MEMO

ARCADIS Design & Consultancy for natural and built assets

SUBJECT
Water Treatment Requirements for the Grangetown Prairie

DATE
03/02/2021

DEPARTMENT
Arcadis Cambridge

COPIES TO
Darren Edmends (STDC)
Nigel Fletcher (Drivers)
Stephen Leyland (Drivers)
Andy Smith (Arcadis)
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TO
Richard Small (Seymour)

OUR REF
10035117-AUK-XX-XX-SP-ZZ-0258-P1-Water Treatment Prairie Excavations

PROJECT NUMBER
10035117

FROM

Adam Bethell
Adam.bethell@arcadis.com

Dear Richard,

Please find below the outline requirements and conceptual design for the Water Treatment to support the groundworks on the Grangetown Prairie area of the Former Redcar Steelworks.

Works Overview

This document sets out the requirement for and conceptual design specification for a water treatment system associated with supporting the groundworks on the Grangetown Prairie area of the Former Redcar Steelworks site.

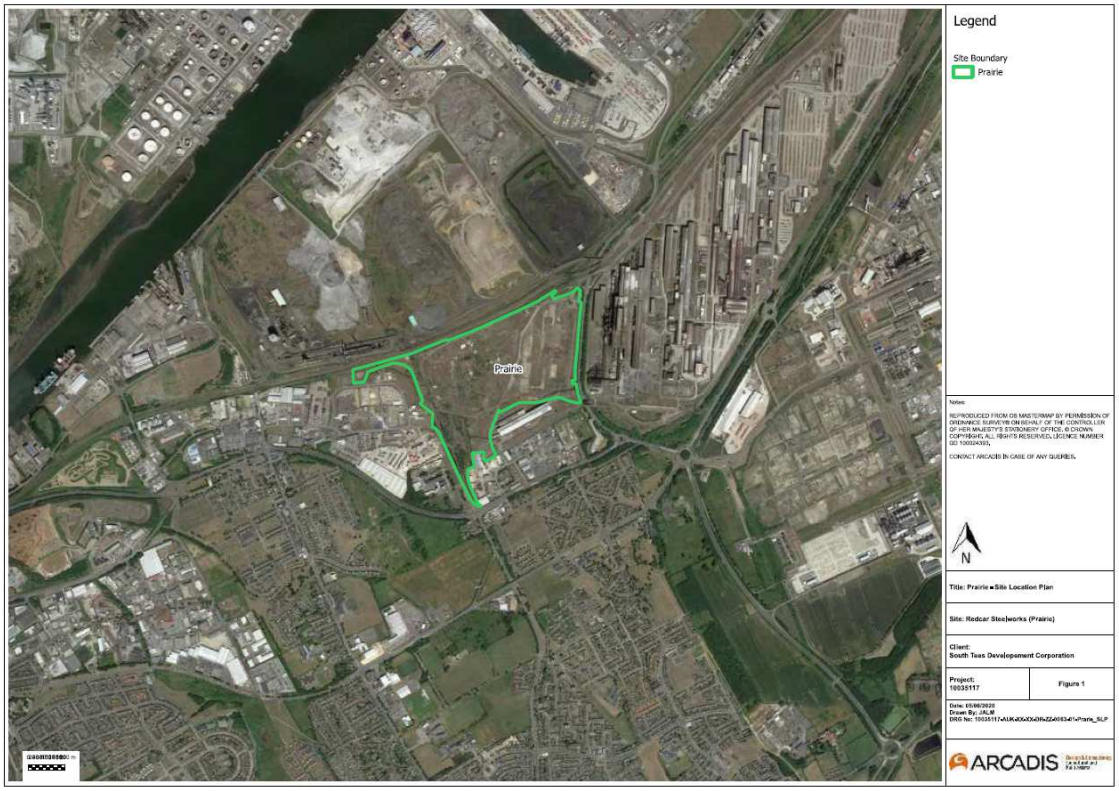
To support the redevelopment at the Redcar steelworks earthworks are being undertaken to remove ground obstructions and materials which are chemically, physically or geotechnically unsuitable. The excavation works will be expected to encounter perched water, infiltrated water and collect rainwater. This water will require collection and removal to allow the excavation works to continue and to enable backfilling works to be completed. The collected water quality will be variable during the project but is likely that, on occasion, it will include the presence of Light Non-Aqueous Phase Liquids (LNAPL), chemical contaminants and physical properties which would require treatment to meet discharge consent criteria prior to discharge into the Northumbrian Water Limited (NWL) foul drainage networks.

It is anticipated that the excavation works will be undertaken within a 41 week program and as such the recovery, treatment and discharge of waters will continue for a corresponding period of time.

Site Setting

The Grangetown Prairie area (the site) is a land parcel situated at the Former Redcar Steelworks located within the Redcar, Lackenby, Grangetown and South Bank conurbations of the Borough of Redcar & Cleveland, within the industrial area generally known as ‘South Tees’. The site setting is shown on the Figure 1 below.

Figure 1 – Site Location Plan



The site is accessed via the Lackenby Gate Entrance located at:

South Tees Development Corporation
Lackenby Gate
Trunk Road
Middlesbrough
TS6 7RT

The system should be able to operate as a standalone system, no power supplies can be provided to operate the system.

The site is located within the wider Redcar security-controlled facility and the water treatment area should be fenced using Heras style fencing, however system componentry should be housed appropriately to prevent unauthorised access / interference.

Provision should be made for the plant to be operated / monitored / maintained during night hours with the provision of safe access, lighting etc for breakdowns or urgent issues.

Regulations

The Grangetown Prairie works area shall be operated under the requirements of the Construction (Design and Management) Regulations 2015 (CDM 2015). For the purposes of this commission the roles of Principal Designer and Principal Contractor shall be fulfilled by others.

Water Quality

Samples of water from the excavations are included within Appendix A. It should however be noted that due to the sample being taken from water in a static condition within the excavation no LNAPLs were present, the water did not contain suspended solids or contamination associated with the suspended solids.

It should therefore be assumed that the water from the excavation pumping is likely to contain LNAPL, suspended solids and contaminants associated with the suspended solids.

It should be considered that the water quality including chemical parameters, suspended solids and sediment collected shall be variable in composition and quantity. The water treatment system design should enable adjustments to be made to maintain the required water quality discharge limits.

Remediation System Capacity and Performance

The system shall be capable of uplift from the excavation or from settlement lagoons (where installed) Water will be produced through a combination of perched groundwater, surface runoff and rainwater, as such the system will only be required to pump when water is present.

Max Flow Rate Discharge

An application has been submitted to NWL for a Trade Effluent Discharge of up to 10 Litres per Second of which up to 5 litres per second would be allocated to this contract. The plant and equipment shall be capable of pumping at maximum flow rate but only at the rate required to prevent the sump from overtopping. It is anticipated that during dry periods that only intermittent pumping would be required.

Max 24 hr Volume

An application has been submitted to NWL for Trade Effluent Discharge of up to 862m3 per 24hr period of which 432m3 per 24hr period would be allocated to this contract.

Discharge Quality

Table 1 contains the anticipated level that may be applied to the discharge consent. For complete clarity these levels are not agreed and do not represent the final consented limits but are presented to provide an indicative range. Actual values may increase or decrease, and individual limited values may be required for specific parameters such as metals.

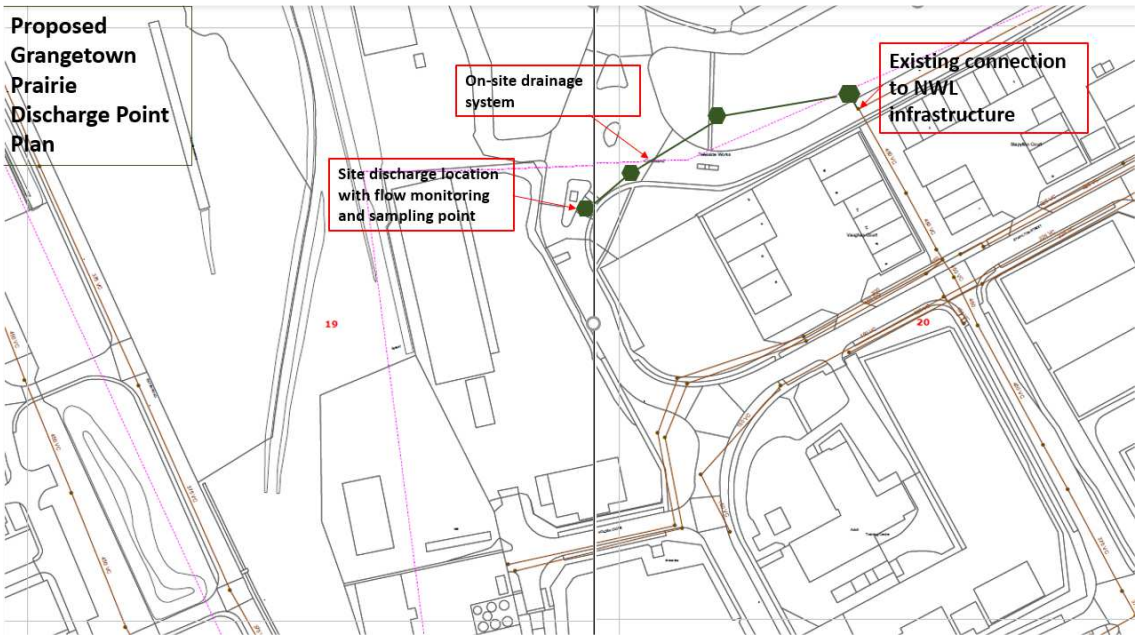
Table 1 – Indicative Discharge Consent Parameters

Discharge Parameter	Anticipated Value
Total PAH's	max 5 mg/l
Total Phenols	max 5 mg/l
Metals	less than 2 mg/l
Petroleum hydrocarbons C10 to C40	max 50 mg/l
Oils/Grease	200 mg/l
pH range	pH6 to pH10
Cyanide	max 1 mg/l
Sulphate	max 1000 mg/l
Ammonia	max 15 mg/l
COD	max 125 mg/l
Suspended solids	max 250 mg/l
Schedule 1 Prescribed substances	Above background concentrations - which is normally classed as no higher than the concentration they are found in potable (drinking) water.

Point of Discharge

The proposed point of entry into the NWL infrastructure is presented on Figure 2 below and is located at approximate Grid Reference NZ 54607 20920. The entry point to the NWL infrastructure is anticipated to be a ground level inspection chamber. The pipework entry must be secured into the inspection chamber in a manner to prevent accidental removal or presenting a risk to health and safety.

Figure 2 – Proposed Discharge Point Location



Immediately prior to the entry into the NWL infrastructure a sample tap must be installed to facilitate the collection of representative samples of the water discharge to allow analytical testing for compliance with the discharge consent.

An MCERTs calibrated Trade Effluent flow meter is required to be installed immediately prior to the discharge point to allow the monitoring of both flow rates and volumes to check compliance with the discharge consent criteria. The Trade Effluent flow meter must clearly show;

- Meter manufacturer;
- Model Number;
- Serial Number;
- Metric readings providing m^3 measurements; and,
- Required calibration frequency from manufacturers specification.

Remediation System Flow Diagram

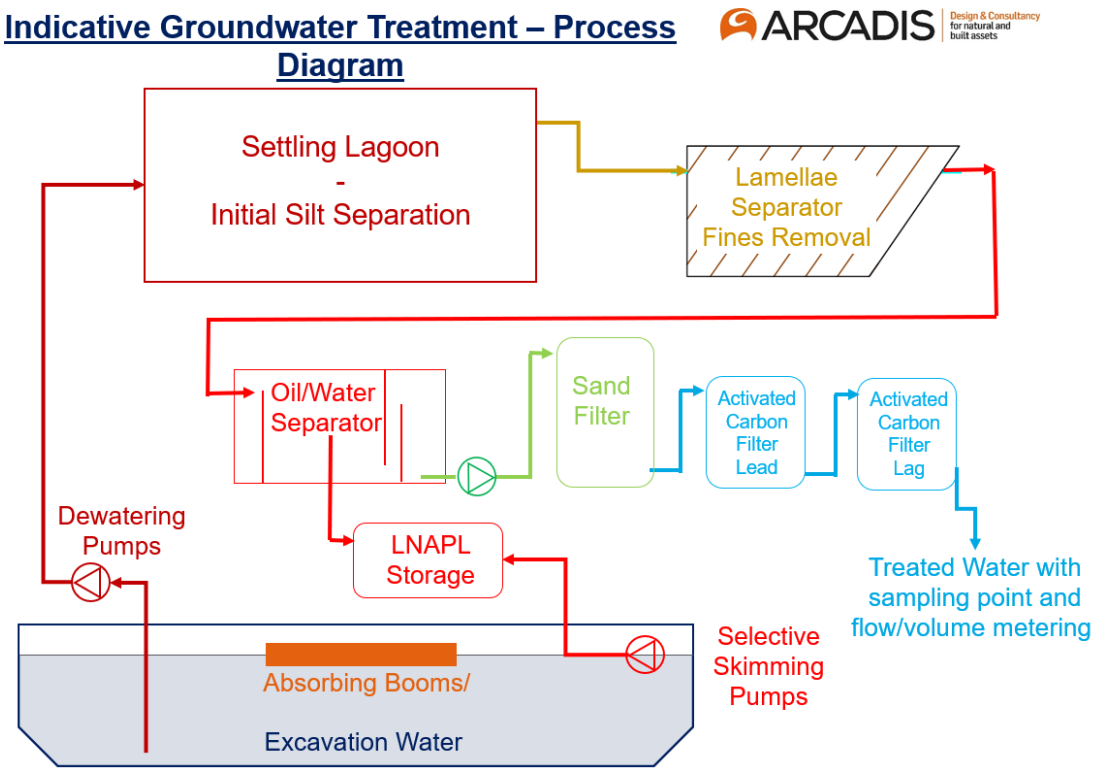
An indicative and simplified process flow diagram for the water treatment system is provided in Figure 3 below. The main process stages are as listed below:

- **Dewatering Pumps**: pump(s**)** shall be required to uplift water and suspended sediments from the excavation / settlement lagoon. The pump(s) will abstract water and sediments and send it over, via a network of pipes, to the main remediation system for above ground treatment. Pumps must be selected to minimise the emulsification of the LNAPL. The Lagoon / Excavation collection area capacity has not currently been designed and should therefore not be considered for use in balancing system flow requirements.
- **Selective Skimming Pumps** – Where recoverable levels of LNAPL, accumulated on the excavation water or within settlement lagoons (where installed), is present then selective skimming pumps should be deployed to recover LNAPL prior to further water processing. The collection of LNAPL should be stored within appropriate storage tanks or UN certified waste containers prior to disposal off site under full duty of care.
- **Silt separation**: once above ground, the extracted groundwater will be required to be pre-treated / processed to promote an initial solids content abatement, a second separation stage following coarse particles removal may be required to promote separation of finer settleable

materials and limit the potential to cause operational issues downgradient of the treatment system This process is to be designed to minimise the emulsification of the LNAPL. Any accumulated silt / sludge recovered will need to be removed at regular intervals based on the actual settling / removal rates.

- **LNAPL / Physical separation**: the equipment will incorporate a weir system designed to remove any LNAPL present in the water with appropriate coalescing elements and filtration to remove LNAPL. A means to measure and quantify the volume of NAPL recovered shall be included in the system design. In addition, a means to routinely drain and remove the LNAPL into appropriate vessels for disposal shall be incorporated into the system. Any hazardous gases or vapours which have the potential to build up in the headspace of the pre-treatment equipment will be extracted under vacuum for treatment via vapour phase activated carbon (or similar), prior to discharge to atmosphere.
- **Filtration**: water will subsequently be passed through a series of filters to remove any remaining suspended particles which may remain in the water and prevent them from fouling subsequent stages of the treatment process.
- **Aqueous / Dissolved Phase Treatment**: contaminants remaining in the water above discharge consent limits at this stage will also require treatment. It is envisaged that this will be achieved by passing through appropriate adsorptive media, (Aqueous Phase Activated Carbon or similar), prior to discharge to the site trade effluent drain network. Sampling ports are required to be installed prior to and post the Aqueous Phase treatment stage.
- **System controls**: the remediation system will be fitted with a series of critical safety devices, including but not limited to high-level switches, pressure sensors and reliefs, gas monitors, emergency stop buttons etc. Those are designed to allow safe and correct operation of the various components, while the associated controls will provide automatic shutdown of the components should any alarm be activated from the existing instrumentation fitted to the system.
- **Secondary and tertiary containment**: the main components of the remediation system processing contaminated materials shall be fitted with a containment bund and associated high-level alarm, designed to hold a volume equal to at least 110% of the largest liquid storage vessel inside the bund.
- **Telemetry Monitoring**: as a minimum the remediation system will be equipped with integral telemetry monitoring, to allow remote communication to office-based staff in the event of a system malfunction or shutdown. This should allow field engineers to respond to the system fault in a timely manner, thereby minimising any operational downtime.
- **Weather Protection:** The treatment system and all associated infrastructure and pipework should be protected against extremes of weather, including but not limited to freezing conditions.

Figure 3 – Indicative Water Treatment Process Diagram



APPENDIX A

Water Quality Laboratory Analysis

Certificate of Analysis

Certificate Number	20-07289-3	03-Jun-20
Client	Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG	

Our Reference	20-07289-3
Client Reference	4251
Order No	(not supplied)
Contract Title	Prairie Site Ground Investigation Works
Description	14 Soil samples, 2 Leachate samples, 3 Water samples.

Date Received	14-Apr-20
Date Started	14-Apr-20
Date Completed	03-Jun-20
Test Procedures	Identified by prefix DETSn (details on request).
Notes	**This report supersedes 20-07289-2, amendments.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager

2139

Summary of Chemical Analysis

Water Samples

Our Ref 20-07289-3
Client Ref 4251
Contract Title Prairie Site Ground Investigation Works

			Lab No	1665287	1665289	1665294
				PRAIRIE_AU	PRAIRIE_AUK_TP11	PRAIRIE_AUK_TP18
			Sample ID	K_SW1	5_SO_0050	6_SO_0100
			Depth		0.50	1.00
			Other ID	1	9	4
			Sample Type	EW	EW	EW
			Sampling Date	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.6	4.3	6.7
Boron, Dissolved	DETSC 2306*	12	ug/l	370	170	370
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.14	< 0.03
Chromium, Total	DETSC 2306*	0.25	ug/l	7.9	110	6.4
Copper, Dissolved	DETSC 2306	0.4	ug/l	4.4	11	3.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.52	20	2.2
Manganese, Dissolved	DETSC 2306	0.22	ug/l	19	990	400
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.06	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.1	4.7	2.9
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.2	86	10
Inorganics						
pH	DETSC 2008		pH	6.8	10.9	7.2
Cyanide, Total	DETSC 2130	40	ug/l	< 40	71	410
Dissolved Organic Carbon	DETSC 2085	2	mg/l	9.9	10	23
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	0.54	5.6
Sulphate as SO4	DETSC 2055	0.1	mg/l	210	230	510
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	310
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	54
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	1.1
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	180
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	1200
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	1000
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	2800
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	280
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	44
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	110
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	1.6	3100
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	29	1200
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	150	240
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	180	5000
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	180	7800
EPH (C10-C40)	DETSC 3311	10	ug/l	220	1900	20000

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Water Samples

Our Ref 20-07289-3
Client Ref 4251
Contract Title Prairie Site Ground Investigation Works

			Lab No	1665287	1665289	1665294
			Sample ID	PRAIRIE_AUK_SW1	PRAIRIE_AUK_TP115_SO_0050	PRAIRIE_AUK_TP186_SO_0100
			Depth		0.50	1.00
			Other ID	1	9	4
			Sample Type	EW	EW	EW
			Sampling Date	n/s	n/s	n/s
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	0.06	0.18	690
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	0.05	69
Acenaphthene	DETSC 3304	0.01	ug/l	0.03	1.3	690
Fluorene	DETSC 3304	0.01	ug/l	0.02	0.80	310
Phenanthrene	DETSC 3304	0.01	ug/l	0.18	2.8	210
Anthracene	DETSC 3304	0.01	ug/l	0.07	0.54	35
Fluoranthene	DETSC 3304	0.01	ug/l	0.50	2.3	28
Pyrene	DETSC 3304	0.01	ug/l	0.41	1.7	18
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.19	0.55	3.4
Chrysene	DETSC 3304	0.01	ug/l	0.28	0.59	3.7
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.44	0.83	4.5
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.15	0.30	1.5
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.22	0.56	2.4
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.14	0.38	1.2
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.05	0.11	< 1.00
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.20	0.52	1.6
PAH Total	DETSC 3304	0.2	ug/l	3.0	14	2100
Phenols						
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	3400

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 20-07289-3
Client Ref 4251
Contract Title Prairie Site Ground Investigation Works

			Lab No	1665595	1675436
				PRAIRIE_AUK_TP11	PRAIRIE_AUK_TP12
			Sample ID	4_SO_0090	3_SO_0060
			Depth	0.90	0.60
			Other ID	6	3
			Sample Type	ES	ES
			Sampling Date	n/s	n/s
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Leachate 2:1 250g Non-WAC	DETSC 1009*			Y	Y
Metals					
Antimony, Dissolved	DETSC 2306	0.17	ug/l	2.9	2.8
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	5.7	4.7
Barium, Dissolved	DETSC 2306	0.26	ug/l	2.3	20
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1
Boron, Dissolved	DETSC 2306*	12	ug/l	63	51
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	1.6
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.2	22
Iron, Dissolved	DETSC 2306	5.5	ug/l	52	31
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.85	0.20
Magnesium, Dissolved	DETSC 2306	0.02	mg/l	0.34	0.22
Manganese, Dissolved	DETSC 2306	0.22	ug/l	10	1.6
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.02
Molybdenum, Dissolved	DETSC 2306	1.1	ug/l	5.2	3.4
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	1.2
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	21	48
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.3	< 1.3
Inorganics					
pH	DETSC 2008		pH	8.5	10.7
Cyanide, Total	DETSC 2130	40	ug/l	< 40	44
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.029	0.13
Chloride	DETSC 2055	0.1	mg/l	6.5	1.9
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.7	31

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 20-07289-3
Client Ref 4251
Contract Title Prairie Site Ground Investigation Works

			Lab No	1665595	1675436
				PRAIRIE_AUK_TP11	PRAIRIE_AUK_TP12
			Sample ID	4_SO_0090	3_SO_0060
			Depth	0.90	0.60
			Other ID	6	3
			Sample Type	ES	ES
			Sampling Date	n/s	n/s
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	30	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 10.0	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	3000	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	410	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	180	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	51	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	3700	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	3700	< 10
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	10000	0.30
Acenaphthylene	DETSC 3304	0.01	ug/l	390	0.58
Acenaphthene	DETSC 3304	0.01	ug/l	30	0.65
Fluorene	DETSC 3304	0.01	ug/l	88	0.28
Phenanthrene	DETSC 3304	0.01	ug/l	200	0.49
Anthracene	DETSC 3304	0.01	ug/l	32	0.21
Fluoranthene	DETSC 3304	0.01	ug/l	45	0.74
Pyrene	DETSC 3304	0.01	ug/l	34	0.50
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	9.6	0.35
Chrysene	DETSC 3304	0.01	ug/l	8.8	0.38
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	12	0.71
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	4.6	0.29
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	8.6	0.44
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	5.7	0.59
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 1.00	0.12
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	5.6	0.58
PAH Total	DETSC 3304	0.2	ug/l	11000	7.2
Phenols					
Phenol - Monohydric	DETSC 2130	100	ug/l	2600	< 100

Key: * -not accredited. n/s -not supplied.

APPENDIX B

Study Limitations

IMPORTANT: This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1. This report has been prepared by Arcadis UK Ltd (Arcadis), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with **STDC** (the 'Client'). Arcadis does not accept responsibility for any matters outside the agreed scope.

2. This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing.

3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Arcadis are unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.

4. All work carried out in preparing this report has used, and is based on, Arcadis' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice, pending changes in legislation, of which Arcadis is aware, have been considered. Following delivery of the report, Arcadis have no obligation to advise the Client or any other party of such changes or their repercussions.

5. This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.

6. Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties.

7. This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received.

8. This report refers, within the limitations stated, to the condition of the Site at the time of the inspections. No warranty is given as to the possibility of changes in the condition of the Site since the time of the investigation.

9. The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does not provide specialist legal or other professional advice. The advice of other professionals may be required.

10. Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.

11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.

12. Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issue