
NORTH AYRSHIRE COUNCIL

23rd June 2021

North Ayrshire Council

Title:	Remediation of land at Ardrossan North Shore
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Purpose:	To provide an update to Council on proposals to remediate the long-standing contamination of the land at Ardrossan North Shore which will facilitate and support the development of a new community campus on the site.
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Recommendation:	That Council notes the proposals for site remediation.
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1. Executive Summary

- 1.1 At the Council meeting on 25 September 2019, the Chief Executive undertook to arrange for a report to be submitted to a future meeting of Council on the detailed arrangements for the remediation of the North Shore, Ardrossan, site. This report provides this update on proposals for the remediation of land at Ardrossan North Shore prior to the sites' development for a new community campus, as well as residential and commercial use.
- 1.2 The contaminants present on the site are largely hydrocarbons from the former oil refinery and there are no unusual conditions which limit the use of the site following standard and well-tested remediation measures to remove any risks. The proposals for the remediation of the site have been informed by extensive site investigations, and will see removal of contaminated material, the use of new material to bring the site up to an appropriate ground level and to provide a cap, and the use of further barriers or membranes. The site will be remediated to a residential standard, which would for example allow crops to be safely grown on it if required. The proposals represent a belt and braces approach which will make the site suitable for use and limit risk to human health. They will also involve considerable betterment of the site given its currently untreated form.
- 1.3 The proposed remediation strategy has been developed by an environmental consultant, informed by discussions with the Scottish Environment Protection Agency and the Councils Contaminated Land Officer.
- 1.4 Programmes for construction work indicate that the remediation works will take around 9 months to complete, commencing in spring 2022.

2. Background

- 2.1 Land at Ardrossan North Shore is one of the areas' highest profile derelict sites given its size and central location within Ardrossan. The principal former use of the site was the Shell Oil refinery, and the site has been vacant since the closure of the refinery in the mid-1980s.
- 2.2 The Council propose to develop a new community education campus on the site, including a relocated Ardrossan Academy and Winton Primary, early years provision, swimming pool, library and accommodation for health and social care staff. The site will also accommodate residential and commercial development, and the proposed Marine Sciences Centre funded through the Ayrshire Growth Deal.
- 2.3 Consultation on the proposal to relocate the education facilities to the site was undertaken in 2019 and approval was granted to proceed with the proposal on 8 June 2020.
- 2.4 A Development Framework, which sets out the proposed layout or use of land on the site was approved by the Council's Planning Committee on 28th April 2021.
- 2.5 Members have previously been updated on proposals for the remediation of the site, and a draft remediation strategy was published on the Council's website in November 2019 as part of a commitment to transparency on the proposals.

Site Conditions

- 2.6 Several site investigations have been carried out across the Ardrossan north shore development site. There is extensive information available in relation to site conditions, with the most recent site investigations in 2019 alone seeing 77 intrusive trial pits on the site and 155 soil samples taken, with the results of these published online. Appendix 1 notes the extent of previous investigations carried out within the site.
- 2.7 Since the publication of those site investigation results in late 2019, additional investigations have been undertaken including further sampling of the stockpiles which exist on the site, the monitoring of ground gas emissions, and site investigations on the Coast to Coast garage site which will also be included within the proposed development site.
- 2.8 As illustrated by these reports, the previous industrial use of the site has resulted in a not unexpected legacy of ground contamination. The contamination issues identified at the site primarily relate to hydrocarbon (oil) contamination of soils, and the presence of a floating hydrocarbon layer on groundwater at the site. In addition, an elevated presence of metals is also noted to be present. With respect to the areas identified as containing higher levels of contamination these are generally concentrated in the central and south eastern areas of the site as illustrated by the plans within Appendix 2.
- 2.9 To allow its development, the site will clearly require remediation to address this soil and groundwater contamination.

Proposals for Site Remediation

- 2.10 The approach proposed within the site remediation strategy has been developed by Envirocentre, an environmental consultant with extensive experience of the sites' ground conditions. The non-technical summary of the strategy is attached at Appendix 2. The development of this has included discussion with the Scottish Environment Protection Agency (SEPA) and North Ayrshire Council's Contaminated Land Officer. The Council are the regulatory or decision-making body on proposals for the site given that it is contaminated land. SEPA are a key consultee and expert organisation with responsibility for protection of the environment. The proposals will also be considered as part of the Planning process.
- 2.11 The proposed remediation strategy has incorporated the measures required to make the site suitable for its intended use. This includes the removal of contaminants of concern to ensure protection of human health and to ensure that there is no release of hazardous materials to the local water environment.
- 2.12 The remediation strategy for the site will generally include the following works:
- Removal or Treatment of Contaminants
- Removal of contaminants through the excavation of areas of soil which are known to be contaminated with hydrocarbons, followed by sampling and laboratory testing of remaining ground to confirm that the excavation has removed the materials of risk.
 - Removal of hydrocarbons (oil sheen) from groundwater at the site through the skimming and then offsite removal of oil.
 - Treatment of contaminated soils to address the risks from the material where possible (i.e. through bioremediation). This will be informed by initial small-scale trial tests on contaminated soils to identify the most effective measures for addressing the soil contamination.
- Provision of new site material
- Infilling of excavated areas with material that is proved suitable for use via laboratory testing.
 - Environmental capping (i.e. upfilling) of areas of proposed soft landscaping with soils shown to be suitable for such use by laboratory testing. The upfilling depth will be designed with respect to the final land use of the area but will generally be at a depth of 60cm across the site.
- Use of Barriers to any residual contaminants
- Installation of hydrocarbon and ground gas resistant membranes in the footprint areas of all buildings built on the site.
 - All water supply pipes, and utility service connections will be suitably specified for the purpose of protection.
- 2.13 The approach therefore demonstrates a 'belt and braces' approach through the removal of known contaminants, and the treatment of the site through a combination of new site material and membranes. The improvement of the site will represent considerable betterment, given that public access is currently taken across the site in its untreated form.

- 2.14 The implementation of the works by a contractor will also require to consider the mitigation of any nuisance, for example any smells or airborne dust that could occur. This will be undertaken through a construction method statement and the onsite management of material, and for example by sealing stockpiles, 'wetting down' material to restrict any dust production, and if required the onsite use of odour management controls.
- 2.15 In terms of risk, the implementation of the site remediation strategy will address risks to public health to ensure that the site is suitable for the proposed use. In practice, the concentrations of contaminants that people are routinely exposed to on a day to day basis (i.e. volatiles generated during fuelling a car) will be significantly greater than the remedial targets that will be achieved and utilised to ensure the site is suitable for use.
- 2.16 The requirements set out in the remediation strategy do not place any constraints on the design or operation of the proposed education campus. The site will be designed to meet the requirements of residential and educational use, which would for example allow the growing and consumption of plants should that be a feature of the school curriculum.

3. Proposals

- 3.1 It is envisaged that remediation works will commence in Spring 2022, and that the remediation of the site will take around 9 months.
- 3.2 All remedial works will be witnessed, documented, monitored and numerous samples collected for analysis by a laboratory to ensure that the remedial works are being completed as agreed with the Council's Environmental Health Service, and SEPA. This will result in the production of a Validation Report completed by a suitably qualified environmental consultant, with verification reports submitted to both the Council and SEPA.
- 3.3 It is recommended that Council notes the proposals for site remediation and the publication of proposals online to ensure transparency.

4. Implications/Socio-economic Duty

Financial

- 4.1 Costs will be met from allocated capital budgets, including the Vacant and Derelict Land Fund.

Human Resources

- 4.2 The development and implementation of site infrastructure works including remediation, the improvement of the sea wall, roads, etc will be managed by a dedicated project manager following a recruitment process.

Legal

- 4.3 The site remediation strategy has been prepared by an Environmental Consultant, who will require to provide a warranty for site works and a validation process which will provide cover on site conditions following the completion of construction works for a specified period of time, usually 12 years from completion of site works.

Equality/Socio-economic

- 4.4 The proposals will bring a long term vacant and derelict site into beneficial use. This will have significant socio-economic benefits for the local community through the provision of a new community campus and other proposals.

Environmental and Sustainability

- 4.5 The proposals for the remediation of the site will involve considerable environmental benefit or betterment, in removing known contaminants within the site and the provision of new clean material to allow the sites development and safe use.

Key Priorities

- 4.6 The site remediation proposals will help contribute to several of the Council Plan key priorities including:
- Inclusive, growing, and enterprising local economy
 - People enjoy good life-long health and well-being
 - Effective infrastructure and digital connectivity
 - Affordable, modern, and well-designed homes that meets residents' needs
 - Vibrant, welcoming, and attractive places; and,
 - A sustainable environment

Community Wealth Building

- 4.7 The site remediation proposals will contribute to the Community Wealth Building objective of making the best use of our land and assets.

5. Consultation

- 5.1 The Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) published an advice on note titled 'Communicating Understanding of Contaminated Land Risks' in May 2010 and the contents of this have been considered. It recognises the emotive issue that the development of contaminated land can become, given the potentially serious implications of the problem. It encourages transparency with information on site conditions, the use of simple language and diagrams, and direct communication with key stakeholders.

- 5.2 The publication of the most recent site remediation strategy further represents the Council's commitment to transparency. Recent consultation on the development framework for the north shore site encouraged interested parties to engage with Council officers and made the offer of one to one meetings. Contacts through that process have been informed of the publication of the updated site remediation strategy and officers have met with representatives of a residents group concerned over site contamination.
- 5.3 Local groups or residents will be offered attendance at further drop-in sessions where they can hear directly from the environmental consultant advising the Council on the site remediation strategy. Regular communication with local communities will be an ongoing feature of the development of the north shore site.

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Background Papers

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Appendix 1 – Previous Site Investigations

- EnviroCentre; Ardrossan Development Site 2019 Site Investigation – Interpretative Report, August 2019
- 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;
- Fairhurst, 20800 Shell Bitumen, Ardrossan, Treatment of Contamination, July 1991.



Ardrossan North Shore Site Investigation Non-Technical Summary



May 2021

Ardrossan North Shore Site Investigation

Non-Technical Summary

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1 INTRODUCTION

In April 2019, Ardrossan North Shore LLP appointed EnviroCentre Ltd to design and oversee a Phase II Geo-Environmental Site Investigation at the Ardrossan Development Site to inform the proposed redevelopment of the site for use as a new community education campus with associated playing fields and playground areas. The site will also incorporate residential and commercial development.

The site investigation works were undertaken by Dunelm Geotechnical and Environmental Limited in two separate phases. This document forms a Non-Technical Summary (NTS) of the findings of Geo-Environmental Site Investigation works undertaken on behalf of Ardrossan North Shore LLP in 2019. The works were undertaken at the Ardrossan North Shore development site as detailed in Figure 1 in Appendix A.

Following on from the 2019 investigations, the results of which were published in late 2019, additional works have been carried out in 2020 and 2021 incorporating:

- Environmental monitoring (groundwater, ground gas and volatile monitoring) completed in 2020.
- Production of Remedial Strategy Document and discussion with North Ayrshire Council Contaminated Land Officer and SEPA completed in 2020.
- Assessment of existing soil stockpiles on site completed in 2021.
- Assessment of sediment quality in adjacent proposed marina development area with respect to potential use as infill on the Ardrossan North Shore site completed in February 2021.
- Site investigation works of the Coast to Coast site which is to form part of the development site, completed in April 2021.

1.1 Site History

The Ardrossan development site lies on land which was 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 for the production of 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 contamination issues historically identified at the site are primarily related to hydrocarbon contamination of soils, and the presence of a free phase (i.e. not dissolved, but visually distinct from water) floating hydrocarbon layer on groundwater at the site. In addition, elevated metals are also noted to be present in soils.

1.2 Objectives

The 2019 site investigation was designed in line with British Standard BS10175: 2011+A2 2017 ('Investigation of Potentially Contaminated Sites').

The objectives of the site investigation were to:

- Determine the presence, concentration/levels and distribution of contaminants, based on a conceptual model of the site.
- Consider the ground and groundwater conditions which may influence contaminant movement i.e. how is the water moving within the soils and how does this affect the movement of the contamination
- Characterise potential pathways in terms of migration and potential attenuation i.e. how can the contaminants move within the site and affect site users or other sensitive issues like the water environment, and what natural processes help reduce the contaminant levels.
- Determine whether the pollutant linkages identified are significant and therefore whether the site is suitable for its intended use i.e. does the contamination present pose a real risk to site users, the buildings or environment?.
- Determine the requirements for remediation (where significant pollutant linkages are identified), including the collection of additional data, if necessary i.e. what can be done to make the site safe for use in the event a potential risk is identified?

1.3 Report Usage

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2 SITE INVESTIGATION WORKS

2.1 Contaminants, Pathways and Receptors

The table below summarises the potential contaminants that were assessed as part of the investigation and the receptors that were considered:

Source	Pathway	Receptor
Soil contamination associated with historic use of the site including:	Direct Contact (i.e. handling of soils or dust associated with the site) – All contaminants of concern excluding asbestos	Future Site Users (i.e. school pupils/employees/visitors)
<ul style="list-style-type: none"> • Heavy Metals; • Asbestos; • Petroleum Hydrocarbons; • Semi-Volatile and Volatile Organic Compounds 	Inhalation of Dust – All contaminants of concern	
	Inhalation of Vapours – Petroleum Hydrocarbons and Volatile Organic Compounds	
	Ingestion (i.e. eating soil or dust associated with the site) – All contaminated of concern excluding asbestos	

The investigation works incorporated excavation of 77 trialpits and drilling and installation of 20 shell and auger boreholes. A plan detailing the site investigation locations is provided as Figure 1 in Appendix A.

A total of 155 soil samples were collected and analysed from the intrusive locations at various depths ranging from 0.4m to 5m below ground level throughout the soil profile. This investigation approach is in line with industry standard and is designed to allow for assessment of the site condition via intrusive locations on a grid based pattern.

Soil samples were variously tested for the following analytes at an accredited laboratory:

- Asbestos screen;
- pH (acidity);
- Heavy Metals (i.e. elements such as arsenic, cadmium, chromium, copper, lead, nickel, mercury, selenium and zinc);
- Fractionated Total Petroleum Hydrocarbons (TPH CWG, i.e. chemicals which originate from crude oil);
- Volatile Organic Compounds (VOCs) (i.e. chemicals typically associated with hydrocarbons such as benzene and again components of oil); and
- Semi-Volatile Organic Compounds (SVOCs, including Polycyclic Aromatic Hydrocarbons (PAHs)).

3 RISK ASSESSMENT AND FINDINGS

The Geo-Environmental investigation has incorporated screening of the soil laboratory results against current generic screening criteria that are routinely used for ground condition assessment in the United Kingdom. There is no current generic screening criteria for a school use set by regulatory bodies, so for the purposes of the assessment two sets of criteria were utilised which reflect the likely usage of the site. These criteria were:

- Residential without Plant Uptake;
- Public Open Space Near Housing.

The screening criteria allow for consideration of the potential exposure for a human user on the basis of the number of hours present on the site, per day on a yearly basis. For the residential without plant uptake scenario the criteria is designed to assess land for use as housing. As such this criteria assumes the receptor will be on site for 365 days a year for up to 19 hours per day. For a school use the receptor is likely to be present on site for approximately 7 hours per day on a lower number of days per year. As such the residential criteria is a very stringent approach to assessment for the site. Should as part of the school development, plant cultivation be part of the design then appropriate remedial measures will be put in place to address risks associated with plant uptake.

The generic screening assessment has identified specific areas of the site where there were elevated concentrations of contaminants with respect to both these land use types i.e. at levels which are considered to warrant further action.

Figure 2 in Appendix A details the locations of sample exceedances (marked as red locations where further action is required) for the Residential without Plant Uptake land use. Figure 3 in Appendix A details the locations of sample exceedances with respect to the Public Open Space Near Housing land use.

4 GROUNDWATER, GROUND GAS AND VOLATILE CONTAMINANT MONITORING

During 2020 further environmental monitoring was carried out at the site. The works incorporated:

- Two groundwater monitoring rounds;
- Six ground gas monitoring rounds;
- Three monitoring rounds to assess risks from volatile contaminants in soil and groundwater.

The environmental monitoring findings are summarised below.

4.1 Assessment of Impact to Groundwater

The investigation has identified evidence of the potential for impact to the Water Environment (potentially both groundwater resource and the adjacent Firth of Clyde) related to the presence of a floating hydrocarbon layer at the site and related elevated dissolved TPH and PAH concentrations.

The locations of the exceedances are generally noted on the east of the site however there is evidence of localised hydrocarbon impact on the western portion of the site.

Figures 171301-016 and 171301-017 in Appendix A details the locations the identified issues.

4.2 Ground Gas Risks

The ground gas assessment identified presence of carbon dioxide within boreholes at the site which results in the site being classified as Gas Characteristic Situation 2 (as per BS 8485:2015+A1:2019).

For future buildings on the site there will be a requirement for provision of gas mitigation measures which will incorporate:

- Provision of an appropriately specified gas membrane with all penetrations sealed and designed to remain durable during the use of the building.
- Provision of a very good passive dispersal layer beneath the buildings (i.e. clear void or no fine gravel layer);
- Provision of passive subfloor ventilation.

4.3 Risks from Volatile Contaminants

The volatile monitoring identified evidence of volatile contaminants at the surface of the site in the areas of the known floating hydrocarbon layer. On this basis the following mitigation measures are proposed:

- Removal of floating oil layer.
- Gas membrane specification should also restrict potential for volatile hydrocarbon ingress.

5 REMEDIAL STRATEGY

A remedial strategy for the site has been developed and discussed with SEPA and North Ayrshire Council's Contaminated Land Officer. This has incorporated agreement of soil contaminant maximum concentration criteria to meet land suitability requirements in relation to human health and ensure no significant release of hazardous materials to the water environment.

The remedial strategy incorporated an update of the human health risk assessment for the entire site to assess for a residential with plant uptake land use scenario. This forms the basis for the remedial target requirements with respect to human health protection.

Figure 1 provided in Appendix B details the identified zones of contamination in relation to the preferred master plan layout. The land-use for the development incorporates the following general land uses:

- School campus buildings;
- Carpark and landscaped areas associated with the school;
- School playing fields;
- Residential Areas

With respect to the areas of identified contamination these are generally related to the following areas

- Portion of school campus building footprint.
- Portion of carpark, landscaped and playing field area.
- Portion of residential development zone on the east of the site.

The remediation strategy for these areas will generally be similar as detailed below:

- Excavation of known areas of soil which are contaminated with hydrocarbons (Figure 1 provided in Appendix B details the identified areas of contamination).
- Following excavation of these soils, sampling and laboratory testing of the remaining ground will be undertaken to confirm that the excavation has removed the identified soil materials of risk.
- Removal of visual hydrocarbons (oil sheen) from groundwater at the site via skimming and offsite removal of oil.
- Either onsite treatment of contaminated soils to address the risks from the material or offsite removal for treatment or disposal. The approach will be informed by initial small-scale trial tests on contaminated soils to identify the most effective measures for addressing the soil contamination.
- Infilling of excavated areas with material that is proved suitable for use via laboratory testing for the proposed development.
- Environmental capping (i.e. upfilling) of areas of proposed soft landscaping with soils shown to be suitable by laboratory testing. The upfilling depth will be designed with respect to the final land use of the area.
- Installation of hydrocarbon and ground gas resistant membranes in the footprint areas of all buildings built on the site.
- All water supply pipes and utility service runs will be suitably specified for the purpose of protection.

All remedial works will be witnessed, documented, monitored and numerous samples collected for analysis by a laboratory to ensure the remedial works are being completed as agreed with North Ayrshire Council Environmental Health Department, and SEPA. This will result in the production of a Validation Report completed by a suitably qualified environmental consultant, with verification reports submitted to North Ayrshire Council Environmental Health department, and SEPA. Site users and residents will not be allowed to move into the properties until the regulators have approved these reports.

5.1 Remediation Pilot Trials

As the first stage of the remediation, pilot trials will be undertaken from June 2021. The purpose of these trials is to identify the most effective means of undertaking the soil treatment works. The trials will incorporate pilot testing of the following potential treatment approaches:

- Bioremediation (i.e. enhancing natural breakdown of the hydrocarbon contaminants);
- Chemical oxidations (use of chemicals to breakdown the hydrocarbons);
- Combination of chemical oxidation and bioremediation;
- Stabilisation and solidification (i.e. mixing soil with cement and chemical binders to “lock-in” the contamination and therefore make it unable to cause impact);
- Soil washing (i.e. use of a washing technique to remove the contaminant from the soil).

The findings of the pilot trials will allow for final compilation of the Remedial Strategy to confirm the exact technique(s) which will be employed on the site to reach the remediation criteria.

6 SEDIMENT TESTING

To facilitate the development of the site there is a requirement to import material to allow the site to reach required levels with respect to flooding, and provide the environmental cap for the remediation.

In February 2021 EnviroCentre collected sediment cores from the adjacent bay area to assess the quality of the material with respect to potential use as imported material.

The testing confirmed that the material is suitable for residential with plant uptake land use (i.e. would be suitable for use on the development). In addition, the assessment identified that the material was predominantly sand which would meet the engineering requirements for the imported fill.

On the basis of the findings of the assessment the sediment would be considered suitable for use as fill on the development site. At this stage works are ongoing with a view to potential other sources of material for the infill.

7 STOCKPILE TESTING

In January 2021 soil sampling was undertaken on existing stockpiles on the Ardrossan Development site to review their status and potential for re-use as part of the development.

The stockpiles were created in 2011 as part of the first phase of remediation of the site and have undergone various stages of bioremediation works.

The investigation identified that much of this stockpiled material had met the remedial targets for the site and as such could be re-used without the requirement for further remediation.

The review confirmed the following:

- 27,600m³ of stockpile material validated for re-use anywhere on the site (i.e. can be within top metre or as cap)
- 3,400m³ can be reused as subsoils or beneath hardstanding.
- 8,600m³ required to be further treated as part of the future enabling works package to allow it to meet re-use criteria.

These stockpiles therefore provide a source of material for use in remediating the site.

8 COAST TO COAST SITE INVESTIGATION

In April 2021 EnviroCentre carried out a site investigation at the Coast to Coast Bus Depot site (area detailed in Figure 1 provided in Appendix C) which is located adjacent to the main Ardrossan Development site.

The site historically formed a portion of a railway station prior to being used as a bus depot.

The purpose of the investigation was to assess the ground conditions and chemical condition of the site.

Review of the soil findings to date have not identified any significant contamination issues with the site, with only a very localised near surface hydrocarbon exceedance. This would be addressed utilising the proposed remedial measures detailed in the existing Remedial Strategy for the main development site. A report was produced in May 2021 detailing the findings.

Environmental monitoring works will continue to July 2021.

9 MITIGATION DURING REMEDIATION AND CONSTRUCTION

The works proposed on the north shore site will involve the excavation and movement of significant amounts of material. This understandably raises concern over the potential for nuisance in the area through smells, or the potential for contaminants to pass into the air through dust particles.

The potential for dust generation will be mitigated through wetting down materials prior to excavation and following stockpiling. On this basis there is considered to be a low risk of dust generation during the works.

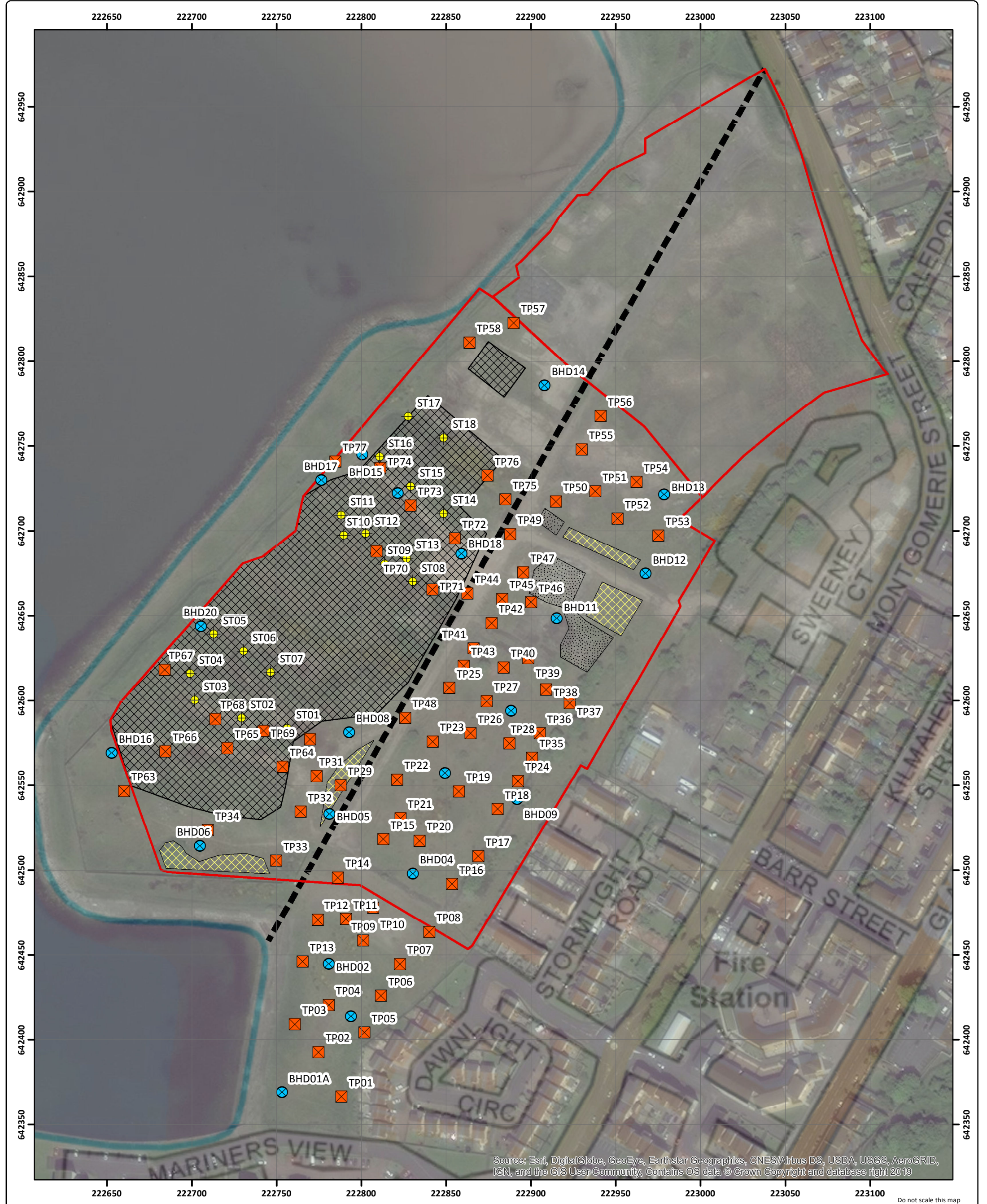
Dust monitoring incorporating visual assessment and static sampling will also be undertaken during the works to ensure that the mitigation measures are effective.

Odour generation is most likely to occur during excavation and movement of soil. Once stockpiled odour generation should be low. Deodorising units will be installed on site to mitigate the impact of odour production.


There will be onsite monitoring of volatile contaminants at the site boundary to ensure that there is no significant risk associated with volatile contaminants being released during the site works. This will be a continuous exercise through the duration of the works.


APPENDICES


A SITE INVESTIGATION FIGURES






Legend


-  Borehole


 Trial pit

 Approximate Stockpile Samples


 Approximate Area of Stockpiles
-  Concrete and Rubble Heaps

 Uneven Ground

 Indicative Line of Old Seawall

 Site Boundaries
- Revisions

B: Updated to show July 2019 locations

Client		North Ayrshire Council		Status		Final	
Project		Ardrossan		Drawing No.		171301-001	Revision B
Title		Figure 1 - Site Investigation Plan		Scale		1:2,000	A3
				Date		17 May 2019	
				Drawn		NC/FR	Checked FR
						Approved GD	
							
						Craighall Business Park, Eagle Street, Glasgow, G4 9XA Tel: 0141 341 5040 Fax: 0141 341 5045	



- Legend
- Exceedance of Residential GAC
 - No Exceedance of Residential GAC
 - Results Pending
 - Site Boundaries
 - Indicative Line of Old Seawall
 - Approximate Area of Stockpiles
 - Concrete and Rubble Heaps
 - Uneven Ground

Revisions
A. Updated to show July 2019 locations

Client
North Ayrshire Council

Project
Ardrossan

Title
Figure 2 - Residential GACs:
All Locations With Exceedance

Status
Working

Drawing No.
171301-010A

Revision
A

Scale
1:2,000

Date
30 August 2019

Drawn
NC

Checked
GD

Approved
GD



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B REMEDIAL STRATEGY FIGURES



Remediation Works

Campus Buildings and Car Parks
Environmental Cap in soft landscaped areas (at least 650mm thick),
gas membranes in all buildings and appropriate specified water pipes.

Housing, Campus Buildings and Car Parks
Environmental cap in soft landscaped areas (at least 650mm thick),
gas membranes in all buildings and appropriate spcified water pipes.

Marina Service Area
Environmental cap in soft landscaped areas (at least 650mm thick),
gas membranes in all buildings and appropriate specified water pipes.

Soft Landcaped Areas
Environmental cap (at least 650mm thick).

Sports Pitches and Outdoor Recreation
Environmental cap in soft landscaped areas (at least 650mm thick),
gas membranes in all buildings and appropriate specified water pipes.

Legend

Identified Area for Soil Excavation Works for Remediation

Campus Buildings & Car Park

Housing

Marina Service Area

Open Space

Reclaimed Land

Sports Pitches & Outdoor Education

Client
North Ayrshire Council

Project
Ardrossan
Remedial Strategy

Title
Remediation Plan and Proposed Layout

Scale
1:2,500 @A3

Status
Final

Drawing No. 171301-023	Revision -	Date 4 Dec. 2020
Drawn NC	Checked FR	Approved GD

Rev	Date	Amendment	Initials
A	18/12/20	Revised site layout	FR

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C COAST TO COAST FIGURE

