



Rinville
Oranmore
Co Galway
Tel: 091 387200

[REDACTED]
Marine Section
Donegal Co. Co.

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Dear [REDACTED]

A proposed sampling and analysis plan is detailed below to cover dredging at the Magheraroarty Pier and subsequent proposed beach nourishment nearby.

Three samples are recommended. You should give your contractor a copy of this plan. You will need to draw their attention especially to Section 3 and Section 4 to confirm that they are capable of meeting the quality assurance standards required.

If you need clarification on anything, please don't hesitate to contact me.

Best regards,

[REDACTED]
[REDACTED]
Marine Environment Chemist

1.0 Sample location and analyses required:

Three surface samples, as listed in Table 1 below) should be taken¹. Sample locations are also shown on the chart in Figure 1 at the end of this document.

Table 1. Locations and details of proposed samples

Sample No.	Depth	Longitude (° W)*	Latitude (° N)*	Parameters for analysis
1	Surface	-8.17377	55.14704	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
2	Surface	-8.17317	55.14765	1, 2, 3, 4a, 4b, 4c, 4f
3	Surface	-8.17268	55.14798	1, 2, 3, 4a, 4b, 4c, 4f

* Positions in decimal degrees, WGS84

2.0 Parameter Code:

1. Visual inspection, to include colour, texture, odour, presence of animals etc
2. Water content, density (taking into account sample collection and handling)
3. Granulometry including % gravel (> 2mm fraction), % sand (< 2mm fraction) and % mud (< 63µm fraction).
4. The following determinants in the sand-mud (< 2mm) fraction * :
 - a) total organic carbon
 - b) carbonate
 - c) mercury, arsenic, cadmium, copper, lead, zinc, chromium, nickel, lithium, aluminium.
 - d) Organochlorines:
 - HCH and γ-HCH (Lindane),
 - DDT metabolites (pp' DDT, pp' DDE, pp' DDD).
 - ICES 7 PCB congeners (to be reported as the 7 individual congeners - 28, 52, 101, 118, 138, 153, 180)
 - e) total extractable hydrocarbons.
 - f) tributyltin (TBT) and dibutyltin (DBT)
 - g) Polycyclic aromatic hydrocarbons (PAH) - Acenaphthene, Acenaphthylene, Anthracene, Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (ghi) perylene, Benzo (k) fluoranthene, Chrysene, Dibenz (a,h) anthracene, Flourene, Fluoranthene, Indeno 1,2,3 – cd pyrene, Naphthalene, Phenanthrene, Pyrene.
 - h) Toxicity tests (Microtox or whole sediment bioassay) using appropriate representative aquatic species. (This requirement will depend on the results of the chemical analyses.)

¹ Further sampling and analysis, at depth if necessary, may be required in the event that problem areas of heavy contamination are identified as a result of the initial testing.

**where the gravel fraction (> 2mm) constitutes a significant part of the total sediment, this should be taken into account in the calculation of the concentrations.*

3.0 Important notes:

- 3.1 The required detection limits for the various determinants are given in Table 2. below.
- 3.2 Details of the methodologies used must be furnished with the results. This should include sampling, sub sampling and analytical methods used for each determinant.
- 3.3 Appropriate marine CRM are to be analysed during each batch of analyses and the results to be reported along with sample results.
- 3.4 Blanks & in-house references to be run with each sample batch, and reported with sample results.

Table 2. Maximum limits of detection required

Contaminant	Concentration	Units (dry wt)
Mercury	0.05	mg kg ⁻¹
Arsenic	1.0	mg kg ⁻¹
Cadmium	0.1	mg kg ⁻¹
Copper	5.0	mg kg ⁻¹
Lead	5.0	mg kg ⁻¹
Zinc	10	mg kg ⁻¹
Chromium	5.0	mg kg ⁻¹
Nickel	5	mg kg ⁻¹
Total extractable hydrocarbons	10.0	mg kg ⁻¹
TBT and DBT (not organotin)	10	µg kg ⁻¹
PCB – individual congener	0.1	µg kg ⁻¹
OCP – individual compound	0.1	µg kg ⁻¹
DDT metabolite	0.1	µg kg ⁻¹
PAH – individual compound	10	µg kg ⁻¹

4.0 Reporting requirements

Reports should include the following information

- 4.1 Results of testing should be reported in EPA spreadsheet format, which can be found [here](#).
- 4.2 Spreadsheet results to include:
 - Tabulated geophysical/chemical test results
 - Clear expression of units
 - Indication of wet weight or dry weight basis
 - Location of samples in decimal degrees WGS84 (latitude/longitude).
 - Date of sampling
 - Treatment of samples and indication of sub sampling, compositing etc.
 - Summary method details
 - CRM results
 - QA /QC
 - Other quality assurance information (e.g. accreditation status)
 - Project details.
- 4.3 If determinant is not detected, report less than values, and indicate LoD/ LoQ used.
- 4.4 Testing laboratories may be asked to provide additional details of method performance including limit of detection, precision, bias



Figure 1. Sample positions at Magheraroarty Harbour