Ardrossan North Shore
Remediation Strategy

January 2023

Ardrossan North Shore Remediation Strategy

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Author:	Graeme Duff
Reviewer:	Campbell Stewart
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Glasgow

Craighall Business Park
8 Eagle Street
Glasgow
G4 9XA
0141 341 5040
info@envirocentre.co.uk
www.envirocentre.co.uk

Aberdeen

Banchory Business Centre
Burn O'Bennie Road
Banchory
AB31 5ZU
01330 826 596

Inverness

Alder House
Cradlehall Business Park
Inverness
IV2 5GH
01463 794 212

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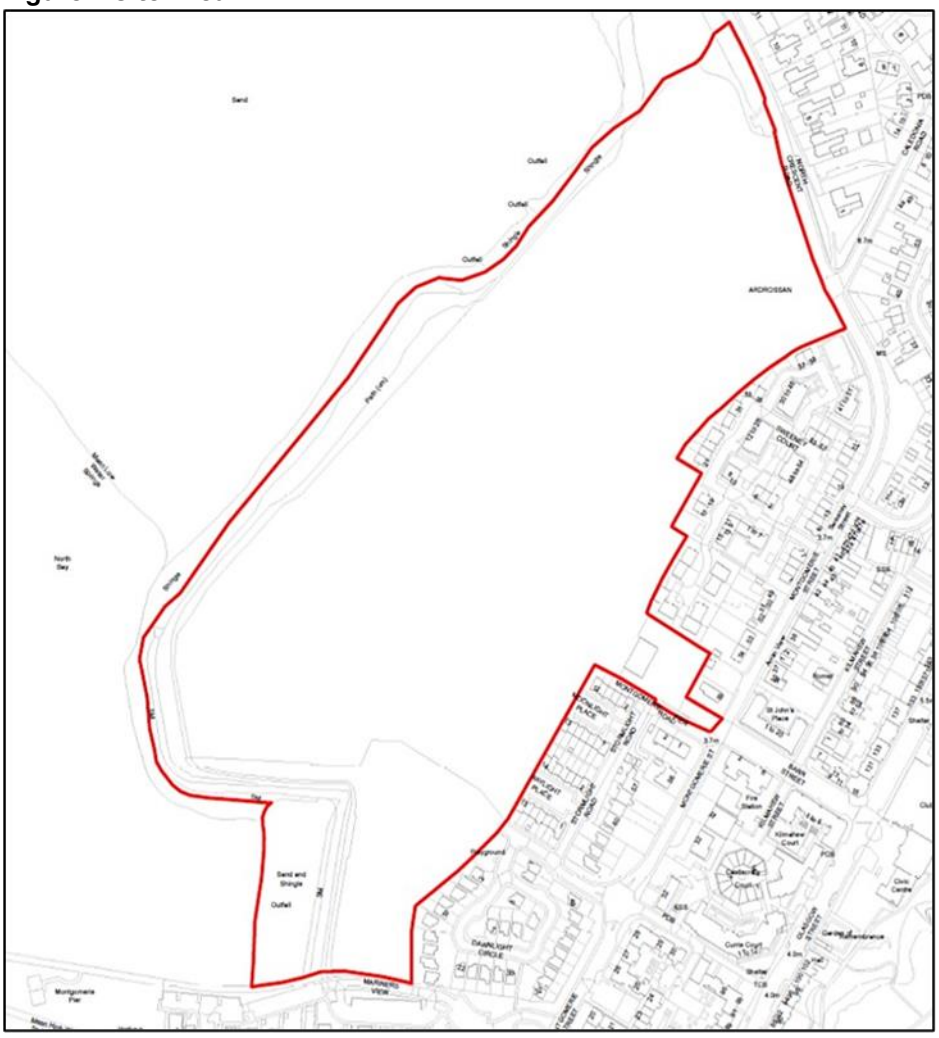
1 INTRODUCTION

In February 2020 EnviroCentre Limited were contracted by Ardrossan North Shore LLP to prepare a Remediation Strategy for the Ardrossan North Shore site. This follows on from a Remediation Options Appraisal developed in March 2020 and detailed in report 9141.

This report is an update to previous versions of the remediation strategy report.

Figure 1 details the extent of the area being considered by this report. The site is proposed for a mixed-use redevelopment incorporating a school and housing.

Figure 1 Site Area



The following reports are provided as part of the tender specification which details relevant intrusive and remediation works previously undertaken at the site:

- EnviroCentre Report No 13209 – Site Investigation 2022, Interpretative Report (January 2023);
- EnviroCentre Report Coast to Coast Site Phase I and Phase II Interpretative Report (May 2021);
- EnviroCentre Report No 8754, Ardrossan Development Site Investigation 2019 and 2020, Interpretative Report (December 2020);
- EnviroCentre Report No 3585 Delineation Investigation, Ardrossan Phase I (2008).

- EnviroCentre Report No 4295, Close Down Report Ardrossan Phase I Site (August 2013).

The following report is based on the outcome of the Intrusive Investigation and Options Appraisal and details the proposed remediation approach and stages.

2 BACKGROUND

The Ardrossan development site lies on land reclaimed from the sea in two stages, the first stage of reclamation occurred between 1855 and 1897, with the site being extended behind a new sea wall in the 1940's. From the mid 1920's until the 1970's the site was used to produce bitumen and the handling of crude oil, fuel oils and aviation fuel. The site was decommissioned between 1986 and 1989.

A number of previous site investigations have been carried across the Ardrossan development site. The key previous investigations are listed below:

- EnviroCentre Detailed Delineation Investigation; Ardrossan Phase I (Northern and Southern Corners), April 2011 (Ref. 4417);
- Fairhurst; Proposed Developers Package, July 2010;
- EnviroCentre Detailed Delineation Investigation; Ardrossan Phase I, December 2008 (Ref. 3585);
- EnviroCentre Remediation Strategy: Ardrossan Main Site, July 2008 (Ref 3319);
- EnviroCentre Draft Remedial Strategy, Ardrossan Former Shell Bitumen Terminal, November 2006 (Ref 2970);
- Mason Evans, Ardrossan Phase II, Hydrocarbon Remediation Report, June 2006;
- Arup Revised Conceptual Site Model, September 2006 (Ref 118692/PR);
- Arup, Ardrossan Bitumen Terminal Investigation and Remediation Strategy, March 2001;
- Shell UK Ltd, Ardrossan Bitumen Terminal, Risk Assessment Report, May 2000;
- Shell UK Ltd, Ardrossan Bitumen Terminal, Factual Report Volume 1, Text and Figures, 1999;
- Raeburn Drilling & Geotechnical, Report on Ground Investigation, July 1995; and
- Fairhurst, 20800 Shell Bitumen, Ardrossan, Treatment of Contamination, July 1991.

The previous industrial use of the site has resulted in a legacy of ground contamination. The significant contamination issues historically identified at the site are primarily related to hydrocarbon contamination of soils, and the presence of a free phase floating hydrocarbon layer on groundwater at the site. In addition, elevated metals are also noted to be present in soils.

2.1 Site Investigation Findings

2.1.1 Human Health Assessment

The 2022 site investigation report incorporated assessment of human health based on a "Residential With Plant Uptake Use" (RES) Given that the development layout is not confirmed the Remedial Options Appraisal adopts the "Residential With Plant Uptake" Scenario for the whole site area. This is considered to be the most conservative generic land use scenario.

The following provides a summary of the key findings with respect to chemical parameters.

Asbestos

Areas where asbestos was identified in the previous site investigations are detailed in Figure 173958-017.

The majority of asbestos was identified within the top metre of the site, which is deemed to be the soil profile of risk of generation of dust and therefore potential for asbestos exposure as part of the proposed development. There was asbestos identified up to depths of 3m in specific areas, which will require to be considered as part of any construction works involving excavation to depth/material reuse.

The 2022 investigation incorporated quantification of identified asbestos, results are provided as part of the SKF Limited Factual Report.

Heavy Metals

The majority of metal/metalloid analytes did not exceed the RES assessment criteria, with the exception of arsenic, lead and nickel.

Drawing 173958-GIS018 details the known areas of heavy metal exceedances recorded from the site investigation works noted in Section 1.

Total Petroleum Hydrocarbons (TPH)

Exceedances of Human Health Criteria for the following TPH bands have been identified within soils at the site.

- Aliphatic TPH C8-C10;
- Aliphatic TPH C10-12;
- Aliphatic TPH C12-C16;
- Aromatic TPH C10-C12;
- Aromatic TPH C12-C16;
- Aromatic TPH C16-C21;
- Aromatic TPH C21-C35;
- Aromatic TPH C35-44;

Figure 173958-GIS019 details the locations which recorded elevations of specific TPH bands.

Semi-Volatile Organic Compounds (SVOCs)

The majority of SVOCs did not record exceedances in relation to the RES criteria, however specific Polyaromatic Hydrocarbon (PAH) compounds were elevated above the assessment criteria including:

- Naphthalene;
- Benzo(a)anthracene;
- Chrysene;
- Benzo(b)fluoranthene;

- Benzo(a)pyrene;
- Indeno(1,2,3-cd)pyrene;
- Dibenz(a,h)anthracene;

Figure 179358-GIS020 details the locations of the PAH exceedances with respect to the human health criteria.

Human Health Summary

Based on the RES assessment the following significant Source-Pathway-Receptor (SPR) linkages were identified:

- Impact to Human Health from volatile TPH Fractions Via Inhalation of indoor vapours;
- Impact to Human Health from TPH Fractions, PAHs and Heavy Metals via ingestion of soil, inhalation of indoor dust and indoor and outdoor dermal contact;
- Impact to Human Health from inhalation of asbestos fibres.

2.2 Water Environment Risk Assessment

The approach to the Water Environment risk assessment has been undertaken in line with the approach defined in SEPA WAT PS10. As the risk assessment is in relation to historic land contamination the following principal receptors have been identified with respect to both hazardous and non-hazardous contaminants:

- Surface Water – Adjacent Firth of Clyde (Screening Criteria Marine Environmental Quality Standards – EQS).
- Groundwater Resource – 50m from source boundary (Screening Criteria Resource Protection Values- RPVs)

It is noted that the principal contaminant of concern at the site relate to TPH. As such, where free phase product is identified the product itself is identified as a source zone (to determine the boundary for assessing groundwater resource impact) and also evidence of potential significant risk of pollution to the water environment.

In relation to EQS for TPH there is a requirement for no sheen to be present to surface water. There is no quantitative EQS or RPV values for TPH fractions. Related contaminants such as BTEX and PAHs do have these assessment criteria, and these have been adopted as potential indicators of significant risk of pollution. In addition, following discussion with SEPA the laboratory detection limit for individual TPH fraction has been adopted as an indicator of potential impact.

The findings of the risk assessment from the groundwater monitoring exercise are detailed below;

2.3 Free Phase Product

Free phase product was identified in BHs 1A, 2, 4, 7 and 9. These boreholes were all located to the southern portion of the site and were in the section of the site located behind the original sea wall (as detailed in Figure 171301-015 provided in Appendix A).

This is consistent with historic assessment of the site which identified the sea wall as constraining groundwater, with groundwater levels behind the seawall noted to be shallower than those on the seaward side of the wall indicating a hydraulic discontinuity.

2.4 Results Screening

2.4.1 Heavy Metals

None of the samples recorded exceedances of heavy metal parameters with respect to RPV criteria.

Elevated concentrations of some heavy metal parameters with respect to EQS were identified at a number of boreholes as detailed in the summary table provided in Appendix C.

The locations of exceedances were:

- BHD1A (Zinc);
- BHD10 (Copper and zinc)
- BHD11 (Chromium, copper, lead and zinc);
- BHD8 (Copper and zinc);
- BHD9 (Lead and zinc);
- BHD7 (Lead and zinc);
- BHD5 (Copper and zinc);
- BHD16 (Zinc);
- BHD3 (Chromium, copper and zinc).

Of the concentrations recorded, the highest exceedance in relation to the EQS was the lead value recorded at BH11 which was 7.8ug/l versus an assessment criteria of 1.3ug/l (6 times the criteria).

It is noted that the surface water assessment allows for dilution on initial release to the surface water, and therefore an exceedance noted in the groundwater does not necessarily represent significant risk to the surface water.

Previous assessment of the dilution potential in the surface water generated a very conservative dilution potential of 2.37 upon initial release to the Firth of Clyde (copy of report provided in Appendix B). This would address all these noted exceedances barring the lead sample at BH11.

2.4.2 BTEX

None of the samples recorded concentrations of BTEX above the laboratory detection limit.

2.4.3 VOCs

None of the samples recorded concentrations of VOCs above the laboratory detection limit.

2.4.4 TPH

Elevated concentrations of TPH with respect to the limit of detection were identified at:

- BHD1
- BHD7;

- BHD8;
- BHD9;
- BH10D
- BHD11;
- BHD12;
- BHD15;
- BHD18; and
- BHD19.

The elevations were generally recorded for the C10-C16 carbon chain lengths.

No TPH above detection limit was identified within the following boreholes;

- BH3;
- BH5;
- BH6;
- BH14;
- BH16;
- BH17;
- BH20.

2.4.5 SVOCs and PAHs

Elevated concentrations of SVOCs and PAHs in relation to EQS criteria were identified for the following borehole locations (note the LOD for 2,4-Dichlorophenol, fluoranthene and benzo(a)pyrene were greater than the EQS values, therefore for these parameters only samples which have recorded concentrations above the LOD are listed).

- BHD12 (naphthalene);
- BHD11 (naphthalene, anthracene, fluoranthene);
- BHD9 (fluoranthene, anthracene);
- BHD7 (fluoranthene, anthracene).
- BHD18 (fluoranthene).

No elevations were recorded with respect to the RPV.

The elevations of PAHs were noted in conjunction with those locations which recorded TPH exceedances.

2.5 Water Environment Risk Summary

The investigation has identified evidence of potential significant impact to the Water Environment (potentially both groundwater resource and the surface water) related to the presence of free phase product at the site and related elevated dissolved TPH and PAH concentrations. The locations of the exceedances are generally noted on the landward side of the old sea wall, however there is evidence of TPH impact on the seaward side of the wall. One of these locations also recorded elevated lead concentrations. Figures 171301-015, 171301-016 and 171301-021 provided in Appendix A details the locations of the identified issues.

3 REMEDIATION STRATEGY

3.1 Remedial Targets

The following remedial target criteria are proposed for the project.

Human Health

LQM/CIEH GAC for Residential Use with Plant Uptake (for lead the median C4SL value for Residential with Plant Uptake is proposed).

Water Environment

Leachate testing for inorganic contaminants with sample results assessed against EQS, RPV and MRV levels

For TPH impact to the Water Environment a Total TPH concentration threshold of 1,000mg/kg (threshold value for hazardous material) will also be applied as an initial target criteria value in relation to remediation validation and informing soil excavation locations and depths. It is acknowledged that depending on the carbon fractions present within the TPH then there may be a risk to the water environment from contaminants (particularly lighter fraction/lower molecular weight hydrocarbons) at a concentration lower than this initial screening criteria.

As noted in the CLAIRE Petroleum Hydrocarbons in Groundwater guidance document –

"The heavier fractions (compounds >20 carbon atoms) are very unlikely to contain hydrocarbon compounds with appreciable aqueous solubility. These compounds are therefore unlikely to be of interest in a hydrogeological risk assessment, except in certain geological environments such as karst, where suspended solid and/or LNAPL may potentially be transported over significant distances. These risks should be considered on a site-specific basis, although research (Schwarz et al., 2011) suggests the likelihood that karstic transport of high molecular weight components, such as PAHs, causing an unacceptable impact on groundwater is low."

When considering the groundwater results from the site there were no BTEX concentrations identified above the laboratory detection limit with no concentrations of TPH fractions for both aromatic and aliphatic TPH fractions below carbon banding C8 found above the detection limit. Therefore, these fractions are not considered to represent a significant risk at the site.

As defined in Table 5.1 of the CLAIRE guidance the following TPH fractions (which have been identified above detection limit within groundwater at the site) are noted to have the following relative mobility in groundwater (listed from most to least mobile):

- Aromatic EC8-10 – High mobility
- Aromatic EC10-12 – Moderate mobility
- Aromatic EC12-16 – Moderate mobility
- Aliphatic EC8-10 – Low mobility
- Aliphatic EC10-12 – Low mobility
- Aromatic EC16-21 – Low mobility
- Aliphatic EC12-16 – Very low mobility
- Aliphatic EC1-21 – Very low mobility
- Aromatic 21-35 – Very low mobility

On this basis it is considered that focussing on the following additional indicator parameters in addition to the initial 1,000mg/kg screening criteria will allow for consideration of presence of more mobile (moderate to high mobility) hydrocarbon contamination. The proposed additional indicator parameters are detailed in the table below. In all cases the site investigation has identified limited numbers of samples which recorded concentrations above the limit of detection. As such the limit of detection is therefore proposed as the validation criteria.

TPH Fraction	Indicator Parameter	Assessment Criteria	No of Exceedances from SI
Aromatic EC8-10	Ethylbenzene	0.01mg/kg (limit of detection)	13 out of 155 samples
Aromatic EC10-12	Naphthalene	0.5mg/kg (limit of detection)	27 out of 155 samples
Aromatic EC12-16	Acenaphthylene	0.5mg/kg (limit of detection)	12 out of 155 samples

In addition, removal of visually discernible free phase product layer where practicable will be undertaken, It is envisioned that the excavation will allow for assessment of visible sheens over an appropriate period to allow for consideration of recharge, tidal and precipitation influence.

Further iterations of the remedial targets may be developed in conjunction with the Contractor if they identify alternative treatment options (e.g. solidification and stabilisation).

Treated materials will be validated by the Contractor on a minimum frequency of one sample per 100m^3 of soil.

3.1.1 Remediation Criteria Assessment Criteria

The following table details the proposed assessment criteria which defines the target for the remediation works and suitability requirements for imported materials. This criteria has been developed on the basis of the treatment approach being designed to reduce the contaminant concentration within the soil. The remediation works are Contractor Designed, as such an updated Remediation Strategy will be produced by the Contractor to reflect their design. It is envisaged that the Contractor will liaise with the regulators (North Ayrshire Council and SEPA) as part of this process. Any alterations to the remediation criteria that are proposed by the Contractor requires to be agreed with North Ayrshire Council and SEPA in advance of progressing the works.

Table 3-1 Remediation Target Criteria

Parameter	Criterial (mg/kg)
Arsenic	37
Boron	290
Cadmium	11
Chromium (III)	910
Chromium (VI)	6
Copper	2400
Elemental Mercury	1.2
Inorganic Mercury	40
Nickel	180
Selenium	250
Vanadium	410
Zinc	370
Benzene	0.17
Toluene	290
Ethylbenzene	0.01
o-xylene	140
m-xylene	140
p-xylene	130
TPH Total*	1,000
TPH Aliphatic EC 5-6	78
TPH Aliphatic EC 6-8	230
TPH Aliphatic EC 8-10	65
TPH Aliphatic EC 10-12	330
TPH Aliphatic EC 12-16	1,000
TPH Aliphatic EC 16-35	1,000

TPH Aliphatic EC 35-44	1,000
TPH Aromatic EC5-7	140
TPH Aromatic EC 7-8	290
TPH Aromatic EC 8-10	0.01
TPH Aromatic EC 10-12	0.5
TPH Aromatic EC 12-16	0.5
TPH Aromatic EC 16-21	540
TPH Aromatic EC 21-35	1,000
TPH Aromatic EC 35-44	1,000
Acenaphthene	510
Acenaphthylene	0.5
Benz(a)anthracene	11
Benzo(a)pyrene	2.7
Benzo(b)fluoranthene	3.3
Benzo(ghi)perylene	340
Benzo(k)fluoranthene	93
Chrysene	22
Dibenz(ah)anthracene	0.28
Fluoranthene	560
Fluorene	400
Indeno(123-cd)pyrene	36
Naphthalene	0.5
Phenanthrene	220
Pyrene	1,200
Asbestos	<0.01%

*the overall TPH concentration in the samples requires to be lower than 1,000mg/kg as the initial target, there is also a secondary target criteria for specific TPH bandings with respect to human health.

3.2 Summary of Remediation Stages

The purpose of the remediation is to ensure the site is suitable for use for the proposed mixed use development. As noted in the previous section from the point of view of human health assessment the development requires to meet the standards for a residential with plant uptake land use scenario. In addition, the development requires to ensure there is no ongoing risk to the water environment related to soil and groundwater contamination.

The Contractor will design, implement and validate the remediation with respect to addressing the ground conditions to meet the proposed development requirements.

It is considered that the following stages will be undertaken by the contractor as part of the remediation works.

- Produce an updated Remediation Strategy to incorporate the Contractor Designed approach. This will incorporate any proposed adjustment to the target criteria. This will be submitted to North Ayrshire Council's Contaminated Land Officer and SEPA for agreement.
- Obtain appropriate licences to undertake the remedial works;
- Provide a Working Plan and Construction Environmental Management Plan for the remedial works;
- Segregate existing stockpiles located on the site and undertake treatment for the residual contaminated fraction to achieve the assessment criteria detailed in Section 3.1.1 (or any agreed new criteria);
- Remove free product present on groundwater via skimming or other method to a point of no discernible sheen. With subsequent appropriate disposal of free product and water arisings;
- Excavation works to remove contaminated soils for treatment (including excavation, segregation and temporary stockpiling of clean overburden where present). EnviroCentre drawing 173958-GIS022 provides detail with respect to known areas of contamination.
- Validation of the excavated areas.
- Backfilling of the excavations to original ground level. Where possible the contractor should utilise validated remediated material for backfill.
- Treatment of soils to meet Remedial Target Criteria detailed in Section 3.1.1 (or any agreed new criteria). Proposed treatment methods to be provided by the contractor. Previously bioremediation has been effective at the site, however alternative methods will be considered. Pilot trials have indicated soil washing will also be a viable treatment option. The contractor should consider the programme and target requirements in development of their treatment proposals;
- Validation of the soil remediation against remedial criteria to ensure material is suitable for reuse on site.
- Onsite environmental monitoring during the works This will incorporate weekly boundary monitoring for VOCs using appropriate sample media (minimum of 6 locations) and weekly dust monitoring (including asbestos assessment at minimum of 6 locations)
- Provision of dust mitigation and odour suppression during the works.
- Provision of a Validation Report detailing the works undertaken including the laboratory results and assessment associated with the validation exercise.

Note, the capping of the site or provision of hydrocarbon resistant gas membranes for future buildings (which form part of the overall remediation strategy for the site) are not to be undertaken by the Contractor.

The Contractor should therefore provide a report to validate the existing ground only, these subsequent remediation requirements (and associated validation) will be the responsibility of another party.

Further specific details in relation to the remediation are provided below.

3.2.1 Segregate Existing Stockpiles and Complete Bioremediation

The previous phase of remediation at the Ardrossan North Shore site incorporated excavation and bioremediation of soils. The remediation process itself is still to be completed, with the stockpiles being present on the seaward side of the site. The stockpiles therefore form a constraint to progressing the next stage of remedial works.

An investigation of the existing stockpiles was undertaken in January 2021. An investigation report is provided as part of the tender information. In addition, further testing of the stockpiles was undertaken as part of the 2022 investigation.

As part of the enabling works the following works are required:

- Movement of existing stockpiles to allow segregation of material for reuse (estimated to be 27,600m^3), completion of bioremediation (estimated to be 3,400m^3), use in specific areas of the development (estimated to be 3,400m^3).

3.2.2 Intrusive Remediation Works and Phasing

The intrusive remediation works under this contract will incorporate intrusive excavation to address the following areas of the site:

- Areas of Free Product;
- Areas of Soil Considered to Present risk of Ongoing Release of Hydrocarbons and PAHs to the Water Environment/Potential Impact to Human Health Via Vapour Release (EnviroCentre Drawing No 173958-GIS022 provides detail with respect to the known area of contamination);

The intrusive works will incorporate the following stages:

- Removal of free product where practicable;
- Excavation and treatment of impacted soils to meet target criteria for re-use. The method for treatment to be proposed by the contractor. Historically, bioremediation has proven to be effective. Pilot trials have also indicated soil washing is a viable option. The contractor should consider the overall enabling works programme and target criteria to identify the preferred proposed treatment methodology.

It is noted that non-volatile contaminants (i.e. heavy metals, asbestos and non-volatile PAHS and TPH) will be addressed through the provision of an appropriate cap (which will be undertaken by another party). As such as noted above, the focus of this remediation is to address TPH and PAHs within soil that present potential ongoing risk of pollution of the water environment and volatile TPH and PAHs within soils which present a potential risk of impact to human health.

The intrusive works will incorporate a validation process in relation to both confirming appropriate removal of free product and contaminated soils, and the confirmation of treatment being effective.

The validation works will be undertaken by the Contractor.

It should be noted that the site enabling works (which principally incorporates construction of the revetment, roads and provision of drainage and utilities) will overlap with the programme for the remediation works. As such both contractors will be present on the overall development site at the site time.

For the purposes of the client programme, and to effectively manage the interface with the enabling works there are portions of the site that the Contractor should prioritise for the early stage of the remedial excavation works.:

- The Campus Area;
- Works in the Vicinity of the Site Revetment (i.e. within 25m);
- Works in the Area of Proposed Roads:
- Works in the Area of the Proposed Utility and Drainage Installation).

Free Product

The areas of known free product are detailed on Drawing 171301-GIS015. These represent borehole investigation points, as such it is assumed that free product extends between these points.

The contractor requires to remove free product from groundwater with validation point being no visible discernible sheen. The Contractor will be responsible for the validation assessment and reporting (including photographic evidence to confirm groundwater condition).

The contractor should allow for all requirements in relation to disposal of pumped water and free product.

Soil Excavation

Drawing 173958-GIS022 in Appendix A details the known areas and depths of contaminated materials for soil excavation for treatment/disposal. The principal driver for the soil excavation is to address ongoing impact to the Water Environment. The excavation areas have been initially identified based on total TPH concentrations recorded within the soil samples, with samples recording total TPH values of over 1,000mg/kg and limit of detection for proposed indicator compounds being identified as areas for excavation.

The contractor should allow for excavation and treatment of contaminated soils (including excavation of overburden and segregation for reuse).

Validation samples from the base and sides of the excavations will be collected on a 20m grid basis by the Contractor. The results of these will be assessed with the proposed target criteria to confirm that the excavation extents have appropriately removed the contamination sources. Where exceedances are present then the excavation will be extended, and further validation sampling subsequently undertaken.

Soil Remediation

The treatment works should be designed to meet the criteria provided in Section 4.1. The contractor will identify their proposed remediation methods. Should the contractor propose alternative target criteria (i.e. should solidification/stabilisation be considered for the treatment process for example) then the contractor will allow for engaging with the regulator to agree revised criteria.

Treated soils will be tested by the Contractor on a frequency of 1 sample per 100m3 for validation purposes, with the results compared against the proposed target criteria. Where the samples pass then it is considered that the 100m3 of soil will be suitable for re-use (and if they fail further remediation will be required).

The excavation and re-use of passed soil will be observed and assessed visually to ensure that the sample was representative of the 100m^3 mass. If deemed during these works that there is a portion of

the material that differs in quality then this will be segregated and retained for further testing/remediation.

Monitoring During Works

Given that the intrusive works will incorporate handling and movement of contaminated soils and groundwater monitoring works will be undertaken during the works to assess the conditions on the boundary of the site with respect to production and release of volatile contaminants. This will incorporate weekly assessment utilising tenax tubes (a total of 9 located on the site boundary) with results being provided to the Council.

In addition, boundary dust monitoring (including asbestos monitoring) will be undertaken on a weekly basis.

Odour assessment and PID assessment will be carried out on the boundary on a daily basis with mitigation measures being incorporated as required.

3.2.3 Site Infilling

The infilling of the excavations are to be carried out in line with the earthworks specification for the site.

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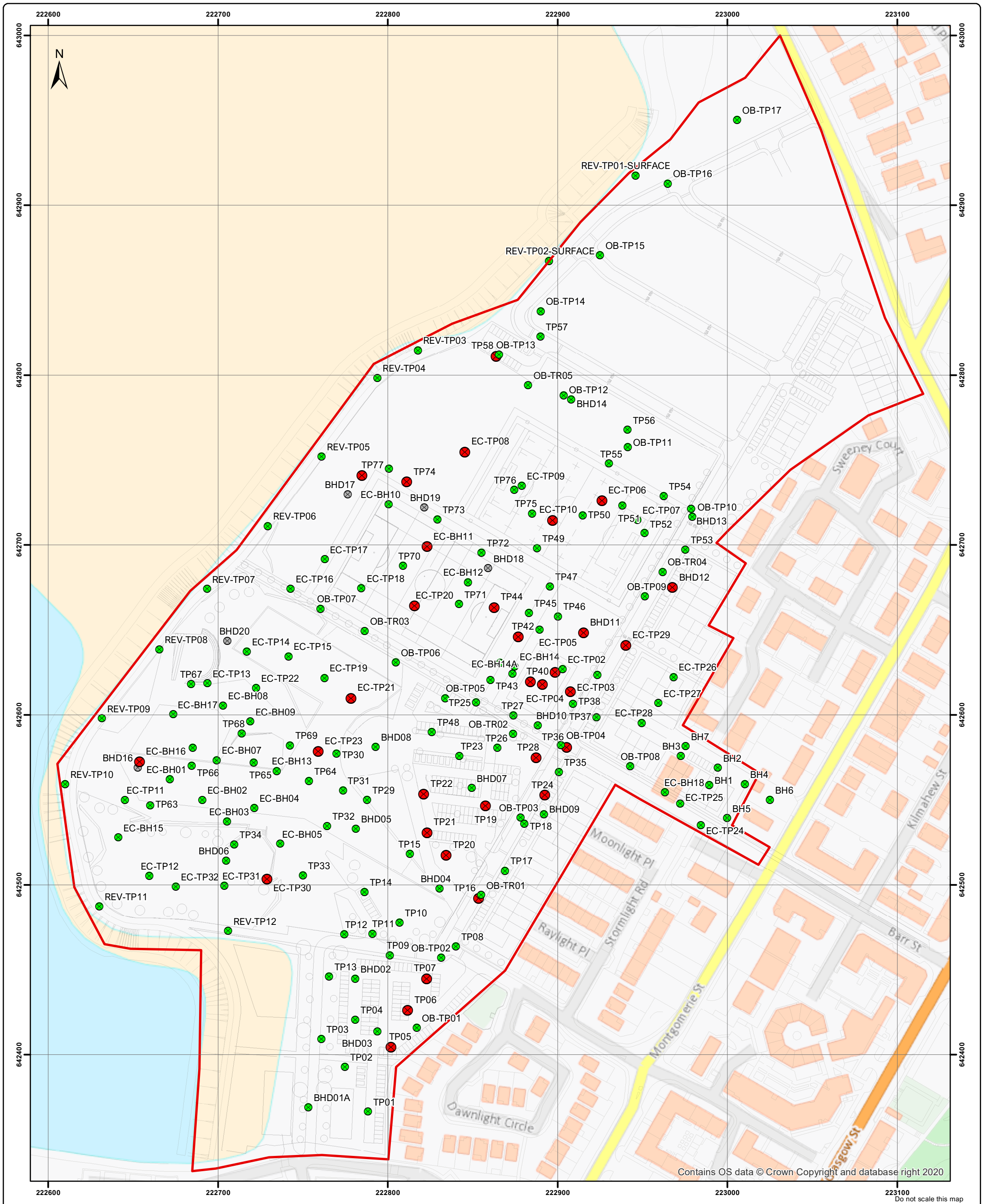
APPENDICES

A FIGURES



Do not scale this map

Legend

- Site Boundary

Asbestos

- Asbestos Detected
- Asbestos Not Detected
- Results Pending

Notes

1. No asbestos was detected in 2008 investigation samples. These locations are not shown for clarity.

Client
Fairhurst

Project
Ardossan North Shore

Title
Asbestos Presence in Soil Samples

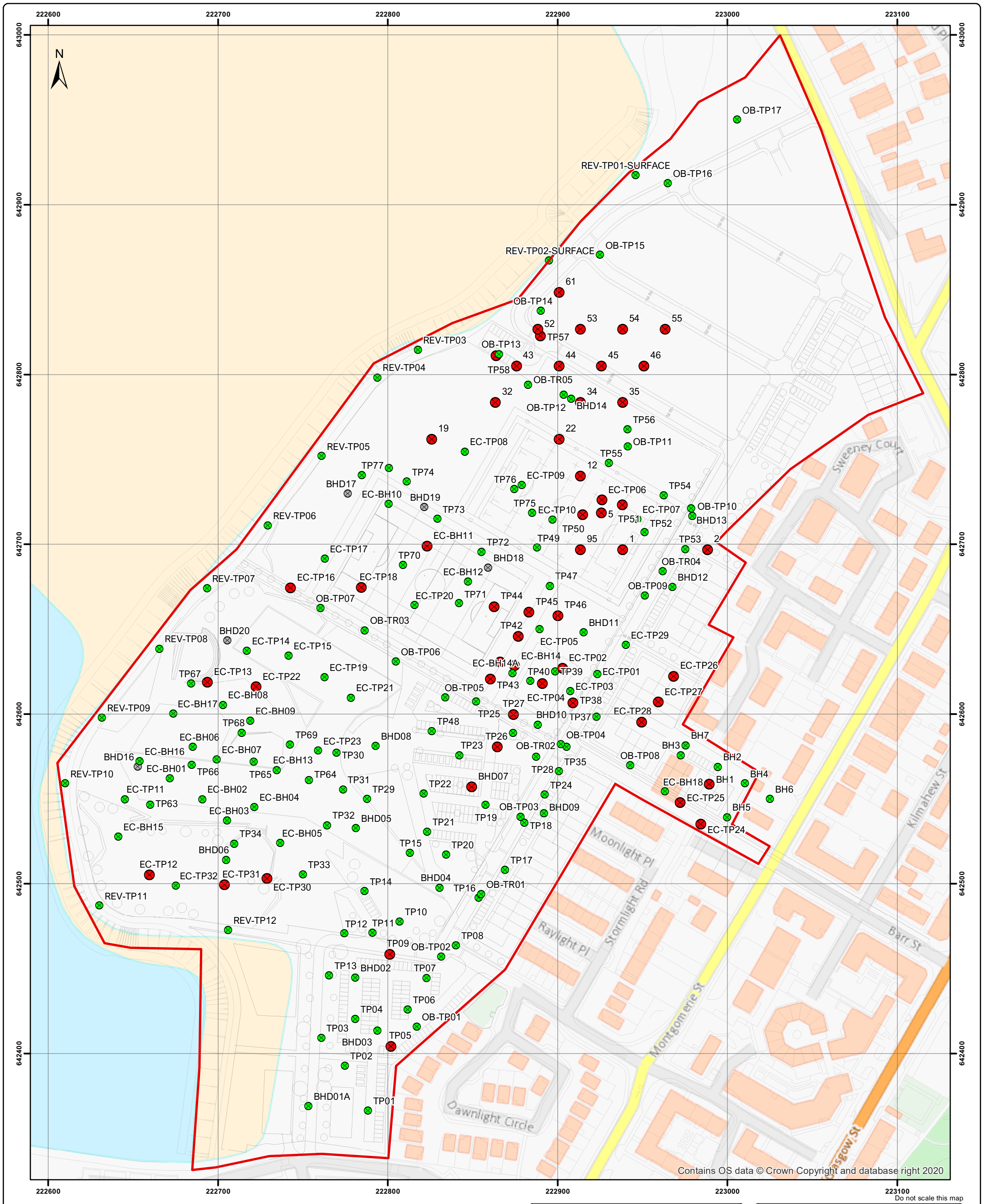
Scale
1:2,000 @A3 0 10 20 40 60 Metres

Status
Final

Drawing No.	Revision	Date
173958-GIS017	-	24 Jan 2023
Drawn	**Checked**	**Approved**
FR	GD	GD

Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



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Legend

- Site Boundary

Heavy Metals

- Metals Exceedance(s)
- No Metals Exceedance
- Results Pending

Notes

1. For the 2008 investigation locations, only those with an exceedance for heavy metals are shown for clarity.

Client
Fairhurst

Project
Ardossan North Shore

Title
Heavy Metals Exceedances of Human Health Assessment Criteria in Soil Samples

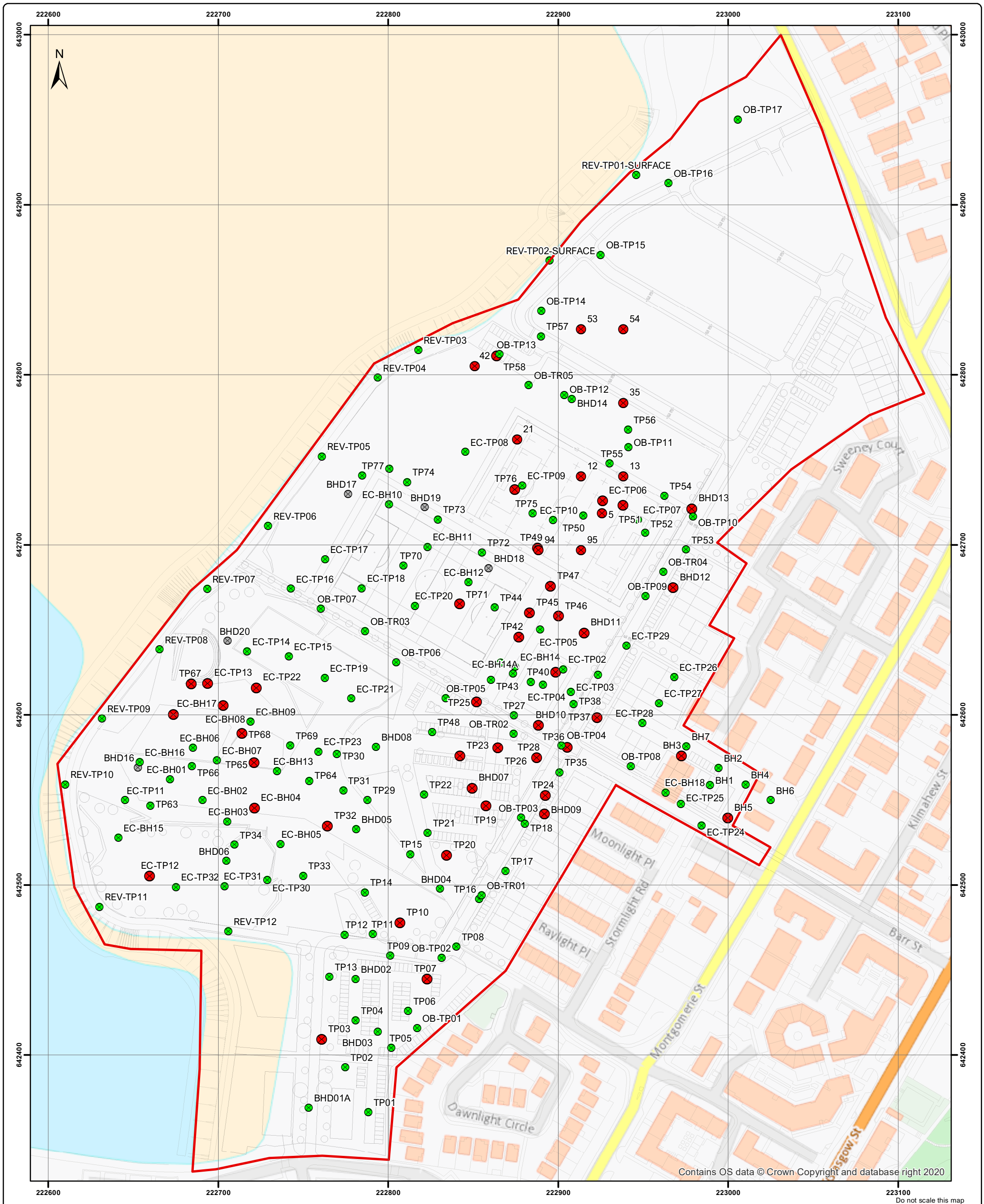
Scale
1:2,000 @A3 (0, 10, 20, 40, 60 Metres)

Status
Final

Drawing No.	Revision	Date
173958-GIS018	-	31 Jan 2023
Drawn	**Checked**	**Approved**
FR	GD	GD

Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Do not scale this map

Legend

- Site Boundary

TPH

- TPH Exceedance(s)
- No TPH Exceedance
- Results Pending

Notes

1. For the 2008 investigation locations, only those with an exceedance for TPH are shown for clarity.

Client
Fairhurst

Project
Ardossan North Shore

Title
TPH Exceedances of Human Health Assessment Criteria in Soil Samples

Scale
1:2,000 @A3 (0, 10, 20, 40, 60 Metres)

Status
Final

Drawing No.	Revision	Date
173958-GIS019	-	31 Jan 2023
Drawn	**Checked**	**Approved**
FR	GD	GD

Rev	Date	Amendment	Initials
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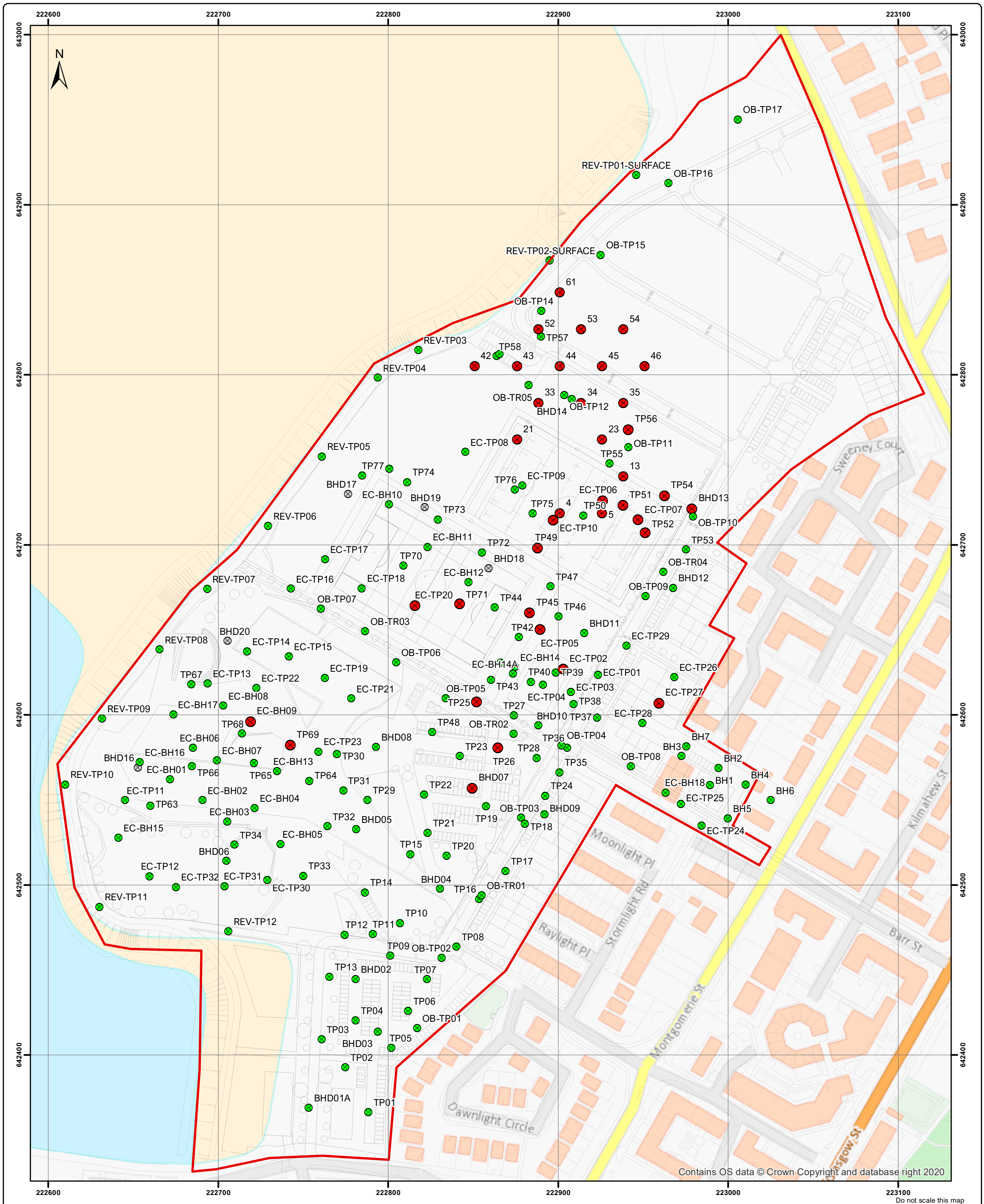
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Do not scale this map

Legend

- Site Boundary

PAH

- PAH Exceedance(s)
- No PAH Exceedances
- Results Pending

Notes

1. For the 2008 investigation locations, only those with an exceedance for PAHs are shown for clarity.

Client
Fairhurst

Project
Ardossan North Shore

Title
PAH Exceedances of Human Health Assessment Criteria in Soil Samples

Scale
1:2,000 @A3 (0, 10, 20, 40, 60 Metres)

Status
Final

Drawing No.	Revision	Date
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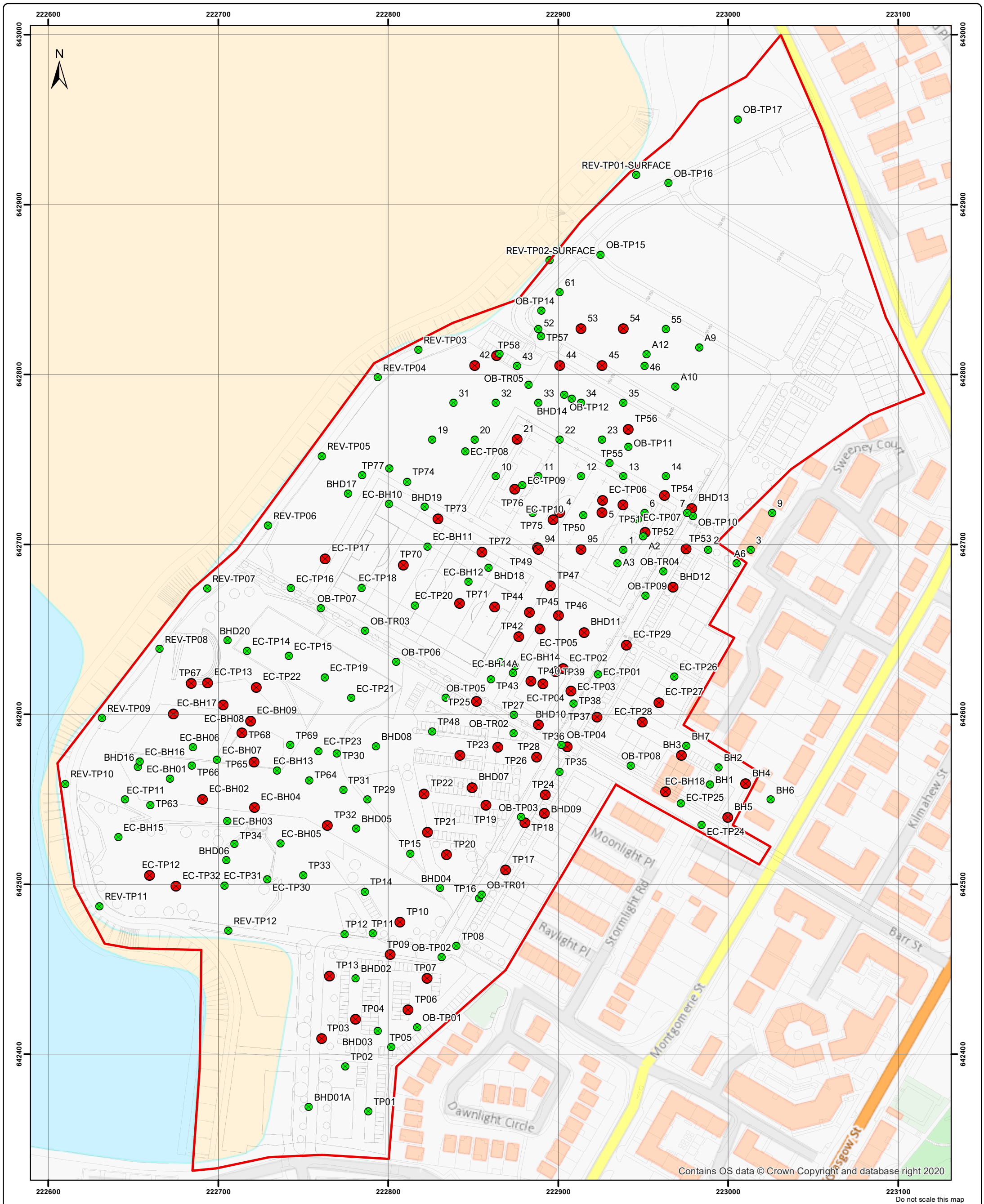
envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Do not scale this map

Legend

- Site Boundary

TPH & PAH

- TPH/PAH Exceedance(s)
- No TPH/PAH Exceedances

Client
Fairhurst

Project
Ardossan North Shore

Title
TPH & PAH Exceedances of Water Envrionment Screeniing Criteria in Soil Leachate Samples

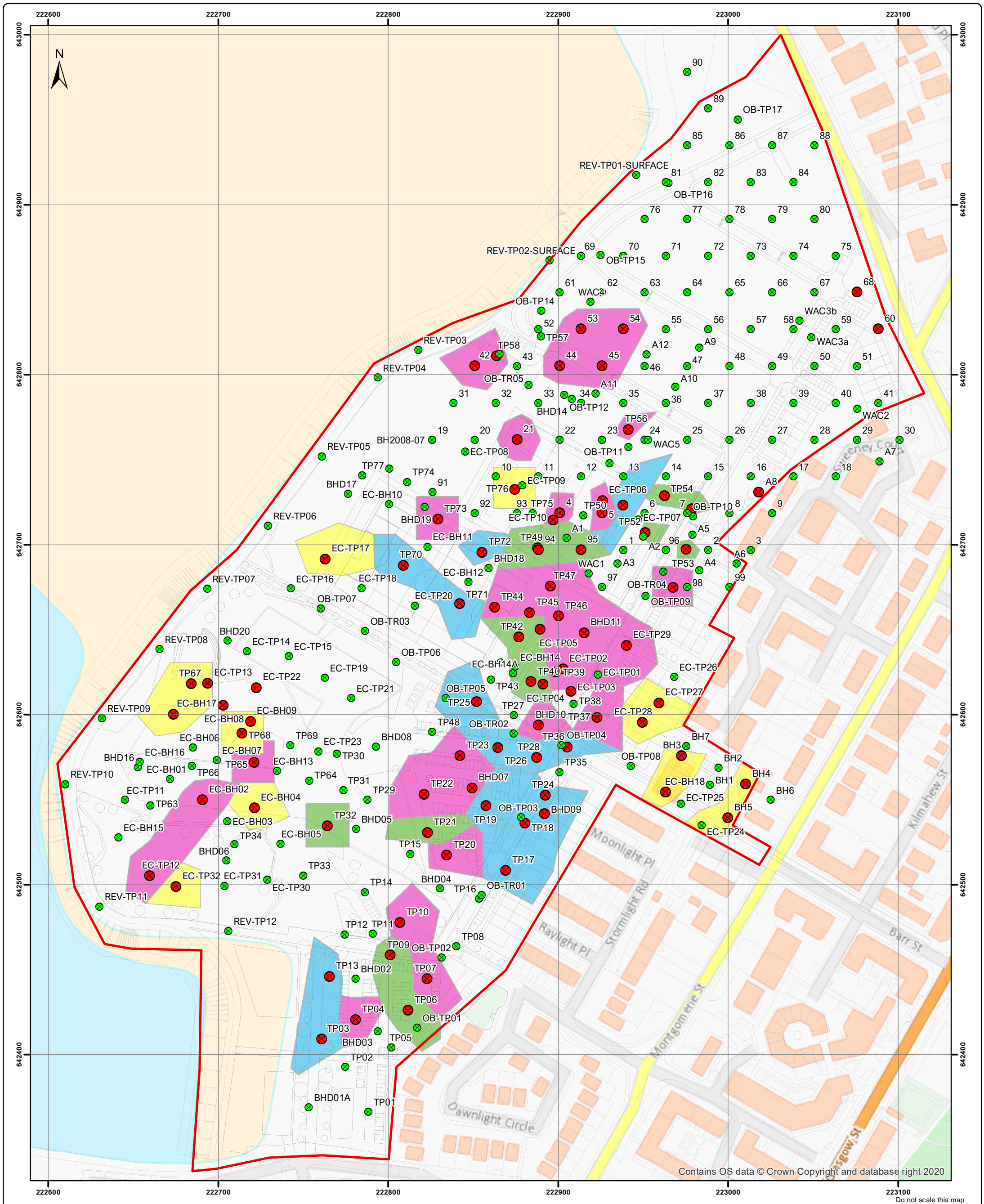
Scale
1:2,000 @A3 0 10 20 40 60 Metres

Status
Final

Drawing No.	Revision	Date
173958-GIS021	-	25 Jan 2023
Drawn	**Checked**	**Approved**
FR	GD	GD

Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Do not scale this map

Legend

- Site Boundary

TPH & PAH

- TPH/PAH Exceedance(s)
- No TPH/PAH Exceedances

Excavation Depth

- 0 - 1.0m
- 0 - up to 1.5m
- 0 - up to 2.5m
- 1.5 - up to 3m

Client
Fairhurst

Project
Ardossan North Shore

Title
TPH & PAH Exceedances of Water Envrionment Screeniing Criteria in Soil Leachate Samples and Remediation Areas ofr Excavation

Scale
1:2,000 @A3 (0 10 20 40 60 Metres)

Status
WORKING

Drawing No.	Revision	Date
173958-GIS022	-	25 Jan 2023
Drawn	**Checked**	**Approved**
FR	GD	GD

Rev	Date	Amendment	Initials
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envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk

B PREVIOUS SURFACE WATER DILUTION ASSESSMENT

Ardrossan North Bay

Remediation Section 1
Surface Water Risk Assessment Addendum

December 2013

EnviroCentre Document No.	5842
EnviroCentre Project No.	13284j
Status	Final
Project Manager	Graeme Duff
Project Reviewer	Campbell Stewart
Date of Issue	December 2013
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EnviroCentre
Craighall Business Park
8 Eagle Street
Glasgow
G4 9XA

t 0141 341 5040
f 0141 341 5045
w *www.envirocentre.co.uk*
e *info@envirocentre.co.uk*

Offices
Glasgow
Banchory

Project Name
Report Title

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1. INTRODUCTION

EnviroCentre have compiled a close down report for the Ardrossan Remediation Section 1, as detailed in Report No 4529 dated August 2013.

The report included assessment of soil results from the sides and base of excavations against generated assessment criteria to establish potential risk to the Water Environment, principally the Firth of Clyde. The assessment utilised the Remedial Target Worksheet approach to allow for dilution in the groundwater body prior to release to the surface water.

The assessment has identified that for specific contaminants dilution within the surface water body requires to be considered. The assessment identified that a maximum dilution factor of up to 9.3 is required to address an individual concentration hotspot of hydrocarbons in the Area of TP70. As part of the assessment the cumulative effect of elevations was also considered, which indicates on a site wide basis a dilution of up to 6 .12 times would be required to allow the 95% Upper Confidence Level value for contaminants to meet the water environment assessment criteria.

This addendum report is compiled to generate a modelled dilution factor for the site. The assessment is undertaken in line with WAT –SG-11 utilising the Environment Agency's EL SID model for initial dilution calculations.

2. SITE SPECIFIC CONSIDERATIONS

It is noted that the WAT-SG-11 guidance document is fundamentally related to the modelling of coastal and transitional discharges related to proposed outfalls. As part of this the document details that SEPA's requirements for initial dilution set at 95%iles are:

- X100 for primary treated sewage effluent
- X50 for secondary treated sewage effluent (>100 p.e.)
- X50 for industrial effluents dependent on treatment etc (case specific).

The mechanism for release to the surface water at Ardrossan is groundwater release. As such none of the above scenarios are considered to be reflective of the processes at Ardrossan.

As part of the detailed delineation exercise borehole water level monitoring was undertaken at four borehole locations on the site as detailed in EnviroCentre Report No 3585 dated December 2008. This indicated that there was no tidal influence on groundwater. Observations made during the remediation works also did not record variations in groundwater depth with tidal cycles. On this basis there is not considered to be direct continuity of the groundwater at the site to the Firth of Clyde. Groundwater migration from the site is further restricted by presence of a former sea wall through the centre of the existing site area.

It is noted that the area of the Clyde located immediately adjacent to the remediation area varies in terms of water depth throughout the tidal cycle, ranging from dry to several metres of water. The site has undergone a range of investigations over a 15 year period which identified free product presence on the groundwater at the site across the area targeted by the first phase of remediation, stretching throughout the majority of the former bitumen terminal site. Throughout this period of known contamination presence there has not been evidence of significant hydrocarbon release to the Firth of Clyde. In addition the remedial works on site were carried out over a 7 month period (November 2010 to July 2011). During these works no evidence of hydrocarbon release to the Firth of Clyde (in terms of visual impact) was noted (i.e. sheens or droplets).

On this basis the mechanism for groundwater release to the Clyde is considered to be complex with no visual evidence of groundwater release being noted during low tide periods. As such the actual area of discharge or flow rate for discharge is not easily defined, however based on the available visual information it is considered that the release is low and does not represent a point source area.

This information should be factored in as part of the modelling approach, as it is considered that the model does not fully represent the conditions in place at the site. Of principal consideration is that the release of groundwater is unlikely to represent a continued steady flow as would be the case of a typical coastal outfall. The known information that the significant presence of free product on groundwater at the site prior to the remedial works did not result in an evident sheen on the surface water which will be significantly improved by the action of free product removal and contaminated soil excavation on the remediation area.

3. MODELLING INPUT DATA

To generate an initial dilution factor for the site the Environment Agency Cederwall Equation calculator has been adopted utilising a still water scenario.

The model requires the following input criteria:

1) Mean Spring Tidal Range (m)
2) Total Water Depth at MLWS (m)
3) Mean Neap Tidal Range (m)
4) Total Water Depth at MLWN (m)
5) Total Effluent Flow (m3/s)
6) Number of Diffuser Ports
7) Height of Ports above bed (m)
8) Diameter of Diffuser Port (m)
9) Diameter of Outfall (m)
10) Ambient Water Density (kg/m3)
11) Effluent Density (kg/m3)

The following initial values were adopted to compile the model prior to running sensitivity analysis to determine the implications of alteration of the criteria.

3.1 Parameter 1-4

In relation to input criteria 1-4 information for the Ardrossan harbour area and tide times have been reviewed to determine the input data. Information is provided in Appendix 1.

3.2 Parameter 5

The total effluent flow value initially adopted has initially been calculated on the following basis:

Groundwater Flow Velocity – 0.77m/day (0.0000089m/s) taken from CLEA briefing note for Sandy Soils and utilised in the RTW assessment.

Length of Revetment front in the area of the remediation section – 95m

Saturated Aquifer Thickness – 4m as defined by borehole logs.

On that basis, flow*length* depth would provide a flow of 0.0033m3/s. This is considered to be extremely conservative as site based observation does not indicate a continuous discharge across the face of the revetment area for the remedial zone. This will be further considered in the sensitivity analysis.

3.3 Parameter 6

As noted previously the risk assessment approach is principally related to outfall assessment. As such there is no diffuser port in place at Ardrossan. For the purposes of the assessment 1 has been adopted.

3.4 Parameter 7

As for the previous parameter, there is no diffuser port in place at the site and in practice there is no defined discharge location. In practice the discharge height may vary along the revetment area and in line with tidal changes to the receiving water. There is no visual evidence of release of groundwater through the existing revetment at the site and as noted previously the mechanism for interaction between groundwater and surface water is complex. The depth of the diffusion port is considered to be a key parameter for the assessment. This value defines the initial mixing depth of water in relation to the incoming flow. In practice at Ardrossan there will be periods when groundwater is released directly to the beach area at low tide and directly into surface water at high tide times. As there is no visual evidence of flow through the revetment at low tide it is assumed that the discharge is occurring close to or potentially below the existing beach area. As such a value of 0.1m has been adopted initially.

3.5 Parameter 8 and 9

The diameter of the diffuser port and outfall cannot be readily defined as there is no identified outfall position. As part of the assessment a value of 0.5m has been applied for the diffuser port and 1m for the outfall, this will be further assessed during sensitivity analysis.

3.6 Parameter 10 and 11

The values for the ambient water density and effluent density have initially been set as 1026 and 1000 as detailed as a generic assumption within the model.

4. MODELLING FINDINGS

A copy of the initial model run as defined utilising the above parameters is provided in Appendix 2.

The model indicates that the 95%ile initial dilution rate on the basis of the modelling input data is 2.53.

To assess the key parameters driving the model a sensitivity analysis has been undertaken. To inform the analysis the input parameters have initially been adjusted by various factors to assess the potential implications of change. The table below details the findings. Alterations to the ambient water density and effluent density have not been undertaken as these are based on standard model default values as there is no applicable information to inform alteration to the values.

Parameter	Alterations in 95%ile	Comment
Mean Spring Tidal Range	The MSTR has been varied by 20% both up and down to indicate potential for alterations in this value. +20% results in 2.69 -20% results in 2.16	Alteration in the tidal range is noted to have a small effect on the dilution rate; however it has not fundamentally altered the findings of the assessment. This value is based on real information collected from

		the nearby Ardrossan harbour. On that basis the adopted value is considered to be robust.
Total Water Depth at MLWS	As above a variation of 20% has been applied to the MLWS total water depth to indicate slight variations. +20% results in 3.43 -20% results in 1.73	The variations in MLWS are noted to have a significant effect on the dilution rate. This is considered principally to be related to the interaction of this value with the height of the release port, as this defines the mean lowest depth of water present to allow dilution to occur. It is considered that this value based on real data represents a robust parameter for adoption. Variation of the port depth as a less well defined parameter is considered to be more appropriate in determining the sensitivity and accuracy of the model.
Mean Neap Tidal Range	Varied by 20% as above: +20% - No change to findings -20% - No change to findings	Adjustment to this value is not considered to result in significant changes to the model results. As above this is based on real data from near the site so is considered robust.
Total Water Depth at MLWN	Varied by 20% as above: +20% - No change to findings -20% - No change to findings	Adjustment to this value is not considered to result in significant changes to the model results. As above this is based on real data from near the site so is considered robust
Total Effluent Flow	As previously indicated there is limited information currently available on the groundwater flow rate into the surface water. As such the initial model exercise included a very conservative assumption that all the groundwater was flowing into the surface water at a steady velocity across the face of the site. In practice the flow discharge is likely to be significantly lower when the following is taken into account: • The model assumes that the groundwater across the remedial site represents the effluent discharge. The exercise is primarily assessing individual hotspots of	The value adopted is very conservative. This requires to be considered as part of the overall risk assessment findings.

	contaminants on the site; therefore the input effluent will be significantly lower in size. • Site observation does not back-up the discharge rates calculated. To provide an indication of the implications of the uncertainty in this calculation, the width of the contaminant zone has been reduced to 45m (half the length of the existing revetment) to reflect the reduced source zone and the depth of aquifer reduced to 0.5m to reflect that hydrocarbon contaminant are principally hydrophobic and will be present on the surface of the input. This results in a flow value of 0.0002m3/s. This alteration would provide a dilution factor of 15.37	
Number of diffuser ports	The diffuser port option reflects that the adopted model is designed for assessment of outfall pipes to the marine environment. These are designed with a range of diffuser options, varying from release at the end of the pipe (1 port) to a series of releases at the end of a pipe. The initial model assumed 1 diffuser port. In practice the route to the surface water will have a series of output areas, each allowing for discharge of the groundwater into the surface water. Adoption of 1 port is considered extremely conservative, further compounding the conservatism of the parameters adopted in the effluent flow calculations. If it is assumed that the discharge occurs from a location every 5m along the assumed 95m wide release zone this results in 19 diffuser points. Adoption of 95 ports would provide a value of 16.88 for initial dilution	The variation in the diffuser port option demonstrates the weakness in the application of this initial dilution model with respect to groundwater release to the surface water. The model is designed to assume active flow from a pipe release (i.e. point source release) which can be mitigated by increasing diffusion through a series of small holes in the pipeline. Modelling assuming that groundwater is released along the length of the revetment and through one diffuser port is considered to be entirely unrepresentative of the active release options at the site. This will be further discussed below.
Diameter of diffuser port and	Variation of these parameters has	Variation has no effect.

diameter of outfall	not effect on the dilution rate. The model assumes that the depth of release water is the key parameter in relation to dilution.	
Height of Diffuser Port	Given that groundwater flow to the site is not through an engineered structure this value is likely to vary at different tide conditions and dependent on the release zones in the revetment. Assuming the value is 0 the dilution rate would alter to 3.22. An increase to 0.5m would lower the dilution rate to 0.15.	The height of the diffuser port has a significant bearing on the initial dilution rate as it determines the depth of the water column at the time of release. In practice given that the at times the foreshore is dry, and other times the water is several metres deep there is likely to be significant variation in the depth of the discharge location.

5. DISCUSSION

Following the modelling exercise there is considered to be significant limitations in the development of an initial dilution rate for a groundwater release utilising modelling packages designed for assessment of effluent outfall impact.

Principally the key areas that have large implications and are difficult to define are:

- Flow Rate – The adopted approach for the initial model is considered to be extremely conservative assuming a consistent flow of groundwater into the surface water area, which in practice has never been observed on the site. As previously noted despite the former presence of significant free product on groundwater no visual sheens have been recorded on surface water or the dry beach indicating that the flow rate is likely to be significantly lower than the initial adopted value.
- Number of diffuser ports – This has significant impact on the model as it assumes an engineered point source release mechanism which is not the method of release likely to be occurring at the Ardrossan site. As noted in the sensitivity analysis increase in the number of diffuser ports (i.e. release areas) has significant impact to the results of the model. It is considered reasonable that if the flow rate utilised is based on the groundwater being released over a 95m width (as noted to be a very conservative approach), that increase of the diffuser ports to reflect the mechanism of release (i.e. through a number of areas across the revetment) may be appropriate.
- Height of diffuser port – The height of the diffuser port will vary as the release mechanism is not an engineered process. As noted the release area is dry at periods and therefore at times no initial dilution will occur. In practice there is no site based observation to indicate that any release is occurring at periods when the beach area is dry.

The results of the initial dilution exercise indicate that the initial dilution occurring at the site will vary, however at periods for the site (i.e. low tide times) the initial dilution will not be 50. As previously indicated the value of 50 is related to the design of an industrial effluent release, and is not considered appropriate for enforcement on a release of groundwater from a remediated site.

The initial model run indicated a 95%ile dilution rate of 2.37 for the site. Assuming a reduction in the flow rate and increase in the diffuser port numbers as undertaken in the sensitivity analysis the 95%ile dilution rate would increase to 109 (thereby addressing the contaminant dilution requirements at the site). This indicates the

potential variation in the model findings and the implications of the conservative approach adopted in the initial model run.

It should also be noted that the dilution modelling is being undertaken to further assess the findings of the Remedial Target Worksheet modelling exercise, which in itself is incorporates elements of conservatism.

Given this uncertainty it is considered reasonable that a great deal of consideration is placed on the actual processes which have been observed at the site over the investigation and remediation period, which are reflective of real life conditions. Given that prior to the remediation there was no evidence of sheens on the beach area or surface water, it is considered that the active removal of free product (29,000 litres) and excavation and bioremediation of soils (~25,000m3) across the initial remediation area has represented significant environmental improvement reducing the potential for any future releases from this zone.

6. MIXING ZONE CONSIDERATIONS

It is noted that the model exercise only allows for initial dilution, and dilution in the subsequent mixing zone is not considered in this assessment. It is noted that the SEPA WAT-SG-11 document states the following in relation to calculation of the mixing zone:

"It is recognised that calculating the dilution and potential effects resulting from defining a mixing zone in this way requires a degree of accompanying survey work and technical data that may not be available or reasonably obtainable. The decision on whether to relax any of these guidelines has to be site-specific and based on a sound assessment of risk. Previous SEPA experience has shown that some effluents exhibit either greater or lesser toxicity than an existing knowledge of their chemical constituents would suggest. A preliminary toxicity screening of any significant complex effluent should be undertaken before assuming toxicity does not need to be considered."

Given the requirements for this modelling is in relation to assessment of hotspots of contamination following a remediation exercise it is the case that there is none of the required technical data to carry out the mixing zone assessment in its entirety.

SEPA guidance stipulates a maximum mixing zone of 100m around the initial release site for consideration.

It is noted that following the Remedial Target Worksheet Assessment and ESI stats package a dilution value of up to 9.3 is required to address an individual hotspot at TP70 (TPH Aro C8-C10 in soil) and a factor of up to 6.12 is required to address cumulative 95%ile values of TPH Aro 8-10 across the remedial area.

Given that the conservative approach to the initial dilution calculation has generated a dilution rate of 2.37 at the point of release to the surface water environment, it is considered that the conditions in the greater Ardrossan harbour area will adequately result in an increase in dilution rates to meet the modelled requirements. This is further justified by the experience of the conditions at the site and surrounding surface water environment.

In the absence of the modelled data for the mixing zone, subsequent surface water sampling to confirm that in the near shore environment the concentrations of the identified contaminants do not exceed the assessment criteria could be undertaken to provide a robust data set to confirm these assumptions.

APPENDIX 1

Tide Time Information Reviewed from –

http://www.tidetimes.org.uk/ardrossan-tide-times#axzz2n40nTUsP

http://www.bbc.co.uk/weather/coast_and_sea/tide_tables/7/410

http://www.visitmyharbour.com/tides/240/uk-tables/ardrossan-tide-tables

C GROUNDWATER RESULTS

Lab Sample Number								1429992	1429993	1429994	1429995	1429996	1426480	1426481	1426482	1426483	1426484	1426485
Sample Reference								BH9	BH7	BH8	BH5	BH3	BH12	BH13	BH11	BH15	BH17	BH19
				Assessment	Assessment	Assessment												
				Criteria	Criteria	Criteria												
Date Sampled				EQS	WHO	RPV		30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020	27/01/2020	27/01/2020	27/01/2020	27/01/2020	27/01/2020	27/01/2020
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status															
General Inorganics																		
pH	pH Units	N/A	ISO 17025					7.7	7.7	7.8	7.6	7.7	7.6	7.6	10.1	7.0	7.0	7.1
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025					590	520	530	650	550	1000	1100	270	1100	4600	1100
Dissolved Organic Carbon (DO	mg/l	0.1	NONE					28.1	24.6	6.29	7.50	7.11	15.6	5.20	11.1	11.2	8.35	16.1
Heavy Metals / Metalloids																		
Arsenic (dissolved)	µg/l	0.15	ISO 17025	25		100		1.00	1.15	0.47	1.25	0.50	1.57	0.49	1.90	0.84	0.42	1.78
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.2		5		0.06	< 0.02	< 0.02	< 0.02	0.04	< 0.02	< 0.02	0.04	< 0.02	< 0.02	< 0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.6		50		0.4	0.6	0.4	< 0.2	0.8	0.2	< 0.2	0.7	< 0.2	< 0.2	0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	5.09				3.2	2.1	2.1	0.8	4.5	1.2	1.2	5.1	0.7	1.1	2.8
Lead (dissolved)	µg/l	0.2	ISO 17025	1.3		25		1.4	2.4	< 0.2	0.3	0.4	1.0	0.3	7.8	< 0.2	< 0.2	1.0
Mercury (dissolved)	µg/l	0.05	ISO 17025			1		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	8.6		20		1.0	2.5	1.2	3.6	2.3	2.9	1.5	5.3	3.2	0.7	0.9
Selenium (dissolved)	µg/l	0.6	ISO 17025			10		1.0	0.7	1.0	< 0.6	0.8	0.7	1.2	0.8	1.0	12	0.8
Zinc (dissolved)	µg/l	0.5	ISO 17025	7.9				3.2	13	6.6	12	17	6.0	4.1	7.2	3.1	2.2	7.4
Monoaromatics & Oxygena																		
Benzene	µg/l	1	ISO 17025	8		1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	74				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025			300		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025			500		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025			500		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Et	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons																		
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025		15000			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025		15000			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C1	µg/l	1	ISO 17025		300			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C	µg/l	10	NONE		300			620	< 10	< 10	< 10	< 10	1000	< 10	340	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C	µg/l	10	NONE		300			1400	440	< 10	< 10	< 10	740	< 10	180	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C	µg/l	10	NONE					1500	540	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C	µg/l	10	NONE					1100	460	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 -	µg/l	10	NONE					4600	1400	< 10	< 10	< 10	1700	< 10	510	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025		10			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025		10			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C1	µg/l	1	ISO 17025		300			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C	µg/l	10	NONE		300			< 10	< 10	< 10	< 10	< 10	460	< 10	200	< 10	< 10	130
TPH-CWG - Aromatic >C12 - C	µg/l	10	NONE		300			< 10	< 10	< 10	< 10	< 10	< 10	< 10	22	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C	µg/l	10	NONE		90			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C	µg/l	10	NONE		90			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 -	µg/l	10	NONE					< 10	< 10	< 10	< 10	< 10	460	< 10	230	< 10	< 10	130
VOCs																		
Chloromethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	10				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroet	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Et	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	2.5				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	100				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	10				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	8				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	3				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025			10		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	74				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	ISO 17025	300				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	20				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1	ISO 17025	50		20		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

1,4-Dichlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

SVOCs

Aniline	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	7.7				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	50				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	2				0.65	0.41	< 0.01	< 0.01	< 0.01	3.6	0.68	12	0.48	< 0.01	1.4
2,4-Dichlorophenol	µg/l	0.05	NONE	0.042				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	40				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5.1	1.0	2.3	< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	800				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025					1.7	2.4	< 0.01	< 0.01	< 0.01	< 0.01	0.37	10	< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.5	< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025					2.0	0.69	< 0.01	< 0.01	< 0.01	< 0.01	0.45	3.5	< 0.01	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025					1.4	0.52	< 0.01	< 0.01	< 0.01	< 0.01	0.82	2.2	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	0.1				0.33	0.20	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.87	< 0.01	< 0.01	< 0.01
Carbazole	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3.6	< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	18	19	5.2	< 0.05	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	0.0063				0.80	0.46	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.59	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025					1.8	1.3	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.58	< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	1.7 x 10-4		0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHS						0.1		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Analytical Report Number: 20-90508
Project / Site name: Ardrossan
Your Order No: 19-0110

Lab Sample Number					1461308	1461309	1461310	1461311	1461312	1461313	1461314	1461315	1461316	1461317	1461318	1461319	1461320	1461321	1461322
Sample Reference					BH7	BH9	BH10	BH11	BH13	BH14	BH15	BH18	BH01A	BH3	BH6	BH5	BH8	BH16	BH20
Sample Number					None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)					None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled					02/03/2020	02/03/2020	02/03/2020	02/03/2020	02/03/2020	02/03/2020	02/03/2020	02/03/2020	03/03/2020	03/03/2020	03/03/2020	03/03/2020	03/03/2020	03/03/2020	03/03/2020
Time Taken					None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Assessment Criteria (EQS)**	**Assessment Criteria (WHO)**	**Assessment Criteria (RPV)**															
General Inorganics																			
pH	pH Units				7.1	7.2	7.0	7.5	7.6	7.2	7.0	7.0	7.6	7.5	7.6	7.2	7.4	7.9	7.0
Electrical Conductivity at 20 °C	µS/cm				510	570	440	740	1100	28000	1100	820	850	640	430	780	650	460	1200
Dissolved Organic Carbon (DOC)	mg/l				11.1	16.6	9.78	29.9	5.62	4.64	12.2	19.0	4.71	4.66	3.93	4.45	4.66	2.60	7.01
Heavy Metals / Metalloids																			
Selenium (dissolved)	µg/l				-	-	-	-	-	< 4.0	-	-	-	-	-	-	-	-	-
Arsenic (dissolved)	µg/l	25		100	1.60	0.53	1.24	1.70	0.22	0.17	0.85	0.24	1.75	0.39	1.12	0.32	0.36	0.58	0.78
Cadmium (dissolved)	µg/l	0.2		5	< 0.02	< 0.02	0.04	< 0.02	< 0.02	0.04	0.03	< 0.02	0.03	0.04	< 0.02	0.10	< 0.02	< 0.02	< 0.02
Chromium (dissolved)	µg/l	0.6		50	< 0.2	0.2	0.2	0.4	< 0.2	< 0.2	0.2	< 0.2	0.4	0.5	< 0.2	0.2	0.5	0.3	< 0.2
Copper (dissolved)	µg/l	5.09			3.9	5.5	6.6	9.7	0.9	< 0.5	1.9	2.0	3.6	6.0	2.3	5.3	6.5	1.7	1.5
Lead (dissolved)	µg/l	1.3		25	1.1	< 0.2	< 0.2	2.3	< 0.2	0.2	< 0.2	0.2	0.6	< 0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l			1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	8.6		20	2.4	1.2	3.2	4.3	0.7	< 0.5	3.3	2.9	1.1	1.6	1.2	5.6	1.0	0.7	2.8
Selenium (dissolved)	µg/l			10	< 0.6	< 0.6	< 0.6	0.8	1.0	U/S	2.5	1.8	3.3	1.3	1.3	1.8	1.4	1.6	3.2
Zinc (dissolved)	µg/l	7.9			17	9.2	15	17	1.8	0.5	5.9	7.5	8.4	8.6	5.1	19	12	8.0	5.6
Monoaromatics & Oxygenates																			
Benzene	µg/l	8		1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	74			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l			300	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l			500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l			500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons																			
TPH-CWG - Aliphatic >C5 - C6	µg/l		15000		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l		15000		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l		300		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l		300		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l		300		280	150	100	160	< 10	< 10	< 10	480	47	< 10	< 10	< 10	370	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l				420	250	91	110	< 10	< 10	< 10	560	89	< 10	< 10	< 10	680	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l				200	290	160	180	< 10	< 10	180	950	260	< 10	< 10	< 10	200	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l				900	690	360	450	< 10	< 10	180	2000	400	< 10	< 10	< 10	1200	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l		10		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

TPH-CWG - Aromatic >C7 - C8	µg/l		10		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l		300		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l		300		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l		300		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l		90		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l		90		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l				< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

VOCs

Chloromethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	10			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	2.5			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	100			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	10			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	8			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	3			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l			10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	74			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	300			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	20			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/l	50		20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

sec-Butylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

SVOCs

Aniline	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenol	µg/l	7.7			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	50			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isophorone	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	2			0.74	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.042			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	40			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	800			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l				2.0	0.79	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.50	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/l				0.42	0.52	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Azobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.57	< 0.01	< 0.01
Anthracene	µg/l	0.1			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbazole	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Anthraquinone	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.0063			0.31	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1.8	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l				0.58	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	2.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	1.7 x 10-4		0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs	µg/l			0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01