



Sludge Treatment Process Description

Fixed Soil Treatment Facility, Exeter Treatment Facility

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	THICKENER TANK	2
3.	FILTER PRESS	3
4.	STABILISATION	4
5.	TESTING	5

1. INTRODUCTION

This document provides a detailed description of the sludge treatment process to be implemented as part of the soil washing operations at the Exeter fixed soil treatment facility extension. The facility currently operates as a permitted hazardous and non-hazardous waste treatment site, receiving and treating imported soils and soil-like material, containing a diverse range of chemical and physical contaminants. Treatment methods presently employed are selected according to the specific contaminant, and concentrations present.

The sludge treatment processes described within this document represents a defined process step within the wider soil washing process, outlined in the document '**E7555UK.SWP.01**'. This report is to be viewed in conjunction with the soil treatment process flow diagram '**E7555UK.PFD.03**', which provides a schematic of the soil wash plant process sequence, and '**E7555UK.PFD.02**' which extracts and illustrates only the sludge treatment stages of the soil wash plant.

The subsequent sections outline each stage of the process in sequential order.

2. THICKENER TANK

The thickener serves as a clarifier within the soil washing process, designed to remove fine grained materials and silt from the sludge, while recovering water for immediate reuse. Sludge containing unwanted fines is pumped to the thickener from both the attrition cell and the sand/silt sump. Where necessary, coagulants or flocculants are added via a polymer makeup system, to increase the settlement rate of fine particles.

The thickener is kept under continuous agitation to ensure even distribution of the sludge, and to prevent premature settlement or blockages. The sludge enters the thickener feed at a controlled velocity through the feed well, allowing flocculated solids to gradually settle. These solids are guided towards the centre by the low-profile rake mechanism and sloped floor, while clarified water overflows from the peripheral weir, where it can be immediately recirculated back to the water treatment system and subsequently back into the soil wash plant.

The thickened sludge is pumped out from the centre using a rubber-lined centrifugal underflow pump and conveyed to the filter press for dewatering.

Figure 1. Photograph of McLanahan Thickener



3. FILTER PRESS

The filter press dewateres sludge from the soil washing process, by pumping sludge at high pressure into a series of hydraulically clamped recessed plates, lined with filter clothes, forming sealed chambers. Fine solids are retained between the plates, whilst filtrate passes through the cloth mesh and exits via the plate ports.

Once the chambers reach the target solid content, hydraulic pressure is released, causing the plates to separate, allowing the dewatered compressed flocculated material to discharge to the ground or a conveyor system.

Approximately 80% of the filtrate is recirculated to the soil wash plant, while the remaining 20% is discharged under the sites trade effluent consent.

Figure 2. Photograph of a Filter Press



4. STABILISATION

The physical and chemical composition of the fine aggregate material is analysed to assess its suitability for stabilisation, helping to minimize landfill waste and improve cost efficiency. Where necessary, binding agents are added to enhance its properties. In cases where stabilisation is not viable, the fine aggregate material is either processed for reuse or prepared for disposal.

5. TESTING

All dewatered flocculated material is subject to UKAS-accredited laboratory testing to determine suitability for disposal or potential re-use. Standard testing includes particle size distribution, and an environmental chemical suite, to assess the presence of any relevant contaminants.

SLUDGE TREATMENT PROCESS

