*Aquatic, Ecology, Environmental and Land Management Consultants*

# Canvey Lake

## Waste Classification

Project reference number: CP2627-001
Date: August 2026


**Author (s):** **Finley O'Grady BSc (Hons), AIFM**
**Reviewed:** **Ash Girdler C.Biol, FRSB, C.Env, MIFM, FIFM**



A.G.A Group Consultancy Limited
Telephone +044 (01953) 886824
Email: info@agagroup.co.uk
Website: http://www.agagroup.co.uk/

# 1. Introduction

A.G.A Group Consultancy Limited was commissioned to undertake a waste classification assessment of sediment proposed for removal during dredging and desilting works at Canvey Lake.

Waste Acceptance Criteria (WAC) testing was previously undertaken on three composite sediment samples collected from the proposed dredging area. The results demonstrated that the material does not satisfy the acceptance criteria for disposal at an inert landfill facility. As WAC testing does not determine whether a waste is hazardous or non-hazardous, further solid-phase chemical analysis was subsequently undertaken to support classification of the sediment in accordance with Technical Guidance WM3: Guidance on the Classification and Assessment of Waste.

WM3 provides the framework for determining the appropriate List of Waste entry and whether a waste exhibits one or more hazardous properties. The assessment includes consideration of waste origin and composition, identification of potentially hazardous substances and Persistent Organic Pollutants (POPs), assessment of hazardous properties HP1–HP15 and assignment of the appropriate waste code.

This assessment has been prepared with reference to the following information:

- Eurofins Chemtest Report No. 26-20893-1, comprising solid-phase chemical analysis of three sediment samples collected on 3 July 2026;
- Eurofins Chemtest Report No. 26-17978-1, comprising WAC and supporting solid-phase analysis of three composite samples collected on 4 June 2026;
- the previous Canvey Lake WAC Suitability Assessment;
- Environment Agency information relating to the Canvey Island drainage network;
- Technical Guidance WM3 v1.2.GB; and
- the applicable GB Mandatory Classification and Labelling List.

Substance classifications used within the assessment have been considered against the applicable GB Mandatory Classification and Labelling framework.

# 2. Site and Waste Context

## 2.1 Canvey Island Drainage System

Canvey Lake forms part of the wider Canvey Island surface-water drainage system.

Environment Agency information identifies a complex drainage network divided into five drainage districts. Surface-water sewers, highway drainage networks and ordinary watercourses discharge into Main River watercourses, either directly by gravity or through pumping infrastructure.

Canvey Lake itself receives, passes and stores surface-water flows within this network and is hydraulically connected to other drainage districts. The lake is specifically fed by the Winter Gardens, Rainbow and St Josephs low-flow pumping stations and subsequently discharges to Hilton Dyke and Hilton pumping station.

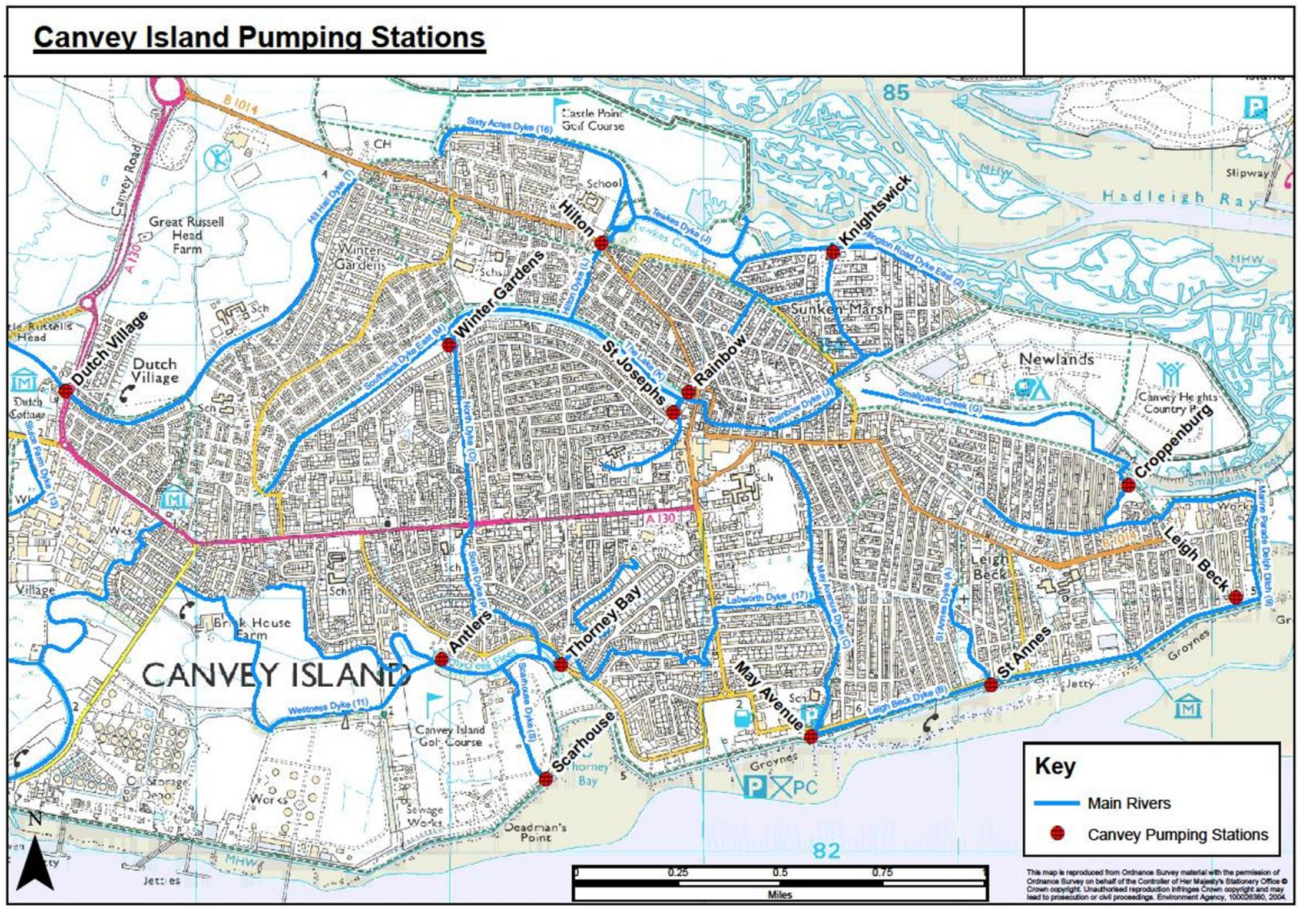


**Figure 1. Canvey Island drainage network and pumping infrastructure. Source: Environment Agency, Canvey Island Drainage Network factsheet.**

The sediment accumulated within Canvey Lake is therefore influenced by a predominantly urban surface-water catchment, including residential areas and highway drainage.

## 2.2 Conceptual Contaminant Source Model

Diffuse urban and highway runoff represents the principal identifiable pathway by which contaminants may enter Canvey Lake.

The surrounding catchment is predominantly residential and urban in character and contains roads and associated commercial land uses, including petrol filling stations. Contaminant groups reasonably associated with these sources include:

- Metals associated with road dust, vehicle wear and urban runoff
- Petroleum hydrocarbons associated with vehicle use and fuel/oil losses
- BTEX and other volatile petroleum constituents
- PAHs associated with fuel combustion and urban deposition
- Suspended solids and naturally accumulated organic matter

No known sewage misconnections or significant sewage-derived inputs have been identified. No significant pollution incidents, persistent oil sheens, fuel or solvent odours, or other evidence of gross chemical contamination have been reported or observed at the site.

The analytical dataset has therefore been assessed in the context of these identified and reasonably foreseeable contaminant sources.

# 3. Sampling and Analytical Methodology

## 3.1 Sampling Strategy

Three composite sediment samples, identified as Samples A, B and C, were collected from the proposed dredging area.

The composite samples were distributed to provide representative coverage of the sediment proposed for removal. The sampling locations and approach were consistent with those used during the preceding WAC investigation.

The previous WAC assessment similarly comprised three composite sediment samples collected from separate areas of the lake to minimise the influence of localised variation and provide representative characterisation of the wider sediment body.

Samples A, B and C have been assessed individually prior to consideration of the overall classification of the represented sediment body.

## 3.2 Laboratory Analysis

The July 2026 samples were analysed for:

- Asbestos
- Moisture and pH
- Cyanide
- Metals
- Cr(VI)
- VPH and EPH petroleum hydrocarbon fractions
- BTEX
- PAHs
- Phenols
- Total Organic Carbon
- Loss on Ignition

All three samples were described as brown sludge. Moisture contents ranged from 77% to 84%, with pH values between 7.5 and 7.9.

Eurofins reports the chemical analytical results on a dry-weight basis.

# 4. Moisture Content and Proposed Dewatering

The dredged sediment is expected to undergo partial dewatering by evaporation at an adjacent site prior to removal. No chemical conditioning agents, including lime, polymers or flocculants, are proposed.

As the laboratory analytical results are reported on a dry-weight basis, the actual concentration present within the wet sediment varies according to its moisture content.

For a dry-weight concentration $C_{DW}$, the corresponding concentration within the material at a given moisture content is calculated as:

$$C_{actual} = C_{DW} \text{ x dry solids fraction}$$

Evaporative dewatering increases the concentration expressed per unit mass of waste as water is removed, with the analytical dry-weight result representing the maximum concentration achievable through removal of water alone.

The classification has therefore considered both:

- The sediment in its as-sampled condition
- The laboratory dry-weight concentration as the conservative upper-bound condition

The dry-weight analytical concentrations have been used for the hazardous-property assessment. This ensures that classification remains applicable following partial evaporative dewatering.

# 5. Waste Classification

The material arises from dredging/desilting and therefore falls within Chapter 17 05 of the List of Waste.

WM3 identifies the relevant mirror pair as:

**17 05 05*** – dredging spoil containing hazardous substances

**17 05 06** – dredging spoil other than that mentioned in 17 05 05.

The purpose of this assessment is therefore to determine whether the material exhibits one or more hazardous properties or otherwise requires the hazardous mirror entry.

# 6. Analytical Results

## 6.1 Metals and Inorganic Determinands

Maximum measured dry-weight concentrations across Samples A–C are summarised below:

| Determinand | Maximum dry-weight result |
|---|---|
| Arsenic | 9.9 mg/kg |
| Barium | 81 mg/kg |
| Cadmium | 0.64 mg/kg |
| Total chromium | 35 mg/kg |
| Chromium VI | <0.50 mg/kg |
| Copper | 47 mg/kg |
| Mercury | 0.12 mg/kg |
| Molybdenum | 1.5 mg/kg |
| Nickel | 24 mg/kg |
| Lead | 77 mg/kg |
| Selenium | 1.3 mg/kg |
| Zinc | 250 mg/kg |
| Antimony | <2 mg/kg |
| Total cyanide | <0.50 mg/kg |

Total chromium concentrations in Samples A–C were 35, 22 and 25 mg/kg respectively. Corresponding trivalent chromium concentrations were also 35, 22 and 25 mg/kg, while Cr(VI) was below the laboratory detection limit of 0.50 mg/kg in all samples.

The analytical data therefore indicate that the measurable chromium fraction is predominantly present in the trivalent state.

# 7. Substance Identification and Speciation

Routine elemental analysis reports the concentration of individual elements but does not necessarily determine the chemical compounds in which those elements occur.

In accordance with WM3, substance selection has therefore been informed by the nature and origin of the waste, the conceptual contaminant source model and available analytical information. Where the precise chemical form cannot be established, conservative compounds capable of reasonably representing the identified contaminant have been considered.

The substances used for classification screening are summarised below.

| Element | Conservative substance used | GB MCL Index | Main relevant hazard statements | Maximum dry concentration |
|---|---|---|---|---|
| As | Diarsenic trioxide | 033-003-00-0 | H350, H300, H314, H400, H410 | 0.00131% |
| Ba | Barium chloride | 056-004-00-8 | H301, H332 | 0.0123% |
| Cd | Cadmium compounds – Note 1 | 048-001-00-5 | H302/H312/H332, H400, H410 | 0.000064% |
| Cr(VI) | Sodium dichromate equivalent | 024-004-00-7 | H350, H340, H360FD, H372, H314, H400, H410 | <0.000126% |
| Cu | Copper(I) oxide | 029-002-00-X | H302, H332, H318, H400, H410 | 0.00529% |
| Hg | Inorganic mercury compounds – Note 1 | 080-002-00-6 | H300, H310, H330, H373, H400, H410 | 0.000012% |
| Mo | Molybdenum trioxide | 042-001-00-9 | H351, H319, H335 | 0.000225% |
| Ni | Nickel sulphate* | 028-009-00-5 | H350i, H341, H360D, H372, H400, H410 | 0.00633% |
| Pb | Lead compounds – Note 1 | 082-001-00-6 | H360Df, H302, H332, H373, H400, H410 | 0.0077% |
| Zn | Zinc oxide | 030-013-00-7 | H400, H410 | 0.0311% |
| Sb | Antimony compounds – Note 1 | 051-003-00-9 | H302, H332, H411 | <0.0002% |

**Table 1. Classification screening table using maximum concentrations – representing values of the highest tested dry concentrations in all three samples.**

*Where Note 1 applies under the relevant mandatory classification entry, the concentration of the metallic element has been used for classification purposes.*
*Nickel sulphate has been adopted as a conservative soluble nickel species for the assessment. The resulting classification concentration remains substantially below the applicable hazardous-property thresholds.*

## 7.1 Chromium Sensitivity Assessment

The laboratory analysis demonstrates that the measured chromium is predominantly trivalent, with Cr(VI) below 0.50 mg/kg.

A supplementary conservative sensitivity assessment was undertaken in which the entire measured chromium concentration was assumed to occur as sodium dichromate.

For the maximum total chromium result of 35 mg/kg:

$$35 \times 2.519 = 88.2 \text{ mg/kg sodium dichromate}$$

equivalent to:

$$0.00882\%$$

This remains below the most restrictive relevant concentration limits considered under HP7, HP11 and HP14. The waste classification is therefore not dependent upon the measured Cr(III)/Cr(VI) distribution.

## 7.2 Petroleum Hydrocarbons

Volatile petroleum hydrocarbon fractions >C5–C10 were below the applicable laboratory detection limits in all three samples.

Total extractable hydrocarbons >C10–C40 were recorded at:

- Sample A – 37 mg/kg;
- Sample B – 150 mg/kg; and
- Sample C – 210 mg/kg.

The maximum dry-weight concentration is therefore approximately:

$$210 \text{ mg/kg} = 0.021\%$$

WM3 provides a specific assessment approach where petroleum oil is present but its precise identity cannot be established. Relevant screening concentrations include 0.1% for HP7/HP11, 2.5% for HP14, 3% for HP10 and 10% for HP5.

The maximum measured hydrocarbon concentration is below the lowest of these screening concentrations.

The June 2026 analytical campaign also recorded C10–C40 concentrations of **81, 71 and 65 mg/kg** in the corresponding composite sediment samples.

The available analytical data therefore do not indicate petroleum hydrocarbon concentrations capable of determining hazardous classification.

## 7.3 BTEX and Polycyclic Aromatic Hyrdrocarbons

BTEX concentrations were low throughout the July analytical dataset. Benzene reached a maximum concentration of 2.1 µg/kg, while ethylbenzene and xylenes were below laboratory detection limits.

The June analytical dataset similarly reported total BTEX at <0.010 mg/kg in all three samples.

Total concentrations of the 16 PAHs analysed in July were:

- Sample A – <0.05 mg/kg
- Sample B – 0.31 mg/kg
- Sample C – 2.7 mg/kg

The maximum benzo[a]pyrene concentration was 0.34 mg/kg, equivalent to 0.000034%.

The reported concentrations do not approach the applicable hazardous-property concentration limits.

## 7.4 Persistent Organic Pollutants

Persistent Organic Pollutants were considered separately from the HP1–HP15 assessment in accordance with WM3.

The June analytical suite included the seven ICES PCB congeners, which were reported at <0.05 mg/kg in each of the three samples.

This is substantially below the applicable 50 mg/kg waste POP concentration limit for PCBs.

The analytical programme did not comprise analysis for every substance regulated under POP legislation. The conceptual contaminant source assessment has therefore also been considered.

No specific source of legacy pesticide contamination, PCB-associated industrial activity, firefighting-foam contamination or specialist fluorochemical activity has been identified within the available information for the drainage catchment.

There is consequently no identified source indicating that additional POP groups are reasonably expected to be present at concentrations material to the waste classification. This conclusion is dependent upon the current understanding of the catchment and should be reviewed if previously unidentified contaminant sources are subsequently identified.

# 8. Hazardous Properties Assessment

## 8.1 HP1 - Explosive

No explosive substances or processes capable of introducing explosive constituents to the sediment have been identified within the conceptual source model.

HP1 is not applicable.

## 8.2 HP2 - Oxidising

No substances are present at concentrations capable of imparting an oxidising property to the bulk waste.

The Cr(VI) concentration is below 0.50 mg/kg. The supplementary assessment in which all measured chromium was conservatively represented as sodium dichromate also remains below concentrations capable of determining the waste classification.

HP2 is not triggered.

## 8.3 HP3 - Flammable

The material comprises water-rich sediment with a measured moisture content of 77–84%. VPH concentrations were below detection, and heavier hydrocarbon concentrations reached a maximum of 0.021% on a dry-weight basis.

No free petroleum phase or persistent oil sheen has been identified.

HP3 is not triggered.

## 8.4 HP4 – Irritant

WM3 applies a 1% cut-off to substances classified H314, H315, H318 or H319 prior to assessment under HP4.

All identified substances carrying the relevant hazard classifications occur below this cut-off.

The measured pH range of 7.5–7.9 also provides no indication of an extreme-pH hazard.

HP4 is not triggered.

## 8.5 HP5 – Specific Target Organ & Aspiration Toxicity

The applicable WM3 concentration limits include:

- H370/H372 – 1%
- H371/H373 – 10%
- H335 – 20%
- H304 – 10%

The maximum calculated concentration of any relevant conservatively selected substance remains below the applicable threshold.

Nickel sulphate, which represents the highest relevant H372 metal substance concentration, is calculated at 0.00633%.

HP5 is not triggered.

## 8.6 HP6 – Acute Toxicity

WM3 applies cut-off values of 0.1% for substances carrying H300, H301, H310, H311, H330 or H331 and 1% for H302, H312 or H332 prior to inclusion within the applicable acute-toxicity calculations.

Relevant conservative substance concentrations include:

- Diarsenic trioxide – 0.00131%
- Barium chloride – 0.0123%
- Mercury – 0.000012%
- Cr(VI) equivalent – <0.000126%
- Cyanide equivalent – <0.0001%

These are below the applicable cut-offs. Other H302/H312/H332 substances are similarly below the 1% cut-off.

HP6 is not triggered.

## 8.7 HP7 – Carcinogenic

The relevant WM3 concentration limits are:

- H350 – 0.1%
- H351 – 1%

The principal relevant conservative substance concentrations include:

- nickel sulphate – 0.00633%
- diarsenic trioxide – 0.00131%
- maximum chromium sensitivity scenario – 0.00882%
- molybdenum trioxide – 0.000225%

All are below the applicable concentration limits.

The maximum petroleum hydrocarbon concentration is also below the 0.1% WM3 unidentified-oil screening concentration relevant to HP7/HP11.

HP7 is not triggered.

## 8.8 HP8 – Corrosive

H314 substances below 1% are excluded from the HP8 summation. A concentration of 5% H314 substances is required to classify the waste as corrosive through the concentration calculation.

The measured pH range of 7.5–7.9 does not indicate corrosive characteristics and all identified H314 substances occur below the applicable cut-off.

HP8 is not triggered.

## 8.9 HP9 – Infectious

The material comprises sediment accumulated within a surface-water drainage lake. It does not arise from healthcare, veterinary treatment, microbiological culture or another waste-generating process associated with HP9.

HP9 is not applicable.

## 8.10 HP10 – Toxic for Reproduction

WM3 applies concentration limits of:

- H360 – 0.3%
- H361 – 3%

Relevant concentrations include nickel sulphate at 0.00633%, lead at 0.0077% and the conservative total-chromium sensitivity scenario at 0.00882%.

All are below the applicable concentration limits.

HP10 is not triggered.

## 8.11 HP11 – Mutagenic

WM3 applies concentration limits of:

- H340 – 0.1%
- H341 – 1%

Nickel sulphate is present at a maximum calculated concentration of 0.00633%. The conservative chromium sensitivity scenario reaches 0.00882%.

Both remain below the applicable limits.

HP11 is not triggered.

## 8.12 HP12 – Acute Toxic Gas Release

Total cyanide was below 0.50 mg/kg in all three samples.

Representing the laboratory detection-limit concentration conservatively as sodium cyanide gives approximately:

0.000094%

This is substantially below the WM3 HP12 concentration relevant to cyanide salts capable of releasing hydrogen cyanide.

HP12 is not triggered.

## 8.13 HP13 – Sensitising

WM3 applies a concentration limit of 10% to individual substances classified H317 or H334.

Nickel sulphate, the principal relevant sensitising substance considered within the assessment, is calculated at 0.00633%.

HP13 is not triggered.

## 8.14 HP14 – Ecotoxic

The relevant WM3 cut-off concentrations are:

- H400 – 0.1%
- H410 – 0.1%
- H411/H412/H413 – 1%

The principal H410 substances considered within the assessment are:

| Substance | Maximum classification concentration |
|---|---|
| Zinc oxide | 0.0311% |
| Lead compounds | 0.0077% |
| Nickel sulphate | 0.00633% |
| Copper(I) oxide | 0.00529% |
| Diarsenic trioxide | 0.00131% |
| Cadmium | 0.000064% |
| Mercury | 0.000012% |

None of the identified H400/H410 substances reaches the applicable 0.1% cut-off and none therefore enters the corresponding HP14 summation calculation.

The maximum petroleum hydrocarbon concentration of approximately 0.021% is also below the WM3 2.5% unidentified-oil criterion relevant to HP14.

HP14 is not triggered.

### 8.15 HP15 – Waste Capable of Exhibiting Hazardous Property Subsequently

No substances associated with the relevant HP15 hazard statements, including H205, EUH001, EUH019 or EUH044, have been identified within the analytical dataset or conceptual contaminant source model.

HP15 is not triggered.

## 9. Data Quality and Limitations

### 9.1 Laboratory Sample Deviation

Eurofins assigned Deviation Code B to the July samples, indicating that the sample age exceeded the specified stability period between sampling and extraction. Eurofins states that results associated with a deviation may potentially be compromised.

The potential significance of this deviation is greatest for time-sensitive volatile determinands and is substantially less relevant to the metals analysis.

The classification does not depend upon a concentration close to a hazardous threshold for any volatile determinand. The July results are additionally supported by the June analytical campaign, which recorded total BTEX below 0.010 mg/kg in all three composite sediment samples and low C10–C40 hydrocarbon concentrations.

The deviation is therefore not considered to materially affect the waste classification on the available evidence.

### 9.2 Sampling Representation

The classification applies to sediment represented by composite Samples A–C within the proposed dredging area.

If visibly anomalous material, buried waste, a hydrocarbon sheen, unusual odour or another previously unidentified indication of localised contamination is encountered during dredging, that material should be segregated and separately characterised prior to removal.

## 10. Waste Classification

The assessment has considered the origin and characteristics of the sediment, representative composite sampling, anticipated evaporative dewatering, analytical composition, current substance classifications, Persistent Organic Pollutants and hazardous properties HP1–HP15.

No hazardous property has been identified for Samples A, B or C.

The sediment represented by the analytical dataset is therefore assigned the following List of Waste entry:

**17 05 06 – Dredging spoil other than that mentioned in 17 05 05**

**Waste classification: Non-hazardous**

The hazardous mirror entry 17 05 05* – Dredging spoil containing hazardous substances is not applicable to the sediment represented by the assessment.

## 10. Landfill Waste Acceptance

Waste classification and landfill Waste Acceptance Criteria represent separate regulatory assessments. Eurofins states that WAC leaching results must not be used to determine whether a waste is hazardous or non-hazardous.

The previous WAC testing demonstrated that the Canvey Lake sediment does not meet the acceptance criteria for disposal at an inert landfill.

All three samples exceeded the inert landfill criterion for Total Organic Carbon, with concentrations of 5.7%, 13% and 7.0%, compared with an acceptance criterion of 3%.

The samples also exceeded the inert landfill leaching criterion for chloride, with concentrations of 5,200, 3,500 and 2,100 mg/kg, compared with the applicable criterion of 800 mg/kg.

Total Dissolved Solids concentrations were 8,200, 7,000 and 4,600 mg/kg, compared with the inert landfill criterion of 4,000 mg/kg.

The resulting waste management position is therefore:

| Assessment | Outcome |
|---|---|
| WM3 waste classification | 17 05 06 – Non-hazardous dredging spoil |
| Inert landfill WAC | Not compliant |
| Appropriate disposal route | Suitably permitted non-hazardous waste facility authorised to accept 17 05 06, subject to facility-specific pre-acceptance requirements |

# 11. Conclusion

Three composite sediment samples representative of the proposed Canvey Lake dredging area were subjected to solid-phase chemical analysis to support classification in accordance with WM3.

The assessment considered potential contaminants associated with the urban and highway drainage catchment, including metals, petroleum hydrocarbons, BTEX and PAHs, together with asbestos, cyanide and relevant POP considerations.

Conservative substance assumptions and dry-weight analytical concentrations were used in the hazardous-property assessment to account for anticipated partial dewatering of the sediment.

No hazardous property under HP1–HP15 was identified for any of the three composite samples. No evidence was identified within the analytical dataset or conceptual contaminant source model that would otherwise require application of the hazardous mirror entry.

The sediment represented by Samples A–C is therefore classified as:

**17 05 06 – Dredging spoil other than that mentioned in 17 05 05 NON-HAZARDOUS WASTE**

The previous WAC assessment demonstrates that the material is not suitable for disposal at an inert landfill, principally due to exceedances of the applicable Total Organic Carbon, chloride and Total Dissolved Solids criteria.

The sediment should therefore be managed through a suitably permitted non-hazardous waste facility authorised to accept 17 05 06, subject to the receiving facility's waste pre-acceptance and acceptance procedures.