA
Bromochloromethane	mg/kg	630	USEPA
Chloroform	mg/kg	99	S4UL
1,1,1-Trichloroethane	mg/kg	660	S4UL
Carbon tetrachloride	mg/kg	2.9	S4UL
1,2-Dichloroethane	mg/kg	0.67	S4UL
Trichloroethene	mg/kg	1.2	S4UL
1,2-Dichloropropane	mg/kg	11	USEPA
Dibromomethane	mg/kg	99	USEPA
Bromodichloromethane	mg/kg	1.3	USEPA
cis-1,3-Dichloro-1-propene	mg/kg	8.2	USEPA
trans-1,3-Dichloro-1-propene	mg/kg	8.2	USEPA
1,1,2-Trichloroethane	mg/kg	5	USEPA
Tetrachloroethene	mg/kg	19	S4UL
1,3-Dichloropropane	mg/kg	23,000	USEPA
Dibromochloromethane	mg/kg	39	USEPA
1,2-Dibromoethane	mg/kg	0.16	USEPA
Chlorobenzene	mg/kg	56	S4UL
1,1,1,2-Tetrachloroethane	mg/kg	110	S4UL
Styrene	mg/kg	35,000	USEPA
Tribromomethane	mg/kg	86	USEPA
Bromobenzene	mg/kg	1,800	USEPA
1,1,2,2-Tetrachloroethane	mg/kg	270	S4UL
1,2,3-Trichloropropane	mg/kg	0.11	USEPA
2-Chlorotoluene	mg/kg	23,000	USEPA
4-Chlorotoluene	mg/kg	23,000	USEPA
1,3,5-Trimethylbenzene	mg/kg	1,500	USEPA
tert-Butylbenzene	mg/kg	120,000	USEPA
1,2,4-Trimethylbenzene	mg/kg	1,800	USEPA
sec-Butylbenzene	mg/kg	120,000	USEPA
1,3-Dichlorobenzene	mg/kg	30	S4UL
1,4-Dichlorobenzene	mg/kg	4,400	S4UL
1,2-Dichlorobenzene	mg/kg	2,000	S4UL
Butylbenzene	mg/kg	58,000	USEPA
1,2-Dibromo-3-chloropropane	mg/kg	0.064	USEPA
1,2,4-Trichlorobenzene	mg/kg	220	S4UL
Hexachloro-1,3-butadiene	mg/kg	31	S4UL
1,2,3-Trichlorobenzene	mg/kg	102	S4UL

Contaminant of Concern	Units	Human Health (Commercial Worker)#	Source
Indicative Semi Volatile Organic Compounds - Exact suite subject to contracted environmental laboratory			
Phenol	mg/kg	760	S4UL
1,3-Dichlorobenzene	mg/kg	30	S4UL
1,4-Dichlorobenzene	mg/kg	4,400	S4UL
1,2-Dichlorobenzene	mg/kg	2,000	S4UL
3&4-Methylphenol	mg/kg	82,000	USEPA
2,4-Dimethylphenol	mg/kg	16,000	USEPA
2,4-Dichlorophenol	mg/kg	2,500	USEPA
1,2,4-Trichlorobenzene	mg/kg	220	S4UL
4-Chloro-3-methylphenol	mg/kg	82,000	USEPA
2-Methylnaphthalene	mg/kg	3,000	USEPA
Hexachlorocyclopentadiene	mg/kg	7.5	USEPA
2,4,6-Trichlorophenol	mg/kg	210	USEPA
2,4,5-Trichlorophenol	mg/kg	82,000	USEPA
2-Chloronaphthalene	mg/kg	60,000	USEPA
2-Nitroaniline	mg/kg	8,000	USEPA
2,6-Dinitrotoluene	mg/kg	1.5	USEPA
2,4-Dinitrotoluene	mg/kg	7.4	USEPA
Dibenzofuran	mg/kg	1,000	USEPA
Diethyl phthalate	mg/kg	660,000	USEPA
4-Nitroaniline	mg/kg	110	USEPA
Azobenzene	mg/kg	26	USEPA
Hexachlorobenzene	mg/kg	110	S4UL
Pentachlorophenol	mg/kg	400	S4UL
Butylbenzyl phthalate	mg/kg	1,200	USEPA
Bis(2-ethylhexyl)phthalate	mg/kg	160	USEPA
Di-n-octyl phthalate	mg/kg	8,200	USEPA

The following GACs have been used in order of availablity:	
S4UL: (Commercial End Use, 1% SOM)	LQM / CIEH (2015) The LQM / CIEH S4ULs for Human Health Risk Assessment. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3223. All rights reserved.
C4SL: (Commerical End Use)	Department for Environment, Food and Rural Affairs (DEFRA) (2014) SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document, December 2014
Arcadis	Where published criteria above are not available, Arcadis has derived GAC based on EA guidance and assumptions in line with current industry standards and standard CLEA inputs for a commerical land use.
USEPA	GAC based on US Environmental Protection Agency (USEPA) Regional Screening Levels (RSL). Available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
Wood derived GAC based on CLEA v1.07 were presented in the Wood 2019 report for benzo(a)pyrene and naphthalene. It is understood	
Notes	
#	Criteria derived considering most sensitive exposure pathway, material may be suitable for use where pathway is not considered active.
na	Comprises multiple contaminant, no applicable GAC
*123**	S4UL exceeds the vapour saturation limit
*123***	S4UL exceeds the solubility saturation limit

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