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Captain Martin Donnelly
Drogheda Port Company
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Co. Meath

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Re: Sampling and Analysis Plan – Drogheda Port Company

Dear Martin,

A proposed sampling and analysis plan is detailed below to cover dredging of the estuary at Drogheda Port. Seventeen samples along the river/estuary plus a sample in each of the active dumpsites are listed.

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

The EPA will specify additional sampling over the duration of the permit.

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

Best regards,

Margot Cronin
Marine Environment Chemist

Sample location and analyses required:

The following surface samples, as listed in Table 1 (below) should be taken¹. Sample locations for the estuary/river are also illustrated in Figure 1.

Table 1. Locations and details of proposed samples

Sample No.	Longitude (° W) *	Latitude (° N) *	Parameters for analysis
1	-6.34867	53.71368	1, 2, 3, 4a, 4b, 4c
2	-6.34765	53.71398	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
3	-6.34546	53.71445	1, 2, 3, 4a, 4b, 4c
4	-6.34072	53.71548	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
5	-6.33674	53.71647	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
6	-6.33588	53.71760	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
7	-6.33136	53.71768	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
8	-6.32787	53.71775	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
9	-6.32497	53.71878	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
10	-6.31018	53.71976	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
11	-6.30870	53.71919	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
12	-6.30672	53.72077	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
13	-6.30375	53.72092	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
14	-6.29117	53.72236	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
15	-6.26432	53.73202	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
16	-6.26124	53.73127	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
17	-6.23868	53.72144	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
18	Mid Dumpsite A1		1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g
19	Mid Dumpsite A2		1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g

* Positions in decimal degrees, WGS84

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.

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, PCBs (to be reported as the ICE Σ 7 CB congeners: 28, 52, 101, 118, 138, 153, 180) and DDT metabolites (pp'DDT, pp'DDE, pp'DDD).
 - 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.)

**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

Contaminant	Concentration	Units (dry wt)
Zinc	10	mg kg ⁻¹
Chromium	5.0	mg kg ⁻¹
Nickel	5.0	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:
 - 4.2.1 Tabulated geophysical/chemical test results
 - 4.2.2 Clear expression of units
 - 4.2.3 Indication of wet weight or dry weight basis
 - 4.2.4 Location of samples in decimal degrees WGS84 (latitude/longitude).
 - 4.2.5 Date of sampling
 - 4.2.6 Treatment of samples and indication of sub sampling, compositing etc.
 - 4.2.7 Summary method details
 - 4.2.8 CRM results
 - 4.2.9 QA /QC
 - 4.2.10 Other quality assurance information (e.g. accreditation status)
 - 4.2.11 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.

Dumping at Sea Analytical Requirements