UK Remediation Ltd

Soil Wash Plant Process Description

Fixed Soil Treatment Facility, Exeter Treatment Facility

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1. INTRODUCTION

This document provides a detailed description of the soil washing process to be undertaken at the Exeter Fixed Soil Treatment Facility extension (FFST). The site is currently operated as a treatment facility, treating imported hazardous and non-hazardous soils and soil-like materials. The site currently accepts a wide range of contaminants within soils and utilises various methods of treatment specific to the contaminants. This document covers the soil washing process only, to be undertaken within the planned extension of the current site, as shown on **'E7555UK.D02'**. This report is to be viewed in conjunction with the soil wash flow diagram '**E7555UK.PFL.03**' .

The purpose of soil washing is to remove hazardous contaminants by using various water rinsing and segregation cycles, including a chemical additive, scrubbing the soil and finally separating the clean aggregates (sand and stone), from the silts and water. By washing the soil, a vast majority of the incoming materials can be reused.

In general terms the soil wash treatment undertaken onsite in the phases described below:

- Feeding, scrubbing, screening and sizing
- Attrition cell circuit
- Removal of deleterious and lightweight materials
- Ultra sand plant – fine sand processing
- Sludge treatment
- Water treatment and reuse

2. EQUIPMENT

The site will use products from McLanahan, specifically the UltraScrub 3625, Attrition Cell AC17-1, Lites-Out FBC-6, UltraSand 3, EcoCycle HRT-8, and EcoCycle Filter Press. Table 1 below describes the equipment that will be used within the soil wash plant.

Table 1: Equipment to be used at the Soil Treatment Facility

Equipment	Activity
Feed Conveyors	Transport material from one stage of a processing plant to another.
UltraScrub 3625	The 'logwasher'. Pre rinsing, then breaking up the material to enable fractions to be separated. Removes deleterious material by attrition scrubbing and breaking down contaminants and expelling them with wastewater.
Attrition System	Scrub the surfaces of particulates, removing deleterious materials and breakdown simulated particles related to durability e.g. compacted clays.
Lites-Out System	Remove lightweight, deleterious materials e.g. rubbish, wood and organic matter
UltraSand Plant	Wash and dewater sand after classification of mid-size fractions
Overflow Transfer System	Manages the excess water carrying the finer particles or contaminants
Water Management: Poly Dosing Unit	Dose polyelectrolytes into water treatment process to aid in flocculation and

Equipment	Activity
	coagulation. Improves solid-liquid separation and enhances water clarity
Thickener	Chemical addition and clarifier to separate liquids from solids using hindered settling. Provides immediate reusable process water
Filter Press	Dewater and separate liquids and solids by pumping slurring to empty chambers

3. FEEDING, SCRUBBING, SCREENING AND SIZING

3.1 Feeding

The contaminated material is fed via the feed hopper onto the main conveyor. The material may be screened to remove large diameter stones prior to the feed.

An over band magnet is placed above the feed conveyor to remove ferrous contaminants prior to delivery to the pre-screen. The flow rate and speed of the feeder are controlled depending on the application and weight of the material

3.2 Screening, Scrubbing and Sizing

As the material moves across the screen length, sand is washed through the bottom via spray bars, while larger particles are discharged off the end of the screen. The slurry that passes through the deck of the screen reports to the collection sump of the UltraScrub. The aggregate that passes over the top deck is discharged via oversized conveyor, while the aggregate that passes over the bottom deck of the pre-screen reports to the log washer.

The log washer generates particle-on-particle scrubbing to remove deleterious materials, which along with organics/ lightweights, flows out the rear of the log washer, while clean material is moved forward. Coarse aggregate that is scrubbed using the log washer reports to a vibratory sizing screen for sizing, with the sized coarse aggregate stockpiled. Organic trash removed by the log washer reports to a trash dewatering screen and discharge chute. Screen throughs from the vibratory sizing screen and trash screen reports to the collection sump of the UltraScrub system.

4. ATTRITION CELL CIRCUIT

A rubber-lined centrifugal pump feeds the slurry from the UltraScrub collection sump to the separator. Overflow from the separator is directed to the LitesOut feed sump. The dewatered underflow is discharged into an attrition cell. The Attrition cell generates material on material scrubbing and causes the liberation of surface contaminants from sand-sized particles. The process helps to increase durability and improve sand equivalency of the product. The Attrition Cell is equipped with an axial turbine impeller with vulcanized rubber for wear resistance. Additional water is added as required, based on electrical power-draw from the attrition cell motor, to maintain a set feed density. The Attrition Cell discharges into the sump that feeds the LitesOut system. On material which attrition is not required, the cells can be bypassed to avoid unnecessary wear.

5. LITESOUT FLAT BOTTOM CLASSIFIER SYSTEM

A flat bottom classifier is used to separate low specific gravity material from higher specific gravity material. The lighter and smaller particles report to the overflow launder, while the coarser and heavier material discharges through a valve(s) on the bottom.

A centrifugal pump feeds slurry to a separator positioned above the Flat Bottom Classifier. Excess water exits the overflow of the Separator and flows over a sieve bend, and reports to the tailing's sump. Partially dewatered sand exits the underflow of the separator and feeds to the flat bottom classifier.

Feed enters the flat bottom classifier via a top entry well, which reduces turbulence, and evenly distributes the material. A dedicated water pump injects water into the bottom of the classifier through multiple replaceable nozzles.

As the solids settle in the upper chamber, a 'teeter bed' is formed, where particles are suspended based on their density. Low-density contaminants rise to the top and overflow and sent to the ultra-sand plant for further screening, while denser material remains suspended or settle which can then be removed and disposed of appropriately.

6. ULTRASAND PLANT

Fine materials from the Flat Bottom Classifier overflow enter the Ultra-Sand Plant (USP), the mixture is directed into cyclones, where the centrifugal forces separate solids from liquids. The sand slurry is then fed through a dewatering screen, which vibrates at a high frequency remove excess water, this produces a drip-free sand product which can be re-used or disposed of appropriately or pumped to the thickener tank for further decontamination. The separated water can be recirculated into the soil wash plant.

7. ADDITIONAL TREATMENT

Water will undergo an optional contaminant specific treatment, such as flocculation, and through the use of sorbents specific to PFAS treated (Activated Alumina and Modified GAC). These treatments can be combined in a two step processes where the water undergoes flocculation treatment followed by filtration through a sorbent.

8. SLUDGE TREATMENT

This section of the report is to be viewed in conjunction with the sludge treatment flow diagram **'E7555UK.PFD.02'**, where the processes of sludge treatment, within the McLanahan Soil Wash Plant are detailed.

8.1 Thickener Tank

Thickeners are used to recover immediately reusable process water while also extracting fines and other materials.

Tailings, which contain unwanted fines, are pumped from the tailing sumps to the Thickener, where a flocculating agent is added via a Polymer Makeup System. The slurry enters the Thickener feed well at a controlled velocity, ensuring even distribution into the settling zone. Flocculated solids gradually settle and are guided toward the centre by the Rake Mechanism, while excess water overflows the Thickener's peripheral weir. The settled solids are then pumped out from the centre using a centrifugal Underflow Pump. The thickener underflow typically has the consistency of thick mud, with solids content ranging from 25% to 40%.

Process water can be reused immediately and recirculated back into the system.

8.2 Filter Press

Filter Presses dewater and separate liquids and solids in a slurry by pumping the slurry at high pressure into a series of hydraulically closed recessed plates lined with filter cloths.

A Filter Press is composed of a support structure holding a series of recessed plates lined with filter cloths. Hydraulic pressure is used to hold the recessed plates tightly together, creating a seal around their perimeters and void spaces between the plates. A high-pressure slurry dewatering pump forces slurry into the empty chamber spaces between the plates for dewatering. The slurry solids are captured between the plates, while the clean filtrate water passes through the filter cloth mesh and exits through ports in the filter plates. When the chamber spaces are full of dewatered slurry solids, the slurry feed pump stops when the desired cake moisture is achieved. The Press is then unclamped, and the plates open sequentially, dropping dry cake to the ground or a conveyor. The hydraulic pressure holding

the plates together is released so the plates can be separated individually, allowing the dewatered solid material cakes to fall by gravity out of the press.

8.3 Optional Stabilisation

The physical and chemical composition of the fine aggregate material is analysed to assess its suitability for stabilisation, helping to minimise landfill waste and improve cost efficiency. Where necessary, binding agents are added to enhance its properties. If the material processed through the soil wash plant contains organic or inorganic contaminants, additional stabilisation measures can be applied. In cases where stabilisation is not viable, the fine aggregate material is either processed for reuse or prepared for disposal.

For the purposes of the Exeter Fixed Soil Treatment facility, only soils containing organic or inorganic contaminants, will be considered for stabilisation.

Soil Washing: an Effective Method for the Remediation of PFAS and Other Recalcitrant Contaminants

Exeter Fixed Soil Treatment Facility

UK Remediation Ltd

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1. PREVIOUS WORK DEMONSTRATING PFAS SOIL WASHING

Soil washing has been demonstrated, along with stabilisation-solidification, to be one of the most effective and deployable technologies thus far identified that is capable of remediating soils of a broad range of long and short, branched and linear chain PFAS Compounds. The 2024 CONCAWE Review (https://www.concawe.eu/wp-content/uploads/Rpt_24-8.pdf) highlighted soil washing as a front-running technology in this regard.

Soil Washing is increasingly used in European countries for treating PFAS impacted soils. These deployments have now shown to be highly effective and deployable at large scale. For example Belgian remediation company DEME has completed numerous major projects using soil washing plant similar to that deployed by UK Remediation (UKRL) at our Exeter FSTF, successfully treating over 700,000 tonnes of impacted soils and dredgings by September 2024 (https://assoreca.it/wp-content/uploads/2024/09/8-PENSAERT-DEME.pdf).

2. SOIL WASHING AT EXETER SOIL TREATMENT FACILITY

Our Facility Manager, Bret Clarke has many years of experience as a plant operator and fitter and is responsible for the day-to-day operation and maintenance of the wash plant. Bret is supported by Richard Bissett, our Senior Operations Manager. Richard also has many years of experience, including installation, commissioning and operation of soil washing plant with UKRL and previous employers.

UKRL staff have expertise in remediating organic, inorganic and mixed contaminants, including recalcitrant substances and emerging contaminants. Under our existing permit, we have successfully completed washing contracts for mixed soils, aggregates, road sweepings and gulley wastes contaminated with a wide range of organics and inorganics.

In 2023 UKRL won the framework contract for treatment of sweepings and gulley waste from Devon County Council. Most of this incoming material is streamed to soil washing. Most of the remediated material is recovered for reuse, as construction aggregate, or as a constituent of our topsoil substitute product line.

UKRL operates its R&D laboratory from our Portishead head office. Here we undertake treatability tests, including for soil washing, to optimise the treatment process and ensure that materials are fully treatable before accepting them in bulk.

3. SOIL WASHING METHODS

Although soil washing is categorised as a single remediation method, the term really describes a suite of physical wet separation and chemical treatment processes that operate as a treatment train, with further upstream and downstream wet or dry treatments included as necessary. This makes the selection of the right process and plant elements critical to successful remediation.

UKRL recognises that one size, or one plant configuration, does not fit all when it comes to successful soil washing. We therefore adopt a job-specific approach, selecting from the various modular plant elements detailed in the process description to configure our wash systems precisely to the requirements of the project, particularly when it comes to the treatment of recalcitrant compounds.

4. PRE-TREATMENT TRIALS AND OPTIMISATION

UKRL views treatability testing and process optimisation trials as a critical step to defining achievable remedial outcomes and in selecting the best plant configuration to achieve this.

Bench scale treatment trials are used prior to contractual acceptance to confirm feasibility. A further optimisation process may then be completed to improve efficiency and remedial end points. From this we can set the treatment steps and operating parameters to achieve goals for the project. This informs the design of the plant and chemical modifications at scale, allowing us to design the mechanical separation and any further chemical dosing and treatment units needed.

For more challenging jobs such as the treatment of POPs, including PFAS, we then undertake pilot trials at full scale, using small batches of the material to be treated, to further iterate the plant to improve the process parameters.

Set-up parameters for the two in-line attrition scrubbing units shown in the process schematic, along with the option to apply treatment improving chemical additives at

various stages of the process via accurate dosing pumps, are an important part of this optimisation process when applied to the treatment of PFAS. Biodegradable surface modifiers added to the second stage attrition scrubber have been shown to materially improve the removal of PFAS from the fine sand and aggregate fraction.

UKRL also selects the best performing water treatment technologies and confirming their effectiveness prior to commencement of treatment of a particular batch. As per the process schematic (E7555UK.PFD.03.R01), our main water treatment plant is supplemented by further intermediate steps where the target contaminants dictate this. For PFAS this will be additional flocculation removal using Perfluorad technology, supplied by Cornelsen Ltd and developed by them specifically as a highly effective PFAS removal treatment step, with a low residual volume of highly concentrated material that is suitable for complete destruction via incineration.

1.0 Process Description

1.1 Feeding, Screening, Scrubbing, Sizing Description

Material is fed from the client's scalper onto the main conveyor. An overband magnet is positioned over the feed conveyor to remove ferrous contaminants prior to delivery to the pre-screen. As the material moves across the screen length, sand is washed through the bottom via spray bars while larger particles are discharged off the end of the screen. The slurry that passes through the deck of the screen reports to the collection sump of the Ultra Scrub. The aggregate that passes over the top deck is discharged via oversize conveyor, while the aggregate that passes over the bottom deck of the pre-screen reports to the log washer. The log washer generates particle-on-particle scrubbing to remove deleterious materials, which along with organics/light weights, flows out the rear of the log washer, while clean material is moved forward. Coarse aggregate that is scrubbed using the log washer reports to a vibratory sizing screen for sizing, with the sized coarse aggregate stockpiled. Organic trash removed by the log washer reports to a trash dewatering screen and discharge chute. Screen throughs from the vibratory sizing screen and trash screen reports to the collection sump of the UltraScrub system.

1.2 Attrition Cell Circuit Description

A rubber-lined McLanahan Centrifugal Pump feeds the slurry from the UltraScrub collection sump to the McLanahan Separator. Overflow from the Separator is directed to the LitesOut feed sump. The dewatered underflow is discharged into an attrition cell. The Attrition cell generates material on material scrubbing and causes the liberation of surface contaminants from sand-sized particles. The process helps to increase durability and improve sand equivalency of the product. The Attrition Cell is equipped with an axial turbine impeller with vulcanized rubber for wear resistance. Additional water is added as required, based on electrical power-draw from the attrition cell motor, to maintain a set feed density. The Attrition Cell discharges into the sump that feeds the LitesOut system. On material which attritioning is not required, the cells can be bypassed to avoid unnecessary wear.

1.3 LitesOut System Description

A MCLANAHAN Centrifugal Pump feeds slurry to a MCLANAHAN Separator positioned above the Flat Bottom Classifier. Excess water exits the overflow of the Separator and flows over a sieve bend, and reports to the tailing's sump. Partially dewatered sand exits the underflow of the Separator and feeds the Flat Bottom Classifier. Feed enters the Flat Bottom Classifier via a top entry well that eliminates turbulence and evenly distributes the feed. A dedicated water pump injects water into the Flat Bottom Classifier false bottom (plenum chamber) where it passes into the tank through multiple, long-life, replaceable nozzles. As the solids settle in the upper sorting chamber, they are met by the rising current of water, causing a hydraulically fluidized ("teeter") bed to form. The teeter bed acts like a dense liquid, with a specific gravity (SG) of approximately 1.55. The low-density contaminants (SG 1.4-1.5), irrespective of particle size, float on top of the teeter bed and discharge over the overflow weir. The teeter bed also classifies the sand, and sand particles smaller than 300 micron report to overflow. A PLC control system measures the density of the teeter bed and

maintains it at a setpoint by moderating the rate of underflow discharge. This is done by varying the frequency that the underflow valves cycle from fully opened to fully closed. +300 micron sand reports to the underflow of the Flat Bottom Classifier, and feeds a McLanahan Vibrating Dewatering Screen. -300 micron sand reports to the overflow of the Flat Bottom Classifier and feeds a static screen Sieve Bend set to cut at 400 micron. The Sieve Bend removes the lightweight contaminants to stack on the ground. Fine sand and water pass through the Sieve, and reports to a USP. The McLanahan Vibrating Dewatering Screen further dewaters the sand and discharges a drip-free cake.

1.4 Non-Spec Fine Sand USP Module Description

Sieve bend throughs enter the feed sump of the UltraSand Plant. A rubber-lined MCLANAHAN Pump feeds the slurry to a Separator. Overflow from the Separator, containing unwanted -63 micron fines flows to the tailings sump. A portion of the overflow is returned to the Sump to maintain level. Partially dewatered underflow from the Separator feeds a MCLANAHAN Vibrating Dewatering Screen. The Dewatering Screen further dewaters the sand and discharges a drip-free cake. Any material passing through the screen returns to the Feed Sump, to mix with the incoming feed and be processed again. Material with low contamination can be blended from the separator underflow to the coarse product dewatering screen.

1.5 Thickener Description

Tailings, containing unwanted -63 micron fines, are pumped from the tailing sumps to the Thickener, where a flocculating agent is added from a Polymer Makeup System. The slurry is introduced at a controlled velocity into the Thickener feed well, which distributes it evenly into the thickener settling zone. Flocculated solids settle and are scraped to the center of the Thickener by the Rake Mechanism. Excess water overflows the peripheral weir of the Thickener. From the center, the settled solids are pumped out via a MCLANAHAN rubber lined centrifugal Underflow Pump with a variable frequency drive. The thickener underflow will typically have a consistency of a thick mud (25 – 40% solids).

1.6 Recessed Plate Filter Press Cycle Description

The slurry is pumped from the Thickener underflow into an agitated Surge Tank with a mixer. A high-pressure centrifugal Pump feeds slurry to the Recessed Plate Filter Press. The Recessed Plate Filter Press operates in batch cycles, controlled by a PLC. The cycle starts by the Press closing and clamping the plates tightly together. The Feed Pump fills the chambers inside the press, and then increases in speed to increase pressure. The Press retains the solids but passes the water (filtrate) which is pumped back to the Thickener feed. Based on slurry flow rate or pressure, the Feed Pump stops when the desired cake moisture is achieved. The Press is then unclamped, and the plates open sequentially, dropping dry cake to the ground or a conveyor.

2.0 PLANT LAYOUT.

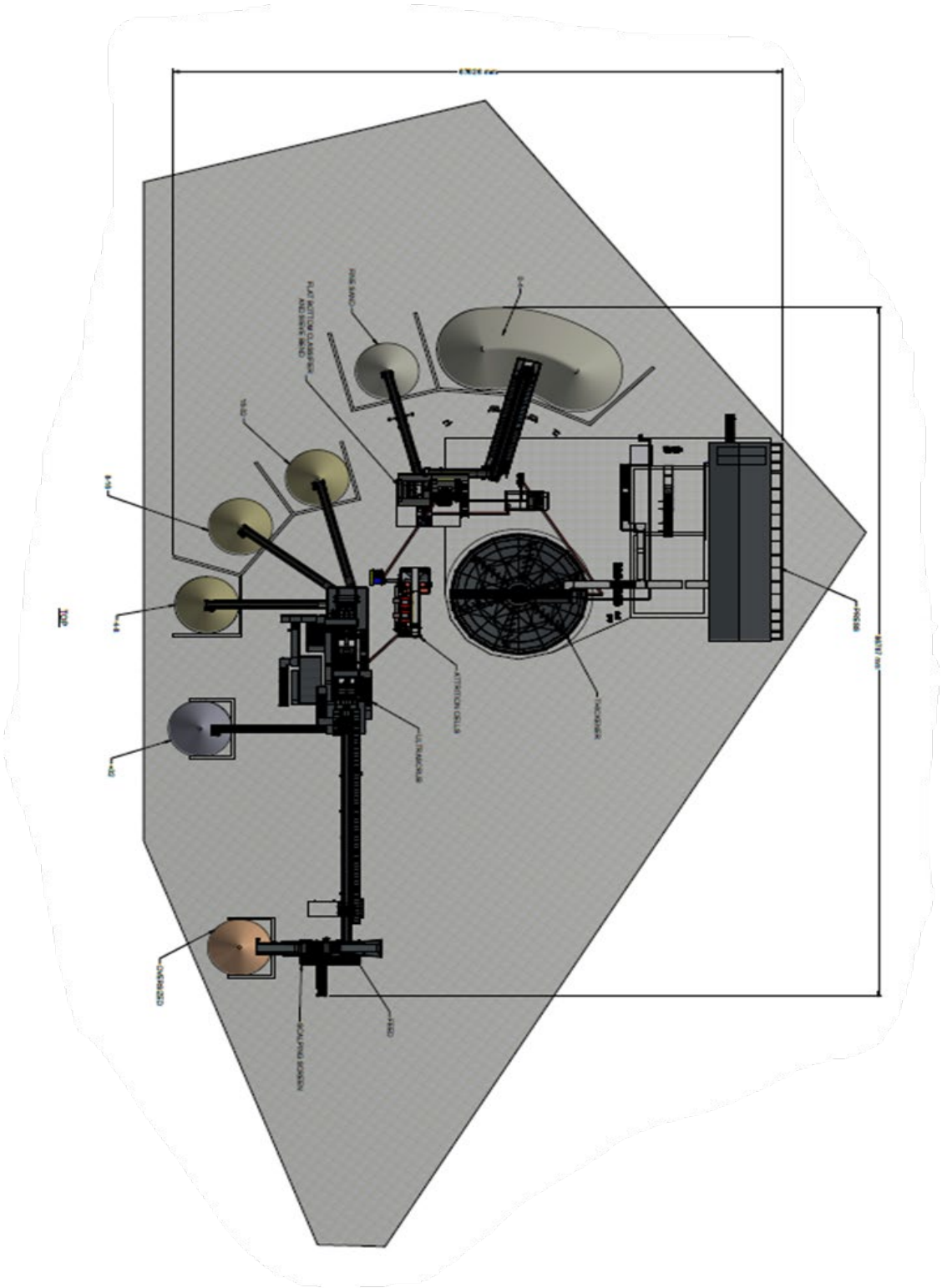

*Illustration purpose only

3.0 Equipment Selection and Description.

3.1 Feed Conveyor

One (1) 650mm (w) x 30m (l) static conveyor:

- Walkway on one side and around head drum.
- 3 Ply smooth belt.
- Lattice Frame construction.
- 11kW Electric Head drive.
- Rubber Lagged head drum.
- Tungsten tipped belt scrapper.
- Self-cleaning spoked tail drum.
- Belt weigher.
- Overband Magnet.
- Pull cords on both sides.

3.2 UltraScrub 3625

3.2.1 Primary Rinsing Screen

One (1) 10'x4' Double Deck Horizontal Full Rinsing Screen.

- Fitted with two 7.6kW electric vibrating motors.
- Sprays bars with polyurethane fan sprays.
- Huck bolted steel construction.
- Rubber vibration isolation buffers.
- PU media.

3.2.2 Mudmaster LogWasher

One (1) 36" x 25' Twin shaft log washer:

- Fabricated steel Washer Box, ribbed and flanged for stiffness and rigidity.
- Adjustable overflow weir.
- Extra heavy duty paddle bases and log shafts.
- Abrasion resistance steel paddles with a through hardness of 500 Brinell.
- 55kW electric motor drive system.
- Horizontal dual output shaft reduction gearbox.
- External pillow block bearings for ease of maintenance.

3.2.3 Aggregate Sizing Screen

One (1) 10'x4' Double Deck Horizontal Part Rinsing Screen:

- Fitted with two 7.6kW electric vibrating motors.
- Sprays bars with polyurethane fan sprays.
- Huck bolted steel construction.
- Rubber vibration isolation buffers.
- PU media.
- Rubber lined rolling and collection chutes.

3.2.4 Trash Screen

One (1) VD-9 (10' x 3') McLanahan Vibration Dewatering Screen:

- Two 3.2kW vibratory motors.
- Heated treated motor bridge.
- Huck bolted construction.
- Modular polyurethane screen media.
- Rubber vibration isolation buffers.
- Feed box, underpan and discharge chute.

3.2.5 Sump and Pump

One (1) Pumping Module, including:

- Feed collection sump model E-900-FW.
  - Steel Fabrication.
  - Velocity break feed well with rubber lined impact plate.
- Electrical on/off level control valve with PIT sensor.
- McLanahan Slurry Pump 150/125 w/ 22kW:
  - Field replaceable moulded rubber casing liners.
  - Type D Gland.
  - Grease lubricated bearings.
  - Drive package.

- DN150 suction hose and DN125 discharge hose.

3.2.6 Aggregate transfer conveyor

One (1) 650mm (w) x 10m (l) static conveyor:

- Chanel Frame construction.
- 3 Ply smooth belt.
- 5.5kW Electric Head drive.
- Rubber Lagged head drum.
- Tungsten tipped belt scrapper.
- Self-cleaning spoked tail drum.
- Pull cords on both sides.

3.3 Attrition System

3.3.1 Separator

One (1) McLanahan Separator model S-518 AX20:

- Fabricated steel with bonded rubber linings.
- Feed Box Extension.
- 20° Cone.
- Polyurethane Vortex Finder.
- Feed Inlet pressure gauge.
- Steel Overflow pipe.
- Automatic underflow regulator.
- Siphon control valve.

3.3.2 Liberator Attrition Cell

One (1) Model AC-17 McLanahan Liberator Attrition Scrubber Cells:

- 1.7 cubic meter tank with rubber baffles.

- Bonded gum rubber lining on all wetted surfaces.
- Axial Turbine, vulcanised rubber baffles.
- Removable rubber lined side panels.
- 45kW Motor with speed reducing gearbox.
- Rubber lined feed and discharge chute.
- 2” dilution water ball valve.
- Air actuated, manually controlled dump gate valve.

3.3.3 Sump and Pump

One (1) Pumping Module, including:

- Feed collection sump model E-900-FW.
  - Steel Fabrication.
  - Velocity break feed well with rubber lined impact plate.
- Electrical on/off level control valve with PIT sensor.
- McLanahan Slurry Pump 150/125 w/ 30kW:
  - Field replaceable moulded rubber casing liners.
  - Type D Gland.
  - Grease lubricated bearings.
  - Drive package.
- DN150 suction hose and DN125 discharge hose.

Note: Generic target attrition time of four minutes used. Testing of material required to determine required attrition time.

3.4 Lites-Out System

3.4.1 Separator

One (1) McLanahan Separator model S-518 AX20:

- Fabricated steel with bonded rubber linings.
- Feed Box Extension.
- 20° Cone.
- Polyurethane Vortex Finder.
- Feed Inlet pressure gauge.
- Steel Overflow pipe.
- Automatic underflow regulator.
- Siphon control valve.

3.4.2 Flat Bottom Classifier

One (1) McLanahan FBC-6 (1.8m dia.) Classifier:

- Fabricated steel with epoxy internal coating.
- Top entry feed well.
- Plenum Chamber for Teeter water distribution
- Replaceable water injection nozzles – style
- Process control system including:
    - Electronic level probe/transmitter
    - Automatic Underflow Dart Valves – Pneumatic with fail-close operation
- Teeter Water Flow Control Valve
- Teeter Water Check Valve
- Teeter Water Magnetic Flow Meter

3.4.3 Sieve Bend

One (1) 8ft wide x 40” radius x 60° arc:

- Wedge wire media with 800-micron aperture.
- Sieve holder.

- Removable feed and discharge lips.
- Polyurethane hold-down and wedges.
- Mild steel feed box with abrasion resistant lining.
- Underpan with coal tar epoxy coating.

3.4.4 Dewatering Screen

One (1) VD-6 (6’ x 2’) McLanahan Vibration Dewatering Screen:

- Two 2.25kW vibratory motors.
- Heated treated motor bridge.
- Huck bolted construction.
- Modular polyurethane screen media.
- Rubber vibration isolation buffers.
- Rubber feed box.
- Underpan with coal tar epoxy coating.
- Lined discharge chute.

3.4.5 Sand product conveyor

One (1) 650mm (w) x 10m (l) static conveyor:

- Chanel Frame construction.
- 3 Ply smooth belt.
- 5.5kW Electric Head drive.
- Rubber Lagged head drum.
- Tungsten tipped belt scrapper.
- Self-cleaning spoked tail drum.
- Pull cords on both sides.

3.5 UltraSand Plant

3.5.1 Separator

One (1) McLanahan Separator model S-415 AX20:

- Fabricated steel with bonded rubber linings.
- Feed Box Extension.
- 20° Cone.
- Polyurethane Vortex Finder.
- Feed Inlet pressure gauge.
- Steel Overflow pipe.
- Automatic underflow regulator.
- Siphon control valve.

3.5.2 Dewatering Screen

One (1) VD-6 (6’ x 2’) McLanahan Vibration Dewatering Screen:

- Two 2.25kW vibratory motors.
- Heated treated motor bridge.
- Huck bolted construction.
- Modular polyurethane screen media.
- Rubber vibration isolation buffers.
- Rubber feed box.
- Underpan with coal tar epoxy coating.
- Lined discharge chute

3.5.3 Sump and Pump

One (1) Pumping Module, including:

- Feed collection sump model E-750-FW.
  - Steel Fabrication.
  - Velocity break feed well with rubber lined impact plate.
- Electrical on/off level control valve with PIT sensor.
- McLanahan Slurry Pump 150/125 w/ 22kW:
  - Field replaceable moulded rubber casing liners.
  - Type D Gland.
  - Grease lubricated bearings.
  - Drive package.
- DN150 suction hose and DN125 discharge hose.

3.6 Overflow Transfer System

3.6.1 Sieve Bend

One (1) 6ft wide x 40” radius x 60° arc:

- Wedge wire media with 800-micron aperture.
- Sieve holder.
- Removable feed and discharge lips.
- Polyurethane hold-down and wedges.
- Mild steel feed box with abrasion resistant lining.
- Underpan with coal tar epoxy coating.
- Mounted beside Lites-Out Sieve bend.

3.6.2 Sump and Pump

One (1) Pumping Module, including:

- Feed collection sump model E-1250-FW.
  - Steel Fabrication.
  - Velocity break feed well with rubber lined impact plate.
- Electrical on/off level control valve with PIT sensor.
- McLanahan Slurry Pump 200/150 w/ 22kW:
  - Field replaceable moulded rubber casing liners.
  - Type D Gland.
  - Grease lubricated bearings.
  - Drive package.
  - VFD Controlled.
- DN200 suction hose and DN150 discharge hose.

3.7 Water Management

3.7.1 Poly Dosing Unit

One (1) 2.5m3 Poly Dosing Plant:

- 50kg Dry Material hopper.
- Screw feeder with VFD control.
- 3-Staged Polypropylene tank with 3 agitators and removeable covers.
- Mixing chamber with vortex jet mixer.
- Ultrasonic Level control system.
- Potable water inlet with on-off valve and flow meter.
- Polymer Dosing pump with VFD control, with pump over pressure protection.
- Duty standby pump arrangement.

3.7.2 Thickener

One (1) HRT-8-E Rake Thickener:

- Mild steel bolted constructed tank which utilizes “toe-out” flanging Methodologies.
- Bridge with full length walkway and hand railings.
- Galvanised supports.
- Access via staircase, connected to adjacent McLanahan equipment.
- Rake drive arrangement, including planetary gearbox driven by an electric motor.

- Torque monitoring and limiting devices.
- Minimum drag semi-truss rake arm design reduces the amount of torque required to move the rakes through the settled solids and minimises the disturbance of the already settled solids.
- Underflow ancillaries including isolations valves, flushing system and flow meter.
- McLanahan Thickener Underflow Pump 80/80 w/ 11kW:
    - Field replaceable moulded rubber casing liners.
    - Type P Gland.
    - Grease lubricated bearings.
    - Drive package.
    - VFD controlled.

Note: We have sized our equipment using standard unit loading factors. Operating capacities are dependent on material characteristics (i.e. particle size, clay content, ability to flocculate, etc.), and test work would be required to establish the unit loading specific to the material at this site, and moisture content of underflow discharge slurry.

Note: Chemical composition of overflow water is assumed to be adequate for efficient washing. If not of sufficient quality, test work will be required to establish further processes required to bring the water to the required standard.

3.7.2 Silt storage Accessories

- Bridge with walkway and hand railing
- Access via staircase from adjacent McLanahan wash plant structure
- Top entry Agitator with electric motor
- Underflow discharge/ suction pipework arrangement with manual isolating valve

3.7.3 Filter Press feed pump

- Cast Iron body Centrifugal pump
- rubber lined
- High resistant wear alloy Impeller
- Double mechanical seal’s device with widia rings
- Capacity to high-speed 200-250 m3/h
- Head to high speed 14 bar

3.8 Filter Press

3.8.1 Filter Press Feed Pump

One (1) High-Pressure Double Stage Feed Pump:

- Hard Metal lined with 55KW Electric Motor.
- VFD Controlled.
- Mechanical Seal with gland flush kit.

3.8.2 Filter Press

One (1) OH FC 1500 151pp KA-A2/131pp Ch. 25mm:

- Recessed Polypropylene Plates with Filtering Cloths:
  - 1500mm x 1500mm Plate size.
  - 131 plates, expandable to 151 plates.
  - 5.72m3 Volume.
- Heavy Duty Triangular Frame:
  - Fabricated steel housing including two (2) end plates and one (1) mobile plate.
  - Lower Dual Tension shafts for tension stress.
  - Overhead Beam for easy access to plates.
- Control panel located beside press.
- 15kW HPU for opening and closing of mobile plate:
  - Double-acting hydraulic cylinder with hard chromium plated shaft.
  - Critical pressures monitored in PLC.
- Automatic plate shifting device.
- Dual-feed inlet for faster fill-up times with reduced inlet velocities.
- Slurry flow meter and pressure switch for end of filtration.
- The McLanahan Filter Press will be placed in a cladded building structure (by UK remediation)
- The Filter press has been sized to facilitate c. 7.18TPH of dry solids. (N.B This is subject to further analysis and conversation)

3.8.3 Drip Trays

One (1) Drip tray system:

- Two (2) bombay doors covering the full area under the plate pack.
- Special leverage moves the doors independently.
- Carbon steel collection tray.

3.8.4 Automatic Cloth Washing System

One (1) High pressure Automatic washing system:

- Automatic trolley with 0.75kW motor.
- Lifting mechanism with 0.75kW motor
- Feed Pump for the washing system
    - One (1) horizontal plunging piston triplex type (3 pistons) in stainless steel, ceramic lined.
    - Capacity: 330 l/min
    - Working Pressure: 100 bar
    - Power: 55kW
- Polyethylene storage tank with level control syste

Note: *That we have sized our equipment using standard unit loading factors. Operating capacities are dependent on material characteristics (i.e. particle size, clay content, etc.), and test work would be required to establish the unit loading specific to the material at this site, and moisture content of discharged cake.*

3.9 Equipment Finish

McLanahan equipment items are finished as follows:-
Equipment Items – Painted Red RAL3001.
Structure – Painted Grey RAL7016.
Guarding – Yellow.
Platform grating, Stair-treads, Handrails – Galvanised.
Conveyors to be Galvanised

4.0 Electronic Controls

A Motor Control Centre will be located in a 40’ control cabin adjacent and in close proximity to the plant.

Motor Control Centre features:

- HMI (Human Machine Interface) control panel,
- Sequenced start and stop programming of prime movers,
- All Primer mover starters,
- Emergency stop (E stop),
- Data logging,
- Blocked pump condition monitoring,
- Low level sump water monitoring /dry run protection for slurry pump,

UKRemediation Ltd

SOIL TREATMENT

WATER TREATMENT