

The Remediation of the Steelworks Waste Site on Haulbowline Island, Cork



European Union Network
for the Implementation
and Enforcement of Environmental Law



An Róimh, 28^ú Meán Fómhair 2023



Haulbowline Island, Remediation Project

Background



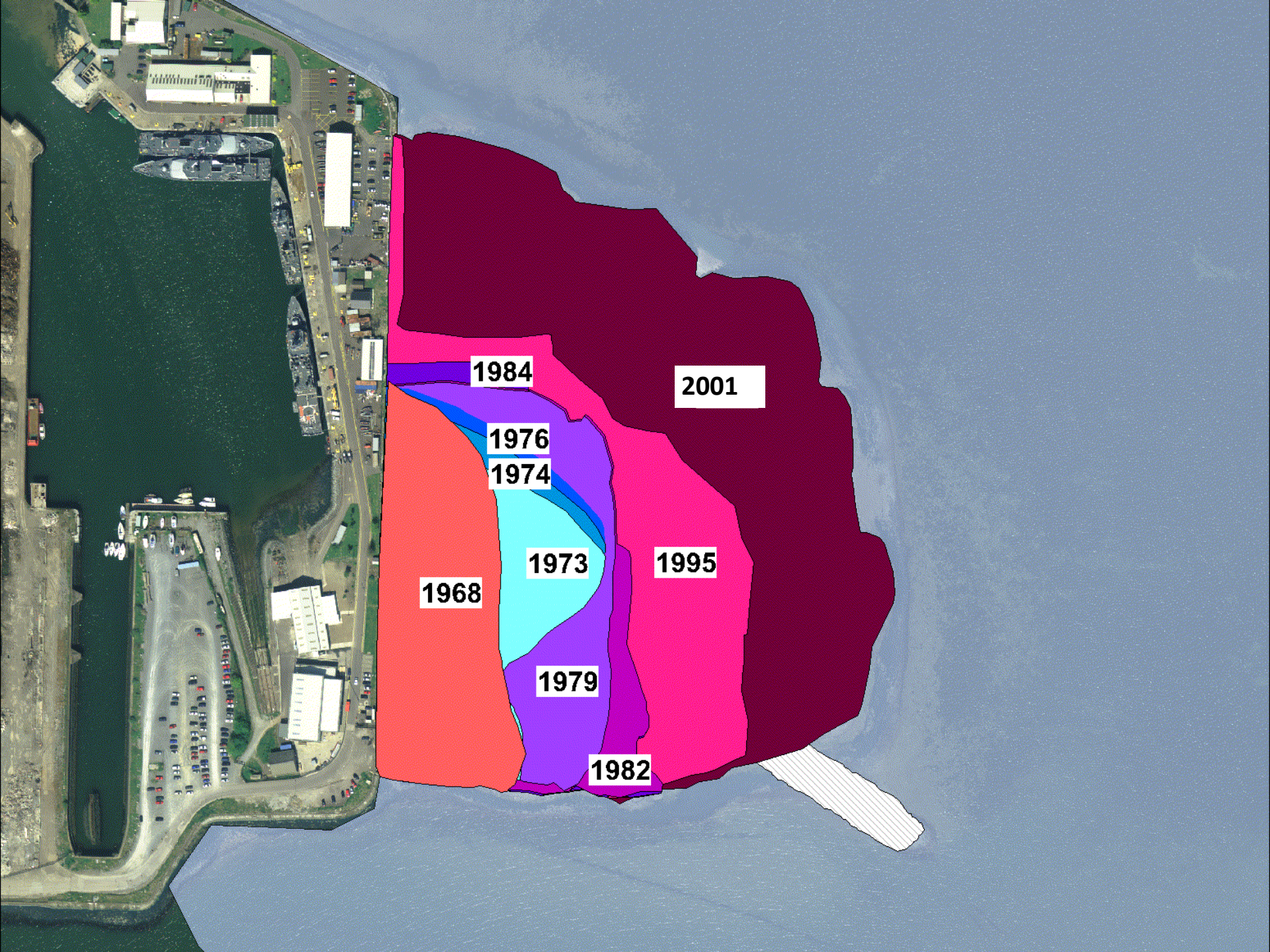
Background

- Steelworks opened in 1939 – Irish Steel Ltd (P)
[open hearth 1942-72 (35t coal to 70t oil in early 1960s); EAF 1972-2001 (35t to 90t in 1981 to 110t with ladle furnace on 1992)]
- Unique site in Irish context
- Process waste dumped on sand spit to east of Naval Dockyard from early 1960s to 2001 creating the East Tip (c. 9ha and c. 650,000m³)





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1968

1973

1974

1976

1984

1979

1982

1995

2001

Background

- Inherent variability of waste - Slag (c. 64%), Refractories (c. 14%), Millscale (c. 13%), Scrap metal (c. 7%), Sludge (c. 1%), Flue dust (c. 0.1%) and other (c. 1%)





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Background

- Complex, multi-faceted and multi-layered project
- Municipality (Cork County Council) took lead
- Key Constraints & considerations
 - No template – site specific solution/bespoke
 - Local sensitivities
 - Conservative approach
 - DQRA starting point



State 'likely to be sued' over Haulbowline dump

by Claire O'Sullivan

A LEADING environmental group has warned the Government will inevitably face court actions over the hazardous waste dump at the former Irish Steel site in Cork harbour.

Friends of the Irish Environment (FIE) predicted medical claims will be lodged by locals on grounds the community's health was put at risk when the steel plant was in operation. They warned that others are likely to sue the State for its failure to ensure toxic byproducts were disposed of properly.

The conclusion of its Toxic Island report, published yesterday, stated that the contractor, who was commissioned by the Department of the Environment (DOE) to clean up the



Blueprint for island being finalised

by Claire O'Sullivan

THE Department of the Environment is finalising a draft plan on how the Cork harbour island of Haulbowline can be cleaned up and redeveloped.

The blueprint will be brought to cabinet shortly and will lay options for the safe disposal of waste from the Irish Steel plant and the redevelopment of the site.

It was estimated by contractors last year that a full clean-up of the site could cost up to €300 million. Options include the storing of waste in tanks or its removal.

with high-level

Up to 500,000 tonnes of toxic waste are dumped on the site, which was described by experts as one of

Examiner, says elevated levels of potentially hazardous substances were recorded in some areas, in par-

cautionary measure, further investigations are being undertaken. Tests to establish the risk to staff

30-year average as well as removal. **EDITORIAL: 16**

Take the dump European Union.

so early last July. Labour councillor Mulvihill, who had a public row over the dump with John Gurnaley on a visit to Cobh last year, took yet another swipe at the Minister for the Environment yesterday.

O'Riordan

ready of the lower harbour. It hasn't

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Haulbowline Island, Remediation Project



Project Objectives

Structured around S-P-R model of environmental risk management:

1. Identify and quantify the risks to human health and the environment.
 - Determine risk based upon current site use;
 - Determine risk based upon potential future public amenity use;
 - determine risk to groundwater & surface waters;
2. Identify and specify the mitigation/remediation measures necessary to minimise those risks.
3. *Leave a positive legacy for residents of the Lower Harbour.*



Tiered Risk assessment process

- GQRA -
 - Basic comparison of soil and leachate data to Water Quality Standards and GACs
- Level 4 DQRA
 - Considering contaminant flux from the site and dilution model in the receptor
- GQRA & DQRA inherently **conservative**

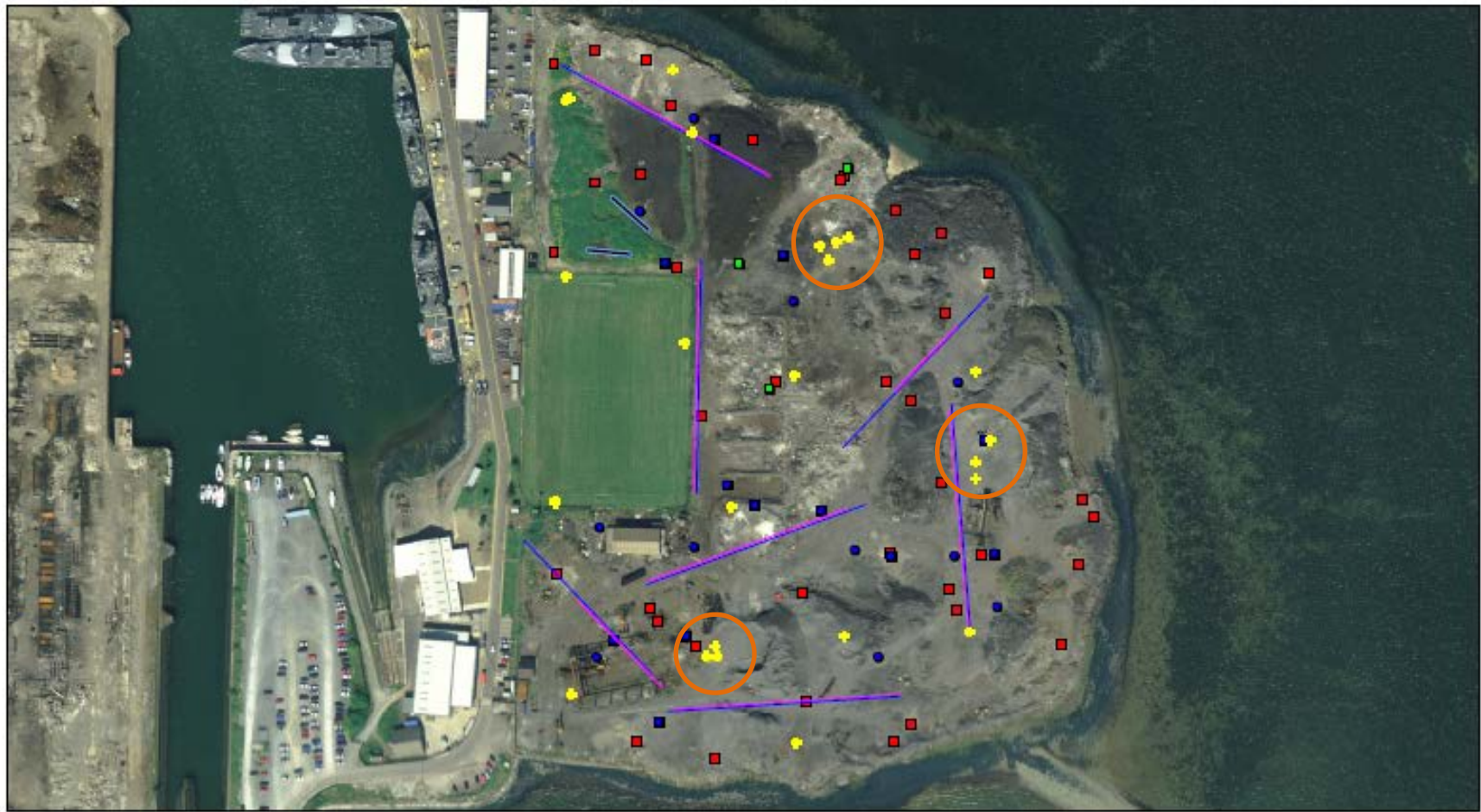


Geo-Environmental Investigations

Investigation included:

- Installation of 35 boreholes, excavation of 31 trial pits and 2 trenches;
- Collection and analysis of 108 waste samples, 34 natural strata and 23 leachability testing samples;
- Collection and analysis of 20 offshore marine samples, 23 harbour water samples, 8 shell fish samples;
- 136 groundwater samples, 5 surface water samples (from excavations), 9 foreshore seepage samples;
- 11 ground gas samples and 17 rounds of gas monitoring.





Title: **Figure 3:
Geophisic Lines
Borehole And Trial Pit
Locations
Haulbowline Project**

Project: **HaulbowlineTeam**

Drawn by: **HaulbowlineTeam**

Date: **26/10/2012**

Legend:

- ★ New Boreholes 2012
- ★ Trial Pits Pre 2012
- Excavations Pre 2012
- Boreholes Pre 2012
- New Trialpits 2012
- Geophysical Profiles
- Geophysical Profiles



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Scale: **1:2000 @ A3**





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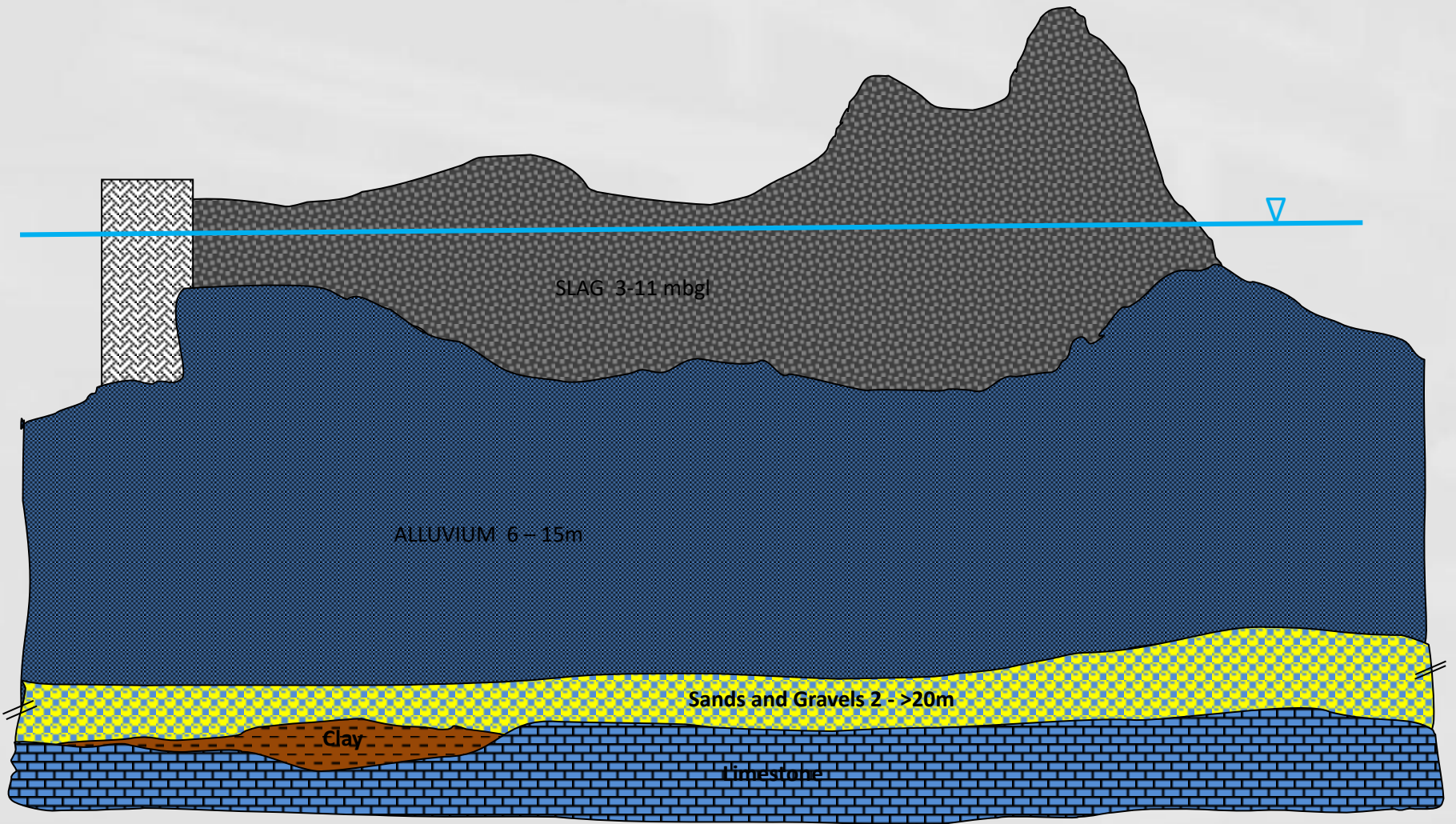
Identify Contaminants of Concern

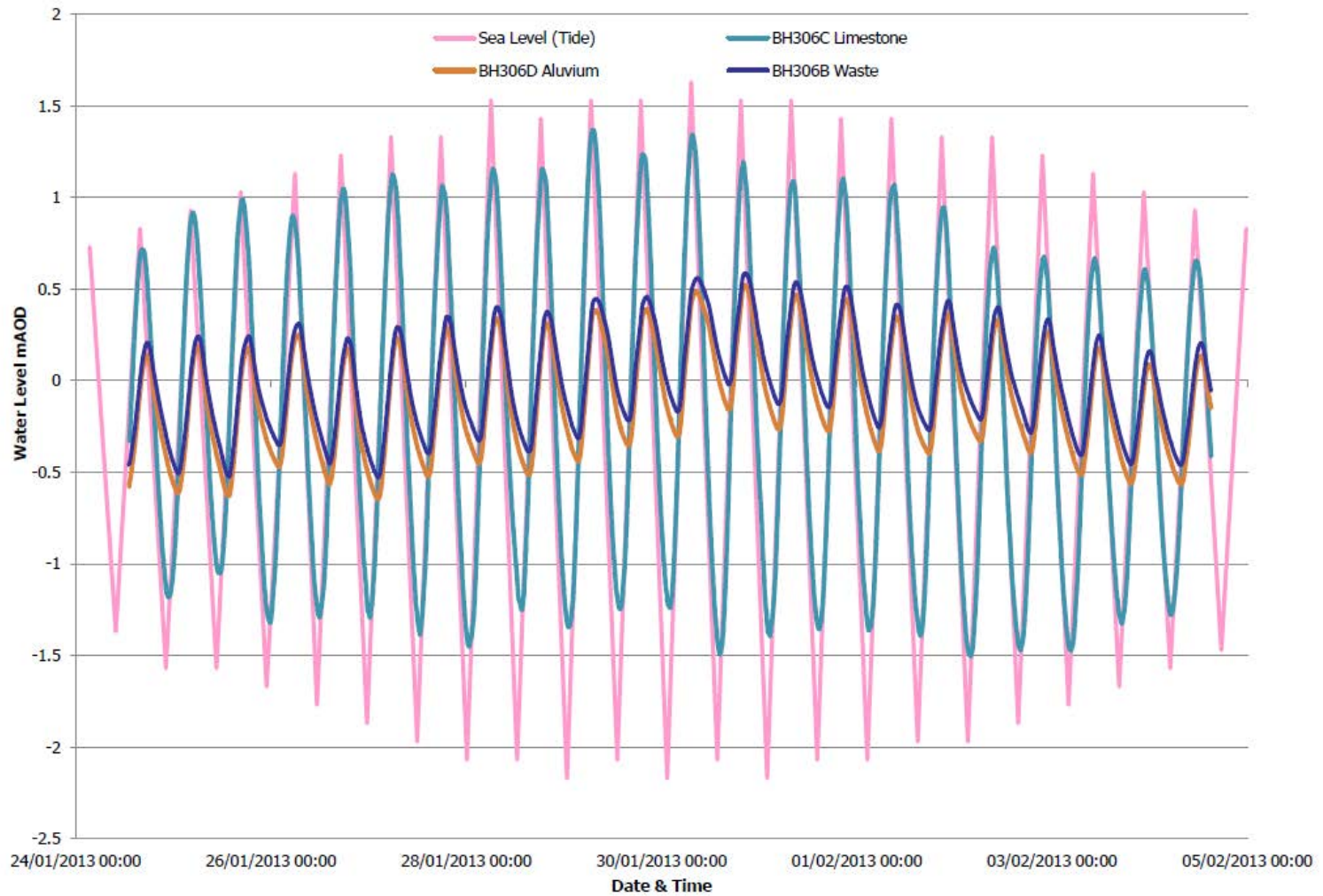
- Industry profile
- Metals associated with steel works: Arsenic, Copper, Cadmium, Chromium, Lead, Manganese Mercury, Nickel
- Polyaromatic Hydrocarbons, PCBs, Dioxins and Furans
- Petroleum Hydrocarbons
- Asbestos



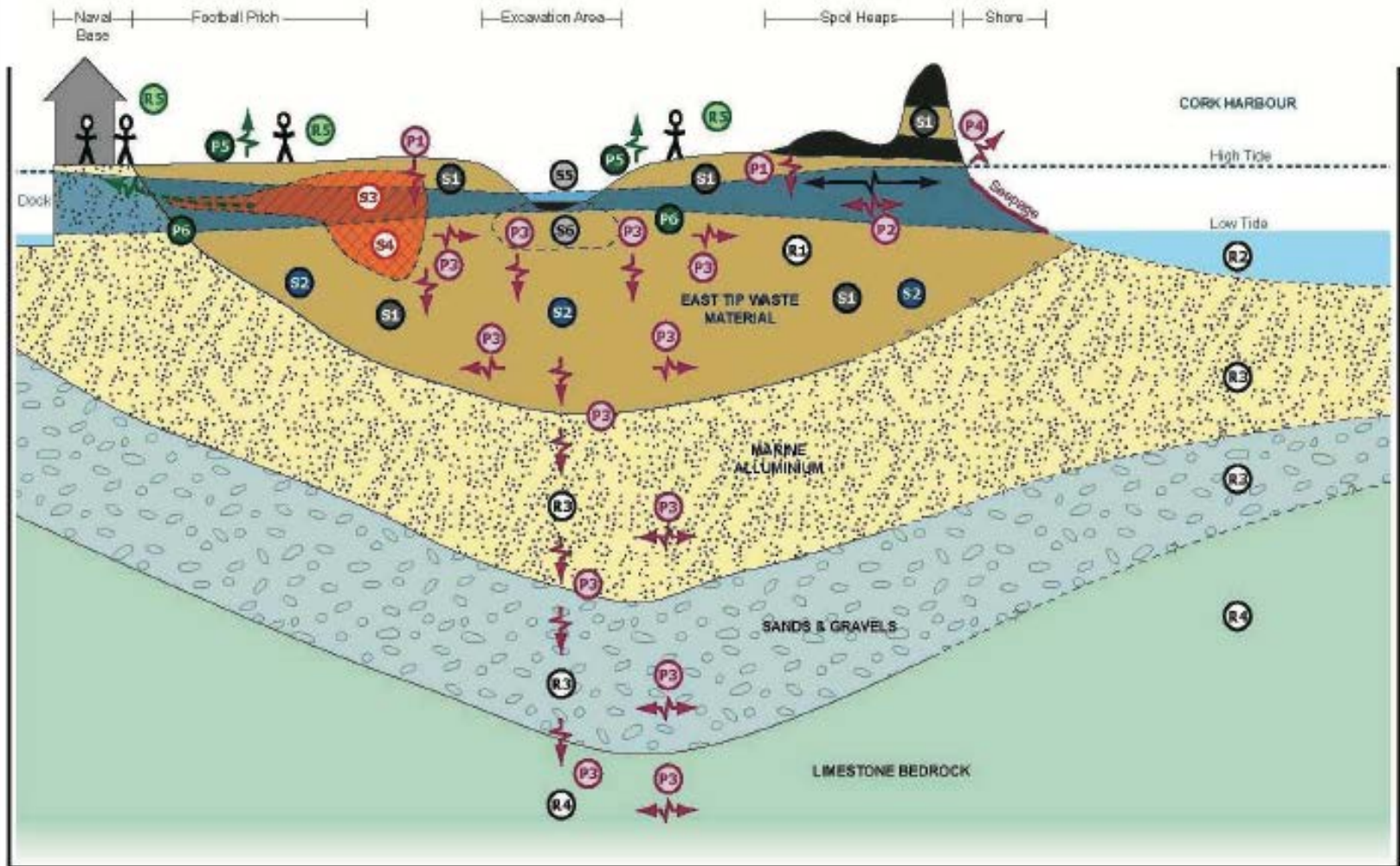
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Key Source-Pathway-Receptor Linkages (Groundwater)



Key Source-Pathway-Receptor Linkages (Groundwater)

Source	Pathway	Receptor
<p>Unsaturated Made Ground/Slag Waste</p> <p>(Containing various leachable contaminants including heavy metal and hydrocarbon compounds)</p>	Leaching and vertical migration	<p>Groundwater / Cork Harbour</p> <p>(Tidal)</p>
<p>Saturated Made Ground/Slag Waste</p> <p>(Containing various leachable contaminants including heavy metal and hydrocarbon compounds)</p> 	Lateral migration of dissolved phase contaminants	
	Vertical migration of dissolved phase contaminants	
	Direct erosion/transport of sediments bearing <u>sorbed</u> contaminants	



Conclusions

- Site conditions sufficiently well understood to facilitate the design of a robust solution.
- No risks identified for wider community now or in long term.
- Potential human health risk for site users in it's current state.
- Potentially leachable contaminants remain in the waste.
- Groundwater impacted with heavy metals and hydrocarbons, and in direct hydraulic continuity with Cork Harbour.
- Model predicts limited theoretical impact to near shore waters (50m) although **no measurable impact to water was observed.**
- Contaminant contribution from erosion and sediment transport is likely to be more important than dissolved contaminant transport.
- Effective remediation will be based on containment of materials within the East Tip – pathway management using PES with max. permeability of 10^{-5}m/s .



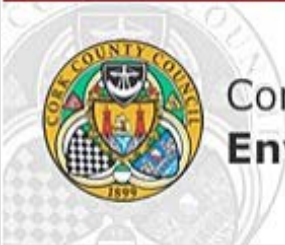
Recommendations

- Control risk to human health by capping and landscaping.
- Limit further leachate generation by minimising infiltration (i.e. low permeability capping).
- Control dissolved phase contaminant loading into Cork Harbour by decreasing lateral permeability around the shoreline perimeter of the site (max 10^{-5} m/s) in conjunction with low permeability capping.
- Address future sediment loading into Cork Harbour by creating erosion protection around the shoreline perimeter.



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Latest News

Project Update

21st November 2011

Works completed on the repair of the sea breach along the northern section of the East Tip.

15th November 2011

Works commence on the repair of the sea breach along the northern section of the East Tip.

9th November 2011

Deadline for receipt of completed Pre-Qualification Questionnaires for Lot 1 and Lot 2 (see 14th October).

2nd November 2011

Members of Cork County Council's project team accompanied by consultants WYG (Ireland) and RPS gave a presentation on the project outline to naval personnel working on Haulbowline Island. This forum afforded the opportunity to those present to address queries to the project team.

28th October 2011

Meetings of the Technical Group and Steering Group were facilitated by Cork County Council at County Hall on the morning of Friday 28th October. In attendance at the technical group meeting



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Key Learnings

- Municipality took ownership
- Set clear objectives
- Risk Assessment & Management is process driver
- Communication
- [Ambition & Innovation](#)

