

TABLE OF CONTENTS

SECTION	PAGE
19.0 ENVIRONMENTAL MONITORING AND AFTER CARE MANAGEMENT PLANS.....	19-1
19.1 Environmental Monitoring.....	19-1
19.1.1 Introduction.....	19-1
19.1.2 Air.....	19-1
19.1.3 Noise	19-2
19.1.4 Groundwater Monitoring	19-2
19.1.5 Surface Water Monitoring	19-3
19.1.6 Archaeological Monitoring.....	19-5
19.1.7 Aftercare Management Plan	19-5
19.1.8 Landscape.....	19-6
19.1.9 Long Term Monitoring.....	19-6

LIST OF TABLES

Table 19.1	Proposed Groundwater Monitoring Platform
Table 19.2	Groundwater Monitoring Suite
Table 19.3	Surface Water Monitoring Suite

LIST OF FIGURES

Figure 19.1	Proposed Monitoring Locations
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19.0 ENVIRONMENTAL MONITORING AND AFTER CARE MANAGEMENT PLANS

Section 1 (Introduction), Section 6 (Site Setting) and Section 8 (Description of the Proposed Development) of the EIS should be referred to before reading this section.

19.1 Environmental Monitoring

19.1.1 Introduction

Environmental monitoring at the Facility and in its environs will be undertaken during the full life cycle of the Facility, including: prior to construction; during construction; while inert materials are being deposited; during the capping of the restored Site; during the closure period of the Facility; and in the post closure period. Monitoring will be carried out to check the environmental performance of the Facility (against the baseline for the Site) and to ensure compliance with conditions of the Waste Licence. The monitoring requirements of this Facility will be imposed by the EPA and contained in the Waste Licence. This monitoring programme will be included in the overall monitoring programme for the “Walshestown Restoration Project”.

The environmental monitoring will include water quality, both chemical and biological, in local streams; groundwater quality; and noise levels and dust fall at the Facility boundary and at sensitive receptors.

Monitoring will be carried out by suitably qualified persons, and samples will be analysed at an accredited laboratory. Monitoring equipment will be calibrated when required and records maintained by the Licensee. Monitoring schedules will be contained in the Environmental Management Plan to be reviewed as part of the Environmental Management System (EMS).

A description of the environmental monitoring programme that is proposed during the active part of the life of the Facility is described in the sections which follow. The Long Term Monitoring Plan (post closure) will be developed during the active life of the Facility based on the results of monitoring carried out up to that point. The short term and long-term monitoring will include air, noise, groundwater and surface water.

19.1.2 Air

Six dust monitoring locations were used in the EIA baseline assessment stage of the project (Figure 19.1). It is proposed that these locations be used for monitoring of dust fall as measured by the Bergerhoff dust gauges during the construction, operation and closure period of the Facility, and until all areas on the site are restored with a vegetative cover. Bi-annual monitoring of ambient air is proposed at the Facility boundary and at select potential local receptors.

19.1.3 Noise

Six noise monitoring locations were used in the EIA baseline assessment stage of the project, and will continue to be used for compliance monitoring throughout the life of the project (Figure 19.1). It is proposed to undertake bi-annual noise monitoring at the Site, which will be in compliance with a Waste Licence for the Facility once granted.

19.1.4 Groundwater Monitoring

It is essential to monitor groundwater beneath and adjoining the Site for quality to ensure that the proposed development is operating as expected and to observe and record potential changes in the groundwater chemistry. This will allow for future calibration and refinement of the current groundwater and surface water impact assessment models.

It is proposed to carry-out groundwater monitoring during the life of the restoration works bi-annually (discussed below) both up-hydraulic gradient and down-hydraulic gradient. Nine existing groundwater monitoring locations, which are proposed to be retained for ongoing monitoring, are depicted in Figure 19.1 and listed in Table 19.1. Two existing boreholes, BH5 07 and BH6 07, will be removed during Site establishment. In addition to the above nine, four new boreholes will be installed in the overburden in 2009.

Table 19.1 provides details of the groundwater monitoring platform for the proposed development.

Table 19.1: - Proposed Groundwater Monitoring Platform

Borehole Location	Status
BHBally	Existing
BHLawlor	Existing
BHA	Existing
BH1-07	Existing
BH2-07	Existing
BH3-07	Existing
BH4-07	Existing
BH5-07	To be removed during Site establishment
BH6-07	To be removed during Site establishment
BH7-07	Existing
BH8-07	Existing
BH9-09	Proposed
BH10-09	Proposed
BH11-09	Proposed
BH12-09	Proposed

Any further locations lost as a result of the proposed restoration activities will be replaced, in consultation with the EPA.

It is proposed to monitor the water level in all boreholes on a bi-annual basis from the present up until three years following completion of all elements of the proposed restoration activities. The boreholes will be sampled biannually in accordance with the suite detailed in Table 19.2.

19.1.5 Surface Water Monitoring

It is essential to monitor the surface water features in the vicinity of the Facility and leaving the Facility for quality and flow rates to ensure that the proposed development is operating as expected and to observe changes and overall improvements in chemistry. In the context of the proposed Facility the two surface water monitoring points proposed on Figure 19.1 (ST01 and ST02) are deemed suitable.

It is proposed to measure surface water flow and sample surface water quality on a bi-annual basis from present up until three years following completion of all elements of the proposed restoration plan. Flow measurements and water quality sampling may reduce in frequency after this time.

The water quality parameters should be in accordance with the suite detailed in Table 19.3.

It is also proposed to carryout biological sampling of the stream feature to the north of the Site on an annual basis for the lifetime of the project, including prior to works commencing. The stream will be rated using the established Q-rating methodology adopted by the EPA.

Table 19.2: Groundwater Monitoring Suite

Determinant	Units
Groundwater Level	M AOD
<i>Chemical Composition Indicators</i>	
Dissolved Oxygen	mg/l
BOD	mg/l
COD	mg/l
Electrical Conductivity	µS/cm
pH	-
<i>Major Ions</i>	
Alkalinity (CaCO ₃)	mg/l
Calcium	mg/l
Chloride	mg/l
Magnesium	mg/l
Nitrate	mg/l
Potassium	mg/l
Sodium	mg/l
Sulphate	mg/l
Nitrate as NO ₃	mg/l
Nitrite as NO ₂	mg/l
<i>List I Substances</i>	
Cadmium	µg/l
Mercury	µg/l
<i>List II Substances</i>	
Ammoniacal Nitrogen	mg/l
Aluminium	µg/l
Arsenic	µg/l
Barium	µg/l
Chromium	µg/l
Iron	µg/l
Lead	µg/l
Manganese	µg/l
Nickel	µg/l
Zinc	µg/l

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Table 19.3: - Surface Water Monitoring Suite

Determinant	Units
Surface Water Flow	l/s or m ³ /d
<i>Chemical Composition Indicators</i>	
BOD	mg/l
COD	mg/l
Electrical Conductivity	µS/cm
pH	-
<i>Major Ions</i>	
Alkalinity (CaCO ₃)	mg/l
Calcium	mg/l
Chloride	mg/l
Magnesium	mg/l
Nitrate	mg/l
Potassium	mg/l
Sodium	mg/l
Sulphate	mg/l
Nitrate as NO ₃	mg/l
Nitrite as NO ₂	mg/l
<i>List I Substances</i>	
Cadmium	µg/l
Mercury	µg/l
<i>List II Substances</i>	
Ammoniacal Nitrogen	mg/l
Aluminium	µg/l
Arsenic	µg/l
Barium	µg/l
Chromium	µg/l
Iron	µg/l
Lead	µg/l
Manganese	µg/l
Nickel	µg/l
Zinc	µg/l

19.1.6 Archaeological Monitoring

A qualified archaeologist will be present during the stripping of any soils which were previously undisturbed.

19.1.7 Aftercare Management Plan

It is expected that the restored Site will be subject to a Waste Licence for a short period of time after the facility closes and until the EPA agrees to the surrender of the Licence. An Aftercare Management Plan will be developed in detail following the grant of the Waste Licence, and will relate to any engineering requirements; the landscape (maintenance of hedgerows, grass swards etc); and monitoring of emissions and the local environment.

19.1.8 Landscape

The objective of the restoration and re-vegetation of the Facility is to create species-rich habitats of value to local wildlife, whose species composition reflects, as far as is feasible, the character of similar semi-natural habitats in the vicinity of the Site.

The planned restoration makes provision for the retention and enhancement of existing habitats, together with the creation of new diverse areas. The long-term management objectives for each habitat type, and specific actions being undertaken, follow below:

- The scrub and hedgerows along the borders of the Site will be retained, to maintain connectivity with the wider landscape;
- The majority of the Site will be managed through light grazing for the creation of a species-diverse, semi-natural grassland with a mosaic of bare patches throughout;
- Wet grassland area adjoining the proposed water features to be created for lapwing and snipe;
- The creation of a linear water feature along the western edge of the Site with surrounding vegetation and woodland to increase its attractiveness to wildlife;
- Tramping tracks around the edge of the Site for pedestrian access through enhancement of the existing 'Pilgrim's Walk', and interpretative signs to be installed at the Site;
- The filling-in of the lagoon to the south of the quarry area will be carried out between 1 September and 1 March, i.e. outside the bird nesting period; and
- Any vegetation removal will be carried out between 1 September and 1 March, i.e. outside the bird nesting period.

In order to ensure successful implementation of the restoration plan, periodic monitoring by an ecologist is recommended in order to assess the success of the remedial works and restoration plan for this Site. The ecologist should produce a report suggesting amendments to the plan where needed.

19.1.9 Long Term Monitoring

The Long Term Monitoring Plan (post-closure) will be developed during the active life of the Facility based on the results of monitoring carried out up to and including that point. The Long Term Monitoring Plan will be reviewed and agreed annually with the Agency.