SURFACE WATER MONITORING PLAN

Former Dickies Boatyard, Beach Road, Hirael, Bangor

Watkin Jones Ltd.

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CONTENTS

1 Introduction

1.1 This Surface Water Montiroing Plan (SWMP) has been prepared to accompany the Construction Environmental Management Plan (CEMP) in respect of the proposed raising of land levels at the former Dickies Boatyard, Beach Road, Hirael, Bangor.

2 Potential Sources of Pollution

2.1 The works proposed to be undertaken at the site has the potential to generate several sources of pollution. The following highlights these sources:

- run-off from exposed ground and materials stock piles;
- run-off from roads and haul routes;
- wheel cleaning operations;
- fuel storage; and
- leaking / vandalised equipment.

3 Reason to carry out regular environmental monitoring

3.1 Monitoring can help determine if construction works are having an impact on the water environment. This can help assess the effectiveness of pollution prevention measures and give early warning of pollution incidents so that corrective action can be taken.

4 Monitoring Programme

4.1 Monitoring essentials

4.1.1 Monitoring must be undertaken by a suitably competent person and should cover the following:

- Visual monitoring undertaken by competent person trained up in what to look at for and what to do in circumstances where the visual inspection is abnormal. Understands the implications to the receiving environment.
- QC MANAGER RESPONSIBLE FOR QC checks of monitoring and sampling activities
- Sampling undertaken by competently trained person and sent to Accredited laboratory for testing.

4.2 Types of monitoring to be undertaken:

Surveillance Monitoring

4.2.1 This represents the minimum long term monitoring regime that will be in place for the life time of the scheme. The results of the surveillance monitoring will also establish a baseline for water quality for the site, and enable an assessment of any long-term changes resulting from the development.

4.2.2 The surveillance monitoring will include sampling of the following basic parameters:

- Visual Inspection (e.g. for suspended solids and oil sheen);
- Biological Oxygen Demand;
- Chemical Oxygen Demand;
- pH;
- Total Dissolved Solids/Conductivity; and
- Temperature

4.2.3 The full suite of monitoring proposed will be subject to revision based on the findings of any investigations to characterise any potential contaminated land sources.

4.3 Operational monitoring

4.3.1 Additional short- to medium-term monitoring required for specific high risk activities, and will be predominantly used during the construction and decommissioning phases when higher risk activities may be carried out. The results of the operational monitoring can be used to demonstrate any localised changes resulting from specific activities or developments.

4.3.2 Increased monitoring will be carried out when higher risk activity being carried out. For example, this will include but not be limited to the following:-

- earthworks (e.g.excavations, bunding, soil stripping etc
- any discharge points e.g. from treatment ponds or welfare facilities
- temporary stockpiling of materials (inc. chemicals, oils, fuel and soils); and
- wheel washing.

4.4 Incident/investigation monitoring

4.4.1 Investigative monitoring takes place when an incident is identified through the surveillance monitoring, or during operational monitoring, where the water environment is known to have been impacted, but the cause of the incident is unclear.

4.4.2 The purpose of the investigative monitoring is to locate the cause(s) of the incident and trigger an incident response, including any remediation measures required.

4.4.3 The results of the investigative monitoring should allow the site operator and regulator to ascertain the magnitude of the incident and assess what affect it may have had on water quality and downstream receptors. As such, the investigative monitoring may remain in place as long as the incident continues and as long as its impacts are felt. The operator will liaise closely with the regulator throughout the process.

4.4.4 In the event of an incident, identified through the surveillance or operational monitoring, it will be necessary to confirm the origin, as well as its magnitude and the extent of any impact on the receiving environment through additional incident monitoring.

4.4.5 When an incident is identified at one of the surveillance monitoring points downstream, the upstream incident monitoring points are automatically sampled to trace the incident back to its source and to confirm the extent of the incident. Sampling from several points along the affected surface water (coast line), including upstream of any incident, will also allow for the magnitude of the impact and it's attenuation along the surveyed reach to be assessed.

4.4.6 Once the source of the incident has been confirmed, and a suitable response is underway, it will be necessary to continue incident monitoring to ensure the effectiveness of the remediation measures taken, and ensure there are no residual impacts.

4.4.7 The frequency, duration and sampling parameters of monitoring vary with dependant on the nature and extent of the incident that has occurred, and specialist advice will be sought where the incident includes the release of chemicals, fuels or oils into the marine environment, if the source of the incident cannot be found, or if the magnitude of the release is significant.

4.4.8 All incidents will be reported to the regulators and records of the cause, magnitude and remediation measures take, along with the monitoring regime and results, will be kept on site so that any patterns or repeats of similar incidents can be noted.

4.5 Decommissioning and Post decommissioning

4.5.1 Copy of all the monitoring records will be available for inspection and kept for 2 years following completion of the land raising operation.

4.6 Water quality monitoring

4.6.1 The operator proposes as a minimum visual (daily), on site testing (weekly) and samples sent to an accredited laboratory (quarterly) for the following parameters:

Daily

- Colouration (visual check for any discolouration)

Weekly

- Temp (deg C)
- pH
- Electrical Conductivity (S/cm)
- Dissolved Oxygen (mg/l or %)

Quarterly

- Chemical Oxygen Demand/Biological Oxygen Demand

4.6.2 Frequency will however be increased during the following events:

- in times of heavy rainfall ie >25mm/day;
- activity dependant ie if proposing higher risk to environment; and
- in the event of an incident / investigation.

5 Equipment

5.1.1 The equipment to be provided on site for monitoring purposes will be as follows:-

- temperature meter and probe;
- pH meter, including probe and calibration solutions;
- conductivity meter, including probe and calibration solutions;
- dissolved oxygen (DO) meter, including probe and calibration solutions;
- flow through cell including tubing and coupling attachments;
- beaker(s) for field measurements (where flow through cell not available);
- deionised or distilled water in rinse bottle;
- site plan showing monitoring locations; and
- monitoring point register (Recording sheets).

6 Surface water monitoring and/or Surface water discharge monitoring Plan

6.1 The following table provides a summary of the features that will be monitored and monitoring locations.

Monitoring point ref & location	Parameter	Source ie (marine water or SW discharge)	Limit	Monitoring frequency	Monitoring standard or method
	Discolouration/Silt	(MW or SW)	No visible trace	Daily*	n/a
	Temperature	(MW or SW)		Weekly*	n/a (on site probe)
	pH	(MW or SW)	Within range of pre-construction commencement of receiving surface water	Weekly*	Using on site kit
	DO (Dissolved Oxygen) % or mg/l	(MW or SW)	Within range of pre-construction commencement of receiving surface water	Weekly*	Using on site kit
	EC (electro-conductivity S/cm	(MW or SW)	Within range of pre-construction commencement of receiving surface water	Weekly*	Using on site kit
	COD	(MW or SW)	Within range of pre-construction commencement of receiving surface water	Quarterly*	Sent to accredited laboratory for testing
	BOD	(MW or SW)	Within range of pre-construction commencement of receiving surface water	Quarterly*	Sent to accredited laboratory for testing

* Frequency increased for the following:

- in times of heavy rainfall ie >25mm/day; and/or
- activity-dependant ie if proposing higher risk to environment in the event of an incident / investigation.