
DRAFT

AGB HOLDINGS
BALLYNAGRAN LANDFILL LTD
DOOLBEG CROSS Co WICKLOW
A67XF83

Fingleton White
Bridge Street Centre
Pontoniss
Co. Laois
R32 W0CC
Ireland
T:(00353)(0)57 866 5400
www.fingleton.ie

# BALLYNAGRAN

PIPE ROUTE

1371-DG-003 0
sheet 1 of 1

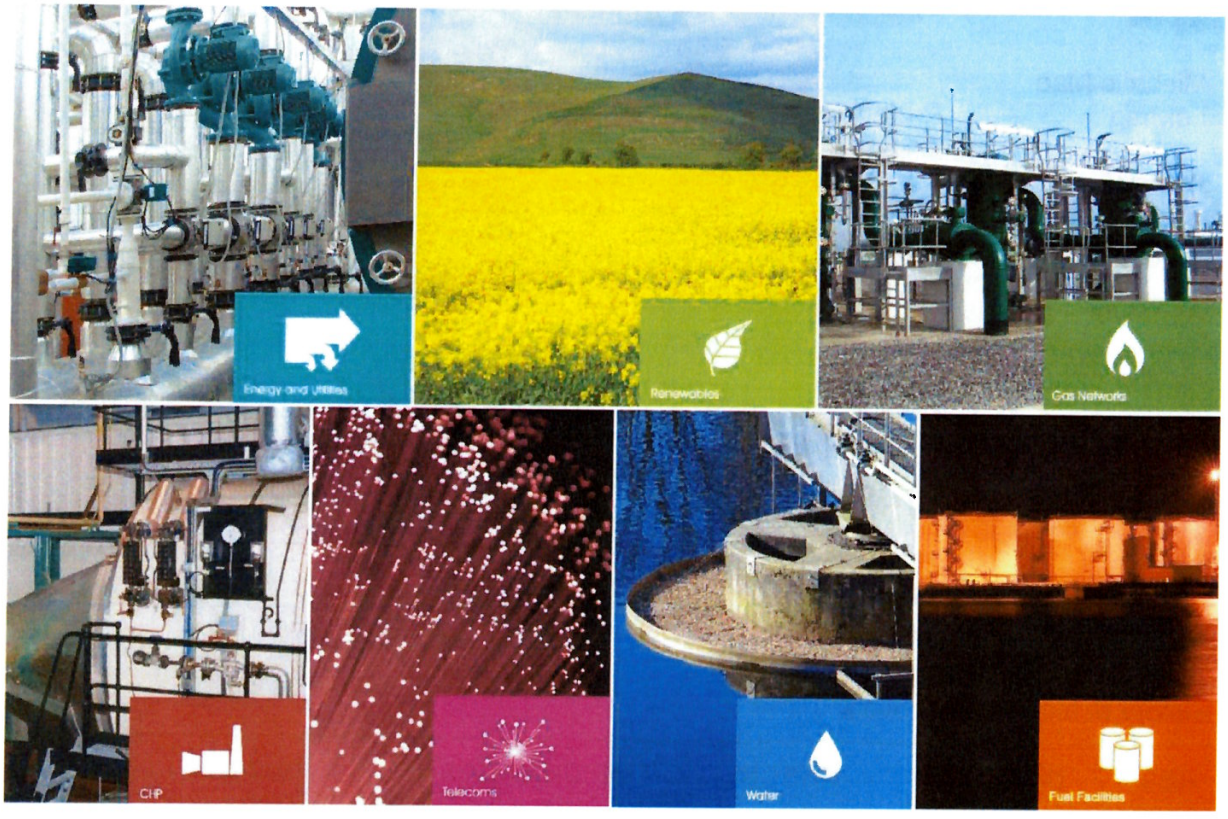
# Appendix B

## Fingleton White Project Description

Fingleton White

# AGB Landfill Holdings Ltd.

## Ballynagran Sewer Connection Project Overview



| | |
|---|---|
| CLIENT | AGB Landfill Holdings Ltd. |
| PROJECT | Ballynagran Landfill Connection to Sewer |
| CLIENT PROJECT NO. | N/A |
| TITLE | Ballynagran Sewer Connection Project Overview |
| DOCUMENT NO. | 1371-RG-0006 Revision R0 |

REVISION NO: 0 PURPOSE: ISSUE

| Name | Position | Signature | Date |
|---|---|---|---|
| Michelle Mac Lennan<br>Author | Project Design Engineer | Michelle Mac Lennan | 11.04.2024 |
| Stephen Morrin<br>Approver | Associate Director | Stephen Morrin | 11.04.2024 |
| Kevin Fortune<br>Approver | Director | | 11/4/2024 |

History of Issues / Approvals

| REV | DATE | DESCRIPTION OF CHANGES | FILE NO. |
|---|---|---|---|
| | | | |
| | | | |

# Table of Contents

# 1 Introduction

## 1.1 Background

Ballynagran Landfill Ltd. are responsible for operating the landfill until March 2026, while the landfill continues to accept waste. AGB Landfill Holdings Ltd. are responsible for the aftercare and maintenance of the landfill after the landfill stops accepting waste. AGB Landfill Holdings Ltd. has appointed Fingleton White to carry out engineering services for a proposed wastewater connection to transport permeate originating from Ballynagran Landfill to the Uisce Éireann wastewater system in Wicklow.

## 1.2 Motivation

Ballynagran Landfill is generating approximately 23,000 $m^3$ per annum of leachate (2018: 22,577$m^3$; 2019: 28,147$m^3$, 2020:20,834 $m^3$, 2021: 20,061 $m^3$). The landfill is currently projected to be in operation until the March 2026. When closed the landfill will continue to generate approximately 8,000 $m^3$ of leachate per annum.

This project does not alter the nature of the landfill or quantity of leachate produced. The motivation for this project is to reduce carbon emissions by removing tankers from Irish roads as at present the leachate is removed from Ballynagran Landfill by up to a maximum of six tankers daily to the treatment plant in Ringsend, Co. Dublin, 50 km away.

The wastewater connection will remove up to 8,000 HGVs from the road network and reduce carbon emissions by an estimated 2,691 $tCO_2$ over the life of the landfill. AGB Landfill Holdings Ltd. would like to deliver these environmental benefits and complete the connection as soon as possible.

# 2 Project Details

## 2.1 Uisce Éireann

A wastewater connection offer was received from Uisce Éireann in September 2023 and signed and finalised in December 2023. See connection agreement in APPENDIX A. The agreed connection point is located at GPS position 52.967, -6.062, approx. 6 m from the existing network, on the R751 Ballynerrin Upper. See Figure 1.

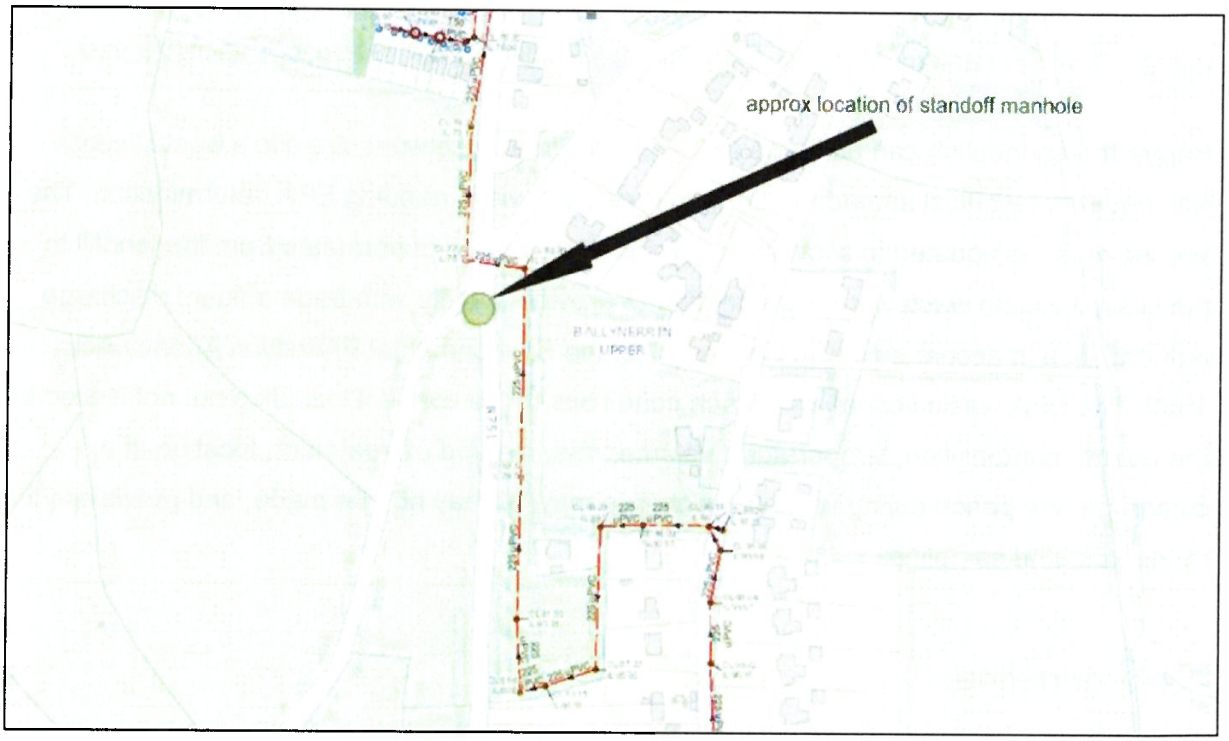



Figure 1: Uisce Éireann Connection Point

Since receiving the connection offer and confirmation of the connection location, Fingleton White is developing the design including route drawings and hydraulic models in line with the conditions of the connection offer. There will be ongoing communication and review by Uisce Éireann throughout the design and construction process to ensure the connection meets their requirements.

## 2.2 Permeate Discharge to Sewer

### 2.2.1 Reverse Osmosis Plant

A Reverse Osmosis (RO) plant is already installed at Ballynagran Landfill and the leachate from the landfill will be processed by this RO plant. The RO plant produces a maximum of 90 $m^3$ of permeate per day. The permeate will be stored in the site's existing 261 $m^3$ permeate holding tank. The proposed pipeline will discharge this permeate from site through a rising main to the Uisce Éireann wastewater network.

### 22.2 EPA Trade Effluent Discharge Authorisation and Limitations

Before the connection can be made to the Uisce Éireann network, the site's waste licence will require a technical amendment or a full licence review, pending EPA determination. The licence must be updated to allow for the pumped discharge of permeate from the landfill to the Uisce Éireann wastewater network and to provide the site with trade effluent discharge authorisation in accordance with Section 97 of the Environmental Protection Agency Act, 1992. The EPA waste licence will attach conditions to the consent including but not limited to the nature, composition, temperature, volume, rate, method of treatment, location of a discharge, the period during which a discharge may, or may not, be made, and provisions for monitoring and sampling.

## 2.3 Pipeline

### 2.31 Route

AGB Landfill Holdings intend to construct a pipeline to transport the permeate from Ballynagran Landfill to the agreed Uisce Éireann connection point. This pipeline will be approximately 4 km in length, running in the public road and verge, where possible, and will cross the M11 between the landfill site and the Uisce Éireann connection point. Refer to APPENDIX B for route drawing.

The location of the landfill site is (52.954247, -6.105508) and the location of the agreed Uisce Éireann connection point is (52.967, -6.062). The pipeline route is highlighted in Figure 2.


Figure 2: Indicative Pipe Route at Ballynagran Landfill, Coolbeg, Wicklow

### 2.3.2 M11 Motorway Crossing

Fingleton White is in ongoing communication with TII regarding the M11 crossing. There is an existing pipe corridor under the footpath in the bridge deck, with an existing section of unused HDPE pipe terminating either side of the bridge. At this stage, it is expected trenchless techniques will not be required under the M11.

### 2.3.3 Ownership and Maintenance of Pipeline

As per the connection agreement with Uisce Éireann, the pipework constructed by Ballynagran Landfill Ltd will not be vested in Uisce Éireann and shall remain the responsibility of Ballynagran Landfill Ltd. The ownership, maintenance, repair, or renewal of the pipework is the sole responsibility of Ballynagran Landfill Ltd.

After the landfill stops accepting waste in March 2026 either the site's EPA waste licence W0165-02 will transfer to AGB Landfill Holdings, or AGB Landfill Holdings will takeover Ballynagran Landfill Ltd. The EPA are aware of this arrangement.

As part of the waste licence, EPA authorisations require closure plans, restoration/aftercare plans (e.g. RMPs, DMPs, CRAMPs) and environmental liabilities risk assessments (ELRAs) to be prepared to the satisfaction of and agreed with the EPA. The objective of the CRAMP is to ensure that the facility is closed and decommissioned in a manner that does not give

rise to environmental pollution and to identify the need for and extent of any post closure monitoring and aftercare. AG BLandfill Holdings Ltd. assumes the EPA Closure Restoration and Aftercare Management (CRAMP) liabilities for Ballynagran Landfill.

### 2.3.4 Pipe Material

The rising main will be of polyethylene material in accordance with Irish Water Code of Practice for Wastewater Infrastructure. The pipework and fittings will comply wit hthe requirements of IS EN 12201. Polyethylene fittings, including fusion joints and electro-fusion fittings, shall comply with the provisions of IS EN 12201 – Part 3.

### 2.3.5 Ppe Size, Pumping Hours, and Flow Rate

An assessment was carried out to determine the optimum pipe size fo rthe proposed application, considering the recommended velocities, pressure drop, required pump head and flowrates. The pipe will be 110 mm PE80 SDR11 pipe, as agreed with Uisce Éireann.

The system is designed to have a velocity of 0.9 m/s in accordance with Irish Water's Code of Practice and IS. EN 16932-2:2018 self-cleansing velocities. This velocity corresponds to a flow rate of 20.7 $m^3$/hr for a 110 mm pipe. It has been agreed with Uisce Éireann to pump 4 nights per week for 7.6 hours per night.

A further review and approval of the pipeline design willbe performed by Uisce Éireann before the pipeline can be constructed and connection made to the Uisce Éireann ne twork.

Table 1: Required Discharge Flow

| Discharge Flow Rates | | |
|---|---|---|
| Peak Daily Flow into Permeate Tank | 90 $m^3$/day | Limited by Reverse Osmosis Plant. Assuming RO plant running 24 hours |
| Peak Weekly Flow into Permeate Tank | 630 $m^3$/week | Assuming RO plant is running 7 days, 24 hours |
| Peak Hourly Flow | 20.7 $m^3$/hr | Flow rate to meet cleansing velocity in 110 mm pipe |

| | | |
|---|---|---|
| Pumping Hours per Week | 30.4 hr | Assuming 4 nights, 7.6 hours of pumping. |

## 2.4 Proposed Programme for Works

Completion of connection expected in Q4 2024, completed in advance of the landfill ceasing operation in Q1 of 2026. The programme is subject to the Uisce Éireann review process, an Bord Pleanála review of planning exemption, EPA licence amendment/review and Road Opening Licences.

APPENDIX A: Uisce Éireann Connection Agreement

Michelle MacLennan
C/O Stephen Morrin
Fingleton White
Unit 21,
Beckett Way,
Park West Business Park.
D12C9YE

**Uisce Éireann**
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

**Irish Water**
PO Box 448,
South City
Delivery Office,
Cork City.

**www.water.ie**

## CONNECTION OFFER

To: Ballynagran Landfill LTD
Coolbeg Cross
Wicklow
A67KF53
(the "**Customer**")

Our Ref: **CDS2200803901**

Connection Agreement – Ballynagran Landfill Ltd, Coolbeg Cross,, Wicklow

Date: 1 September 2023

## SUBJECT TO CONTRACT

Dear Applicant,

**Outcome of your Connection Application - Summary**

## We have completed the review of your Connection Application.

Irish Water has reviewed your application for connection(s) to the Network(s). Based upon the details provided by you, Irish Water can offer you a connection(s) in accordance with the terms of this Connection Offer.

## Where can you find more information?

You can find more information about the terms of your Connection Offer in this **Connection Offer letter** and enclosures. Please read this Connection Offer letter and the following enclosed documents, in particular:

- General Conditions (Appendix 2)
- Special Conditions (Appendix 3)

If you have any queries in relation to this Connection Offer, please contact our Customer Service Department at:

**Telephone:** 1800 278 278 or +353 1 707 2828

**Email:** newconnections@water.ie

**Web:** www.water.ie/contact-us

## Next Steps[1] to proceed with this Connection Offer:

- Sign and return the Letter of Acceptance (see attached)
- Pay the Connection Charge (see Section 3(a) below)

You have **90 days** from the date of this Connection Offer to accept the offer.

**Please note that Quotable Charges for the cost of completing any additional, non-standard, works required to facilitate connections are based on rates which are due to be revised shortly.**

**If you do not accept a Connection Offer within the acceptance period specified, any Quotable Charges within your Connection Offer may be subject to updated rates which could result in an increased Connection Charge.**

If you wish to proceed with this Connection Offer, please complete the Next Steps listed above.

Yours sincerely

Yvonne Harris

**Yvonne Harris**
**Head of Customer Operations**

[1] The purpose of this list is to draw particular attention to the key deliverables in the Connection Agreement. Developers are required to adhere to all requirements specified in the Connection Agreement.

**Outcome of your Connection Application - Details**

**Providing a connection between the:**

Wastewater Works
(the "**Network(s)**")

**AND**

**The development located at Ballynagran Landfill Ltd, Coolbeg Cross,, Wicklow**
(the "**Customer's Premises**")

Following receipt of your application for a connection to the Network(s) (the "**Customer Application**"), Irish Water is pleased to offer you ("**You**" or the "**Customer**"), a connection between the Network(s) and the Customer's Premises, subject to and in accordance with the conditions set out in this Connection Offer (the "**Connection Offer**"), the General Conditions for a Water and/or Wastewater Connection (the "**General Conditions**", copy attached in Appendix 2) and any Special Conditions pertaining to this connection (the "**Special Conditions**", as may be attached in Appendix 3).

This Connection Offer is conditional upon payment of the Connection Charge and the return of the signed Letter of Acceptance (the form of which is included at Appendix 1 to this Connection Offer).

(Please note that capitalised terms not otherwise defined within this Connection Offer shall have the meaning given to them in the General Conditions)

## 1. Connection Agreement

We enclose a Letter of Acceptance for your consideration.

We would encourage You to read the entirety of this Connection Offer and the Connection Agreement. If You are satisfied with these and wish to proceed, please:

- sign the Letter of Acceptance and return it to **Irish Water, PO Box 860, South City Delivery Office, Cork City**. Alternatively, You can send back a scanned version of the signed Letter of Acceptance to newconnections@water.ie; and
- pay the Connection Charge in accordance with section 3 below.

You and Irish Water acknowledge that there shall be no intention to create any legally binding contract between You and Irish Water unless and until You have completed the above steps.
If, in the opinion of Irish Water, You have not returned the Letter of Acceptance or paid the Connection Charge, no contract shall come into force.

Once the signed Letter of Acceptance has been returned and the Connection Charge has been paid, the Connection Agreement shall become legally binding on You and Irish Water and the Connection Works can be carried out. The Connection Agreement is comprised of this Connection Offer, the General Conditions and any Special Conditions. In the event of any conflict or inconsistency between these documents, they shall apply in the following order:

i. Special Conditions
ii. General Conditions
iii. Connection Offer.

Any decision by Irish Water to enter into a Connection Agreement with You is made in reliance on the information in and with Your Customer Application. If the information supplied is incorrect or incomplete, Irish Water reserves the right to apply additional Connection Charges and contract terms.

Irish Water's decision to make a Connection Offer to You is made in reliance on the information contained in and submitted with the Connection Application. If the information supplied is incorrect or found to be materially inaccurate in any way, Irish Water reserves the right to apply additional Connection Charges, to impose additional contract terms and/or take any steps in accordance with the General Conditions.

This Connection Offer is based on a high-level desk top analysis carried out by Irish Water on the feasibility of a connection for your Development. Once the Connection Offer has been accepted by You, Irish Water will begin a detailed design of the connection. If during the process of detailed design Irish Water, at its discretion, forms the opinion (acting reasonably) that either:

A. a connection to your Development is not feasible or practicable or safe to complete; or
B. a connection to your Development would involve the expenditure by Irish Water of monies in excess of that provided for by way of the Connection Charge,

then the Connection Agreement may be terminated by Irish Water in accordance with General Condition 18.

The Connection Agreement shall constitute the entire agreement between You and Irish Water.

Any reference in this Connection Offer to an Appendix is to an appendix to this Connection Offer.

## 2. Validity of Connection Offer

You have 90 days from the date of this Connection Offer to accept the Connection Offer by returning the Letter of Acceptance **and** paying the Connection Charge. Thereafter, the Connection Offer shall lapse unless otherwise agreed in writing by Irish Water.

## 3 Connection Charge

The Connection Charge(s) shall be determined in accordance with Irish Water's Connection Charging Policy as set out in the Water Charges Plan (which can be found at www.water.ie/connections)

The Wastewater Connection charge is €23,344.00

The Total Connection Charge is €23,344.00 ("**Connection Charge**"). A breakdown of the Connection Charge is set out in Appendix 4.

Payment of the Connection Charge can be made by:
A. Cheque, made payable to "Irish Water" or
B. Money Transfer, by EFT to the following bank account:

Allied Irish Bank, 40/41 Westmoreland Street, Dublin 2, Ireland.

| Account Name | BIC | IBAN |
|---|---|---|
| IW AR-EFT | AIBKIE2D | IE29 AIBK 9333 8464 3085 94 |

Please note that You must quote the Irish Water reference number specified above in any communications and when making payment (see 'Our Reference' on the first page of this letter). The Connection Charge will only be deemed paid when funds have cleared in Irish Water's bank account.

## 4. Connection Works

Once the Connection Offer has been validly accepted, Irish Water or its agent shall make contact with You to schedule the Connection.

## 5. Distribution System, Drains and Service Connection

You are responsible for providing, maintaining and renewing the Distribution System and/or Drains and Service Connection required for the provision of Water Services (see General Condition 10).

## 6. Cancellation by the Customer

You may cancel the proposed Connection by writing to Irish Water at the contact address set out below within fourteen (14) Business Days of returning the Letter of Acceptance:

- noting that you wish to cancel the Connection; and
- quoting the reference number set out above (see 'Our Reference' on the first page of this letter);

No charges will be incurred by You unless the Connection or part thereof has already been carried out with your agreement. If You cancel the Connection in accordance with this paragraph, Irish Water will refund any payment which You have already made for the proposed Connection, subject to any costs that may have already been incurred by Irish water in the provision of the Connection.

## 7. Queries

If You have any queries in relation to the payment of the Connection Charge or otherwise, please contact Irish Water's Customer Service Department at:

Telephone: 1800 278 278 or +353 1 707 2828
Email: newconnections@water.ie
Web: www.water.ie/contact-us

## 8. Disputes

Any dispute in respect of the terms of this Connection Offer (including in relation to the Estimate of Connection Costs) may, upon your application, be referred to the Irish Water

complaints process. Details of the Irish Water Complaints Process are available on the Irish Water website.

Once a legally binding Connection Agreement is entered into, all disputes in relation to your agreement with Irish Water shall be resolved pursuant to General Condition 30.

## 9. Next Steps

- **Accepting the Offer**: sign and return the Letter of Acceptance and pay the Connection Charge.
- **Customer Construction Phase**: If required, Irish Water or its agent will contact You in relation to the connection assets required to facilitate your connection to the Network(s).
- **Connection to Network(s)**: Irish Water or its agent will contact You to arrange a suitable time to complete the Connection Works.

## Appendix 1

## Letter of Acceptance

**Letter of Acceptance**

**[to be returned to Irish Water]**

Irish Water

PO Box 860

South City Delivery Office

Cork City

I/we have read, understood, accept and agree to comply in full with the terms of the Connection Offer dated 30 August 2023, the General Conditions and any Special Conditions (which together constitute the Connection Agreement).

I/we further understand and acknowledge that there shall be no intention to create any legally binding contract between me/us and Irish Water unless and until I/we have completed, signed and returned this Letter of Acceptance and paid the Connection Charge.

I/we have made payment for Connection Reference CDS2200803901 via

Electronic Funds Transfer EFT ☐
Cheque ☐

Customer address: _____

Customer's signature: _____

For and on behalf of: _____

Print full name of Customer in BLOCK letters: _____

Date: _____

Connection Reference: CDS2200803901

## Letter of Acceptance

## [Customer Copy]

[to be retained by Customer]

I/we have read, understood, accept and agree to comply in full with the terms of the Connection Offer dated 30 August 2023, the General Conditions and any Special Conditions (which together constitute the Connection Agreement).

I/we further understand and acknowledge that there shall be no intention to create any legally binding contract between me/us and Irish Water unless and until I/we have completed, signed and returned this Letter of Acceptance and paid the Connection Charge.

I/we have made payment for Connection Reference CDS2200803901 via

Electronic Funds Transfer EFT ☐
Cheque ☐

Customer address: _____

Customer's signature: _____

For and on behalf of: _____

Print full name of Customer in BLOCK letters: _____

Date: _____

Connection Reference: CDS2200803901

**APPENDIX 2**

## General Conditions

IRISH WATER

General Conditions for a Water and/or Wastewater Connection

(Version 0.2)

February 2019

## General Conditions for a Water and/or Wastewater Connection (the "General Conditions")

1. **Definitions:** In these General Conditions the following definitions apply:

"**Affiliate**" of a Person means any subsidiary or holding company (within the meaning given to such expressions by the Companies Act 2014) of such Person or any subsidiary of any such holding company;

"**Applicable Law**" means all Acts of the Oireachtas, statutory instruments, regulations, orders and other legislative provisions which in any way relate to the Connection Agreement, including the Water Services Acts, the Building Regulations, the Construction Regulations and any code or guidance as may be issued from time to time by any Regulator or relevant industry authority. Any reference to "Applicable Law" or any enactment or statutory provision is a reference to it as it may have been, or may from time to time be amended, modified, consolidated or re- enacted;

"**Building Regulations**" mean the Building Control Acts 1990 to 2014 and all subordinate legislation and regulations made pursuant to the said Acts including, without limitation the Building Control Regulations 1997 to 2017 and relevant codes of practice, and any amendment, update or replacement or repeal thereof;

"**Business Day**" means every day other than a Saturday or Sunday or bank or public holiday in Ireland;

"**Competent Authority**" means any local or national or supra-national agency, authority, department, inspectorate, ministry, official or public or statutory Person (whether autonomous or not) or regulatory authority of Ireland or of the European Union which has jurisdiction over any of the Parties to the Connection Agreement and the subject matter of the Connection Agreement, including the Commission for Regulation of Utilities but excluding a court or tribunal of competent jurisdiction;

"**Connection Charging Policy**" means the Irish Water Connection Charging Policy which may be found at www.water.ie/connections;

"**Connection Offer**" means the conditional offer letter issued by Irish Water to the Customer relating to the connection of the Customer's Premises to the Network(s) and which forms part of the Connection Agreement;

"**Connection Agreement**" means the agreement between the Customer and Irish Water to facilitate the connection of the Customer's Premises to the Network(s), which shall be comprised of the Connection Offer (including the appendices thereto), the General Conditions and the Special Conditions (if any);

"**Connection Charge**" means the charge for connecting to the Irish Water Waterworks and/or Wastewater Works (as the case may be), as specified in the Connection Offer. The Connection Charge shall only be deemed paid when funds have cleared in Irish Water's bank account;

"**Connection Facilities**" means the facilities (including the Service Connection(s)) required to be constructed and/or upgraded and installed by Irish Water in order to connect the Customer's Pipe Work to the Network(s);

**"Connection Point(s)"** means a location or locations to be determined by Irish Water (which may be outside the boundary to the curtilage of the Customer's Premises) at which the Customer's Pipe Work is to be connected to the Waterworks (where, as specified in the Connection Offer, the Customer requires connection to the Waterworks) or the Wastewater Works (where, as specified in the Connection Offer, the Customer requires connection to the Wastewater Works) (via the Service Connection(s)). Connection Points may differ for both the Waterworks and Wastewater Works;

**"Connection Works"** means the permanent and temporary works and services to be performed by or on behalf of Irish Water in the acquisition, design, procurement, construction and installation of the Connection Facilities and the obtaining of permits and the tie-in and commissioning of a Connection Point(s) in accordance with the requirements of this Connection Agreement;

"**Construction Regulations**" means the Safety Health and Welfare at Work Act 2005, the Safety Health and Welfare at Work (General Application) Regulations 2007 to 2016 as amended, the Safety Health and Welfare at Work (Construction) Regulations 2013 as amended and any guidance requirements issued from time to time from the Health and Safety Authority;

**"Customer"** means the person or entity to whom the Connection Offer is addressed and who has entered into the Connection Agreement with Irish Water;

**"Customer's Pipe Work"** means the pipe, relating fittings and associated accessories to be laid by the Customer within the boundary of the Customer's Premises in accordance with Relevant Standards and Applicable Laws, , and the Distribution System (if connecting to the Waterworks) and the Drain (if connecting to the Wastewater Works), to be used to connect the Customer's Premises at a Connection Point;

**"Customer's Premises"** means the premises identified as such in the Connection Offer, including any part of any public or private building, vessel, vehicle, structure or land (whether or not there are structures on the land and whether or not the land is covered with water), and any plant or related accessories on or under such land, or any hereditament of tenure, together with any out-buildings and curtilage and which is:

- receiving Water Services; or

- specified in an application for Water Services completed by the Customer; or

- a premises deemed to be a premises by Irish Water; or

- such other premises as may be notified by the Customer to Irish Water and

accepted in writing by Irish Water from time to time, but does not include land which is a Public Road, a road which is the subject of an order under Section 11 of the Roads Act 1993 or a road which has been taken in charge by a local authority pursuant to a non-statutory local authority taking in charge scheme;

**"Deed(s) of Grant of Wayleaves and Easements"** means the Deed(s) of Grant of Wayleaves and Easements referred to in Clause 10 hereof;

"**Dispute**" means a difference or dispute between the Parties arising out of or in connection with this Connection Agreement;

**"Distribution System"** means a pipe and its related fittings, that is used or to be used as the case may be to convey water into or through one or more Customer's Premises (including any related internal or external taps) excluding a Service Connection;

**"Drain"** means a drainage pipe, or system of such pipes and related fittings for collection of Wastewater, that is not owned by, vested in or controlled by Irish Water, and that is not a Service Connection, which is used or to be used as the case may be, to convey Wastewater from one or more Customer's Premises or to any wastewater treatment system on a Customer's Premises where the Wastewater is generated;

"**Environment**" means the environment generally, including all physical, biological and ecological aspects of the environment and:

(a) air, including that within buildings or natural or man-made structures above or below ground;

(b) water, including the open sea, coastal or inland waters, ground waters, aquifers, drains and sewers;

(c) land, including the seabed or riverbed under any water as described above, and any surface land and sub-surface land; and

(d) human and animal health, and plant life;

"**Environmental Law**" means any statute or common law, or other requirement having the effect of law, in Ireland relating to the Environment, including without limitation the provisions of the Water Services Acts and Local Government (Water Pollution) Acts 1977 to 2007;

"**Environmental Protection Agency**" means the Environmental Protection Agency established pursuant to the Environmental Protection Agency Act, 1992;

**"Force Majeure"** means any event not within the reasonable control of a Party and which could not have been prevented or the consequences of which could not have been prevented by a Party acting and having acted as a Reasonable and Prudent Operator and which has the effect of preventing a Party from complying with its obligations under this Connection Agreement, including:

- acts of terrorists;

- war declared or undeclared, blockade, protest, revolution, riot, insurrection, civil commotion, invasion or armed conflict;

- sabotage or acts of vandalism, criminal damage or the threat of such acts;

- extreme weather or environmental conditions including drought, extreme storms, lightning, fire, landslip, accumulation of snow or ice, natural disasters and phenomena including meteorites, the occurrence of pressure waves caused by aircraft or other aerial devices travelling at supersonic speeds, impact by aircraft, volcanic eruption, explosion including nuclear explosion, radioactive or chemical contamination or ionising radiation;

- any change of legislation, governmental order, restraint or directive having the effect of preventing or delaying the performance of any obligation hereunder;

- a strike or any other form of industrial actions by persons employed by the affected Party or by any local authority or by any contractor, subcontractor or agent of the affected Party;

- any strike which is part of a labour dispute of a national character occurring in Ireland or elsewhere;

- the act or omission of any contractor, subcontractor or supplier of either Party but only if due to an event which, but for the contractor, subcontractor or supplier not being a Party to the Connection Agreement, would have been Force Majeure;

- an outbreak of foot and mouth or any other restrictions put in place as part of a strategy to contain a communicable disease in Ireland; and

- the collapse of the euro currency;

provided that the following shall not constitute Force Majeure:

- lack of funds and/or the inability of a Party to pay; and

- mechanical or electrical breakdown or failure of machinery or plant owned or operated by either Party other than as a result of the circumstances identified above;

**"Irish Water"** means Irish Water (Uisce Éireann) a designated activity company incorporated in Ireland (company registration number 530363) and having its registered office at 24-26 Talbot Street, Dublin 1;

"**Legal Requirement**" means any Applicable Law, legislation or directive, regulation,

requirement, instruction, direction or rule of any Competent Authority binding on either or all of the Parties to this Connection Agreement and includes any modification, extension or replacement thereof then in force;

"**Network**(s)" means the Waterworks and/or the Wastewater Works, as applicable and specified on the face of the Connection Offer, and any related lands, which are owned by, vested in, controlled or used by Irish Water;

"**PRA Compliant Map**" means ordinance survey plans, suitable for registration of any Deed of Grant of Wayleaves and Easements relating to property intended to be taken in charge by the local authority and the Connection Facilities to be vested in Irish Water together with all easements relating thereto suitably identified by the relevant symbols and/or colours designated by the Property Registration Authority.

"**Public Road**" means a road over which a public right of way exists and the responsibility for the maintenance of which lies on a road authority;

"**Reasonable and Prudent Operator**" means a person acting in good faith with the intention of performing its contractual obligations hereunder and in so doing and who in the general conduct of its undertaking exercises that degree of skill and diligence which would reasonably and ordinarily be exercised by a skilled and experienced operator complying with Applicable Law engaged in the same type of undertaking under the same or similar circumstances and conditions and the expression "**Standard of a Reasonable and Prudent Operator**" shall be construed accordingly;

"**Regulator**" means, where applicable, all present and future regulatory bodies having jurisdiction over Irish Water including, but not limited to, the Commission for Regulation of Utilities, the Environmental Protection Agency, the Minister of Housing, Planning and Local Government, the Office of the Data Protection Commissioner, the Competition and Consumer Protection Commission and/or any other statutory body or regulatory authority which regulates on an on-going basis or from time to time the business or operations of Irish Water;

"**Relevant Standards**" means the Connections and Developer Services Standard Details and Codes of Practice published and amended from time to time by Irish Water which are applicable to the Customer's Pipe Work and which are available on the Irish Water website ( www.water.ie/Connections );

"**Service Connection**" means a water supply pipe or drainage pipe, together with any accessories and related fittings, extending from a Waterworks (where, as specified in the Connection Offer, the Customer requires connection to the Waterworks) or Wastewater Works (where, as specified in the Connection Offer, the Customer requires connection to the Wastewater Works) to the outer edge of the boundary to the curtilage of the Customer's Premises and used, or to be used as the case may be, for the purpose of connecting the Customer Premises with a Waterworks and/or Wastewater Works (as the case may be), and, if used or to be used for connecting more than one such premises it shall extend to the outer edge of the boundary to the curtilage of the premises which is furthermost from the said Waterworks and/or Wastewater Works (as the case may be);

**"Sewage"** and **"Sewage Effluent"** have the meanings assigned to them by the Local Government (Water Pollution) Acts 1977 to 2007;

**"Sewers"** means sewers of every description, excluding Storm Water Sewers, owned by, vested in or controlled by Irish Water, but does not include a Drain or Service Connection;

**"Special Conditions"** means any special conditions attached to the Connection Offer or as may be agreed from time to time;

**"Storm Water"** means run-off rainwater that enters any pipe;

**"Storm Water Sewer"** means any pipe or other conduit (a) used solely for the conveyance of Storm Water; or (b) designed or intended to be used for the conveyance of Storm Water (whether or not it is connected to a sewer by a 'storm water overflow' within the meaning of the Waste Water Discharge (Authorisation) Regulations 2007;

**"Wastewater"** means Sewage or other Sewage Effluent discharged, or to be discharged, to a Drain, Service Connection or Sewer but does not include Storm Water;

**"Wastewater Works"** means Sewers and their accessories, and all other associated physical elements used for collection, storage, measurement or treatment of Wastewater, and any related lands, which are owned by, vested in, controlled or used by Irish Water;

**"Water Main"** means water supply pipes owned by, vested in or controlled by Irish Water but does not include pipes, fittings and appliances to which the terms "Service Connection" or "Distribution System" apply;

**"Water Services"** means all services, including the provision of water intended for human consumption, which provide storage, measurement, treatment or distribution of surface water, ground water, and/or Wastewater collection, storage, measurement, treatment or disposal;

**"Water Services Acts"** means the Water Services Acts 2007 to 2017;

**"Waterworks"** means water sources, Water Mains and their accessories, and all other associated physical elements used for the abstraction, treatment, storage, measurement or distribution of water, and any related land, which are owned by, vested in, controlled or used by Irish Water;

**"Water Supply Maintenance Point"** means the point at which a Service Connection for water supply enters the boundary to the curtilage of the Customer's Premises.

2. **Interpretation**: Unless the context otherwise requires, any reference in this Connection Agreement to:

2.1 any gender includes the other;

2.2 a statute, bye laws, regulation, delegated legislation or order is to the same as amended, modified or replaced from time to time and to any bye law, regulation, delegated legislation or order made thereunder;

2.3 any agreement, instrument or code is to the same as amended, novated, modified, supplemented or replaced from time to time;

2.4 unless otherwise specified any reference in this Connection Agreement to a "Clause" or "Appendix" is a reference to a Clause or Appendix in this Connection Agreement;

2.5 "**including**" means comprising but not by way of limitation to any event, class, list or category;

2.6 a "**Person**" shall be construed as a reference to any natural or legal person, firm, company, corporation, Government or Agency of a State or any association or partnership (whether or not having separate legal personality). A Person includes that person's legal or personal representative, permitted assigns and successors;

2.7 "**Party**" means a party to this Connection Agreement and "**Parties**" shall be construed accordingly;

2.8 the singular shall include the plural and vice versa;

2.9 words not otherwise defined that have well-known and generally acceptable technical or trade meanings in the water industry are used in this Connection Agreement in accordance with such recognised meanings;

2.10 where a word or expression is defined in this Connection Agreement, related words and expressions shall be construed accordingly;

2.11 headings are for ease of reference only and shall not affect its construction;

2.12 time shall be construed by reference to whatever time is applicable in Ireland; and

2.13 where a Party is required to use "**all reasonable endeavours**" that Party should explore all avenues reasonably open to it, and explore them all to the extent reasonable, but the Party is neither obliged to disregard its own commercial interests, nor required to continue trying to comply if it is clear that all further efforts would be futile; and

2.14 references to the "Commission for Regulation of Utilities" shall include any Competent Authority which may replace or succeed the Commission and assume its functions in relation to the regulation of the water industry in Ireland .

3. **Defined Terms in Connection Offer:** Terms which appear in uppercase in these General Conditions which are not otherwise defined shall have the meaning given to them in the Connection Offer.

4. **Order of Precedence:** In the event of inconsistency or conflict between the Connection Offer, the General Conditions and the Special Conditions, the following order of precedence will apply: (1) Special Conditions (2) General Conditions (3) Connection Offer.

5. **Regulated Entity:** Irish Water operates within a regulatory framework governed by the Regulators.

6. **New Connection:** Irish Water shall charge and the Customer has agreed to pay in full the Connection Charge notified to the Customer in the Connection Offer. Following payment by the Customer, Irish Water shall perform or procure a third party to perform its obligations under the Connection Agreement and the Customer shall perform its obligations under the Connection Agreement.

7. **Sub-contractors/Agents:** The Customer acknowledges that Irish Water may sub-contract or engage an agent to perform certain of the obligations of Irish Water pursuant to the Connection Agreement, in which case, Irish Water shall not be relieved of any obligation or liability with respect to its rights or obligations under the Connection Agreement. The Customer shall have no recourse to any such third party; the Customer's sole recourse shall be to Irish Water in accordance with the Connection Agreement.

8. **Rights and obligations under law.** Nothing in this Connection Agreement shall affect or prejudice any rights, duties or obligations of the Parties under Applicable Laws.

9. **Principal Obligations:**

9.1 Subject to the terms of this Connection Agreement, Irish Water will carry out (or procure the carrying out) of Connection Works to facilitate the connection of the Customer's Premises to the Waterworks and/or Wastewater Works as specified in the Connection Offer).

9.2 The Customer will:

9.2.1 carry out its obligations pursuant to Clause 10 to facilitate the connection of the Customer's Premises to the Waterworks and/or Wastewater Works (as the case may be and as specified in the Connection Offer);

9.2.2 comply with all Relevant Standards and Applicable Laws and obtain all necessary easements, licences, permits or authorisations that may be required in connection with the performance of its obligations and its receipt of the Water Services pursuant to this Connection Agreement.

10. **Customer's Connection Obligations**:

10.1 The Customer shall:

10.1.1 make payment to Irish Water of the Connection Charge set out in the Connection Offer;

10.1.2 in a timely manner, provide, install, test and commission within the boundary to the curtilage of the Customer's Premises all Customer Pipework necessary to connect the Customer's Premises, Distribution System (if connection is to Waterworks) and Drain(s) (if connection is to Wastewater

Works) to the Network(s) at the Connection Point(s) in accordance with Relevant Standards and Applicable Law;

10.1.3 provide safe, free and unrestricted access (which access may not be exclusive) for Irish Water and, and all parties acting on its behalf, to any land or premises of the Customer when reasonably required for the purposes of Irish Water's functions or in relation to this Connection Agreement;

10.1.4 if required by Irish Water in the Connection Offer and at the Customer's own cost, procure adequate way-leaves and easements from third party landowners for the Customer Pipe Work and the Connection Facilities (so that Irish Water and all parties acting on its behalf can establish and carry out the Connection Works) and if required by Irish Water:

10.1.4.1 deliver for approval by Irish Water the PRA Compliant Map;

10.1.4.2 where the Connection Facilities are not entirely comprised within the boundaries of the lands owned by the Customer, the Customer shall deliver to Irish Water a Deed of Grant of Wayleaves and Easements (in duplicate) for the benefit of Irish Water and the Connection Facilities, duly executed by the applicable landowner (to include without limitation a protected strip of ten metres, five metres on either side of the Connection Facilities, in respect of the full length of the Connection Facilities, unless an alternative strip width has been agreed in writing with Irish Water) TOGETHER WITH the PRA Compliant Map. The required form of Deed of Grant of Wayleaves and Easements will be provided by Irish Water on request;

10.1.4.3 irrevocably instruct its appointed solicitor to use best endeavours to stamp and register the Deed(s) of Wayleaves and Easements in the Property Registration Authority as soon as practicable at the Customer's expense and to provide notice of the relevant dealing number and evidence of such registration to Irish Water immediately following completion of registration **PROVIDED THAT** if requested by Irish Water the Customer shall consent to Irish Water taking over the registration process, and the Customer undertakes and agrees to assist Irish Water with this registration process following written request to do so;

10.1.4.4 specifically include reference and notice of the Deed(s) of Wayleaves and Easements in favour of Irish Water in any transfers, conveyances, assignment, lease and/or licence which it may have with any third party.

10.1.5 inform Irish Water, and all parties acting on its behalf, of any relevant safety precautions before entry to the Customer's Premises. Since Irish Water will not be aware of the specific hazards present on the Customer's Premises, the Customer is obliged to inform Irish Water of such hazards. The Customer must ensure that Irish Water, and all parties acting on its behalf, are either accompanied at all times by the Customer, or has been

adequately briefed as to the presence of any specific hazards, the precautions that must be taken and what to do in the event of an accident or emergency;

10.1.6 co-operate with and assist Irish Water, and all parties acting on its behalf;

10.1.7 not unreasonably interfere with or restrict the carrying out of Irish Water's obligations in accordance with this Connection Agreement;

10.1.8 not do or cause or permit to be done anything which causes, or could reasonably be expected to cause, damage or destruction to any part of the Connection Works or in any way interferes with its operation or materially interferes with Irish Water's (and all parties' acting on its behalf) access to same;

10.1.9 be solely responsible at all times for maintaining and keeping excavations and reinstatements on its property in a safe and secure condition and will indemnify and keep indemnified Irish Water, its servants, agents and contractors against all claims, demands, proceedings, damages and expenses whatsoever in respect thereof;

10.1.10 where there is to be a connection to the Waterworks, accept liability for the care, maintenance, renewal and repair of the Customer Pipework and the plumbing fixtures and fittings and associated pipework of the Distribution System up to the Connection Point where the Service Connection connects with the Distribution System, to ensure that such infrastructure complies at all times with Applicable Law including but not limited to European Union (Drinking Water) Regulations 2014 and any regulations that may be made under Section 54 of the Water Services Act 2007 or any bye-laws made by Irish Water. Irish Water shall accept no responsibility for the maintenance, renewal, adequacy, safety or other characteristics of such infrastructure, save that, in terms of water supply, Irish Water shall maintain and repair that part of the Service Connection extending from the Waterworks up to the Water Supply Maintenance Point;

10.1.11 where there is to be a connection to the Wastewater Works, accept liability for the care, maintenance, renewal and repair of the Customer Pipe Work and the plumbing fixtures and fittings and associated pipework of any Drains up to the Connection Point with the Service Connection to which those Drains are connected. Irish Water shall accept no responsibility for the maintenance, renewal, adequacy, safety or other characteristics of such infrastructure. Any Drain or Drains located within the boundary to the curtilage of the Customer's Premises and/or any system of Drains that drains more than one premises within the boundary to the curtilage of those Customer's Premises shall be the sole responsibility of the Customer; and

10.1.12 agree the timing of any works to be carried out by the Customer with Irish Water.

10.2 The Customer shall take such steps as Irish Water may notify from time to time to prevent a risk to human health or the environment, to facilitate the reasonable conservation of water, to ensure the proper and effective management of Water Services, to prevent contamination of any Waterworks (where there is to be a connection to the Waterworks), and to protect the Wastewater Works (where there is to be a connection to the Wastewater Works).

10.3 The Customer shall not allow discharge of rainwater runoff from roofs, paved areas or other surfaces into any Drain or Sewer, except as may be agreed in advance in writing with Irish Water.

10.4 During the duration of this Connection Agreement, Irish Water may specify any technical requirements or standards necessary to minimise the risk of leakage or to protect the integrity of any Waterworks or Wastewater Works.

10.5 For the avoidance of doubt, the Customer is prohibited from using the Service Connection and/or using any other mechanism to supply Water Services onwards to another location or premises other than the Customer's Premises notified to Irish Water by the Customer to which the Service Connection applies. Irish Water shall in no way be liable for a breach of this provision by the Customer or by any other third party, including any adverse consequences arising directly or indirectly as a result of such a breach and all costs, damages or claims arising therefrom.

10.6 The Customer hereby indemnifies Irish Water and its servants, agents and contractors in respect of any loss, damage or injury that may result from the laying or use of pipes within the boundary to the curtilage of the Customer's Premises. The Customer indemnifies Irish Water and its servants, agents and contractors in respect of any loss, damage or injury caused as a result of any leakage of Wastewater from Drains or Service Connections or water from the Distribution System up to the Connection Point where Service Connection connects with the Distribution System.

10.7 The Customer shall be solely responsible for preventing any backflow, back syphonage or blowback from the Distribution System of the Customer's Premises into the Water Main or Waterworks.

10.8 Where a connection is made to the Wastewater Works, Irish Water shall be entitled to take spot samples of the Wastewater discharged by the Customer for the purposes of testing compliance with the terms of this Connection Agreement and/or for general research or compliance purposes. If, in the opinion of Irish Water, the characteristics of the Customer's Wastewater are such that it is likely to produce what Irish Water determines to be a significant impact upon the Wastewater Works, then Irish Water may require the Customer to enter into a separate end-user agreement containing additional conditions in connection with the treatment of the Customer's Wastewater. The Customer acknowledges and agrees that it will, if requested to do so by Irish Water, cease discharging its Wastewater to the Network pending entry into the end-user agreement

**11. Use of Water:**

11.1 Where in the opinion of Irish Water, waste or deliberate misuse of water occurs on the Customer's Premises, Irish Water may restrict or reduce the pressure of the Water Services temporarily until satisfied that the waste or misuse has been rectified.

11.2 The Customer may in times of water scarcity be required to limit the use of Water for essential purposes only as prescribed by Irish Water.

11.3 With the exception of customers covered under the Irish Water Domestic Customer Vulnerable Code of Practice, the Customer shall be responsible for installing and maintaining sufficient storage to provide a reserve water supply if that is necessary for any special needs which the Customer has for a specific rate of flow or pressure or if, taking account of any interruption to the Water Services which might occur due to works, a burst or any other reason, a prudent customer acting reasonably in order to protect its business needs would provide such storage.

11.4 The Customer shall ensure so far as practicable that all water is drawn at a reasonably regular rate of flow and pressure and shall use its storage facility to reduce peak demands being made upon the Waterworks by the Customer.

11.5 The provisions of this Clause 11 shall survive the termination or expiry of this Connection Agreement.

**12. Time for Completion/Delays:** Irish Water shall use commercially reasonable endeavours to ensure that the Connection Works are completed in a timely manner but Irish Water shall not be liable for any loss or damage suffered by the Customer in respect of delays resulting from any cause whatsoever.

**13. Third Party Losses:** The Customer shall indemnify Irish Water and its servants, agents and contractors, and hold Irish Water and its servants, agents and contractors harmless at all times from any and all losses of any third party incurred, suffered or sustained pursuant to this Connection Agreement, but only to the extent any such loss was not caused by Irish Water's breach of this Connection Agreement or the negligence of Irish Water in undertaking its obligations under this Connection Agreement.

**14. Liability:**

14.1 **Immunity:** Nothing in this Connection Agreement shall affect any immunity that Irish Water benefits from Applicable Law.

14.2 **Death or Personal Injury:** Subject to Clause 14.1 above, nothing in this Connection Agreement will exclude or limit the liability of either Party for death or personal injury resulting from the negligence of that Party or any other loss that cannot be excluded or limited under Applicable Law.

14.3 **Reasonable and Prudent Operator**: Subject to Clause 14.2, where the obligations of

Irish Water are performed in accordance with the Standard of a Reasonable and Prudent Operator, Irish Water shall have no liability whatsoever to the Customer in respect of this Connection Agreement.

14.4 **No liability for Force Majeure:** Neither Party shall be liable for any breach of this Connection Agreement directly or indirectly caused by Force Majeure.

14.5 **No Liability:** Neither Party shall be liable to the other Party in contract, tort, warranty, strict liability or any other legal theory for: (a) any loss of profit, revenue, use, contract (other than this Connection Agreement), opportunity, or goodwill; or (b) punitive or exemplary damages; or (c) any indirect, consequential, incidental or special damages (including punitive damages).

14.6 **No implied warranties:** All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from this Connection Agreement.

15. **Assignment:** The Customer shall not be entitled to assign the benefit or transfer the burden of this Connection Agreement without the prior written consent of Irish Water. Nothing shall prevent Irish Water from assigning the benefit or transferring the burden of this Connection Agreement to an Affiliate.

16. **Sub-contractors:** Either Party shall have the right to sub-contract or delegate the performance of any of its obligations or duties arising under this Connection Agreement without the prior consent of the other Party. Such subcontracting by Irish Water or the Customer of the performance of any obligations or duties under this Connection Agreement shall not relieve Irish Water or the Customer (as the case may be) from liability for performance of such obligation or duty.

17. **Customer's Authority:** The Customer represents and warrants to Irish Water that it has full power and authority to enter into and to exercise its rights and perform its obligations under this Connection Agreement and has obtained all authorisations and consents necessary for it to so enter, exercise rights and perform obligations and such authorisations and consents are in full force and effect.

18. **Term & Termination:**

18.1 This Connection Agreement shall commence upon the date that the Customer returns the Customer Acceptance Form and pays the Connection Charge (and if these occur on different days, the Connection Agreement shall commence on the later date) and shall continue in full force and effect until the Parties' respective obligations under Clause 9 have been performed in full unless it is earlier terminated in accordance with the provisions of this Connection Agreement.

18.2 The Connection Offer and this Connection Agreement is based on a high-level desk top analysis carried out by Irish Water on the feasibility of a carrying out the Connection Works for the Customer Premises. Once the Connection Offer has been accepted by You, Irish Water will begin a detailed design of the Connection Works. If during the process of detailed design Irish Water, at its discretion, forms the opinion (acting

reasonably) that either:

A. the Connection Works are not feasible or practicable or safe to complete; or
B. the acquisition of all rights for the laying of the Customer Pipe Work and/or the Connection Works are not possible or commercially practicable; or
C. the Connection Works would involve the expenditure by Irish Water of monies in excess of that provided for by way of the Connection Charge,

then the Connection Agreement may be terminated by Irish Water by way of written notice to the Customer. In the event that Irish Water exercises its right to terminate the Connection Agreement on the basis of the foregoing then Irish Water shall return any Connection Charge paid by the Customer, less (if deemed appropriate by Irish Water) any outstanding costs and expenses incurred by Irish Water as at the date of termination. This provision is additional to and does not replace any other provisions relating to termination.

18.3 Irish Water shall be entitled to terminate this Connection Agreement by written notice to the Customer if the Customer sells the Customer Premises to a third party.

18.4 The Customer shall be entitled to terminate this Connection Agreement upon written notice to Irish Water within 14 days of the date of this Connection Agreement.

18.5 Either Party shall be entitled to terminate this Connection Agreement upon written notice to the other Party where:

18.5.1 there is in any material breach by the other Party of its obligations under this Connection Agreement and the breach cannot be remedied or if it is capable of being remedied, it has not been remedied by such Party within 28 days of the issue of a notice to it by the other Party identifying the breach and requiring it to be remedied; and

18.5.2 an event of Force Majeure persists for a period of 180 days or more, provided at least 14 days' notice of termination has been given in writing.

18.6 In the event that either Party exercises its right to terminate under this Clause before the Connection Works commence, Irish Water shall return any Connection Charge paid by the Customer, less any outstanding costs and expenses incurred by Irish Water as at the date of termination, including, but not limited to, costs of construction, and any legal or financing costs.

18.7 Termination of this Connection Agreement shall not prejudice or affect any right of action or remedy which shall have accrued or shall thereafter accrue to either Party under this Connection Agreement.

18.8 Without prejudice to Clause 18.7, in particular, the following clauses:

Clause 4 (Order of Precedence);
Clauses 10.1.1, 10.1.9, 10.1.10, 10.1.11, 10.2, 10.3, 10.5, 10.6, 10.7 and 10.8;
Clause 11 (Use of Water);
Clause 13 (Third Party Losses);
Clause 14 (Liability);

Clause 18 (Term and Termination);
Clause 20 (Insurance);
Clause 26 (Entire Agreement);
Clause 21 (Data Protection);
Clause 29 (Governing Law); and
Clause 30 (Disputes),

of this Connection Agreement shall continue in full force and effect and be fully binding on the Parties notwithstanding termination or expiry.

## 19. Notices

19.1 Notices or other communications given pursuant to this Connection Agreement shall be in writing and shall be sufficiently given if delivered by hand or sent by e-mail or pre-paid registered post to the e-mail or postal address referred to below of the Party to which the notice or communication is being given or to such other address and as such Party shall communicate from time to time to the Party giving the notice or communication.

19 2 The Customer's address for service is as set out in the Connection Offer.

19.3 Any notice required or permitted to be given by the Customer shall be in writing addressed to Irish Water at Irish Water, PO Box 860, South City Delivery Office, Cork City or by email to newconnections@water.ie or such other address or electronic mail address as may be notified by the Customer to Irish Water from time to time.

19.4 Every notice given in accordance shall be deemed to have been received as follows:

| Means of Dispatch | Deemed Received |
|---|---|
| Hand Delivery | The time of delivery. |
| Post | 48 hours after posting (and proof that the envelope containing the notice or communication was properly addressed and sent by pre-paid registered post will be sufficient evidence that the notice or other communication has been duly served or given). |
| Email | Upon receipt by the addressee of the complete text in legible form. |

provided that if, in accordance with the above provisions, any such notice or other communication would otherwise be deemed to be given or made outside working hours (being 9am to 5.30pm on a Business Day) such notice or other communication shall be deemed to be given or made at the start of working hours on the next Business Day.

## 20. Insurance:

20.1 The following insurance obligations will apply in the alternative depending on whether the Customer's Premises is a:

20.1.1 *single domestic unit* (see Clause 20.2 below); or
20.1.2 *a small non-domestic development* (where the connection to the Customer's Premises is proposed to be a 25mm water supply Service Connection and/or a 100mm Wastewater Service Connection)(see Clause 20.2 below); or
20.1.3 a development *other than* a single domestic unit or a small non-domestic unit (see Clause 20.3 below).

20.2 Where this Connection Agreement relates to a *single domestic unit* or *a small non-domestic development*, the Customer shall ensure that any Contractor engaged by them in relation to the Customer's Pipe Work has appropriate and adequate insurance cover in place throughout the duration of the works in relation to the matters referred to in Clause 10.

20.3 Where this Connection Agreement relates to developments *other than* a single domestic unit or a small non-domestic development, the Customer shall ensure that any Contractor engaged by them in relation to the Customer's Pipe Work has appropriate and adequate insurance cover in place throughout the duration of the works in relation to the matters referred to in Clauses 10. In particular, the Customer shall, within five days following a written request from Irish Water, furnish Irish Water with evidence that the insurances referred to below are being maintained by the Contractor:

20.3.1 **Employers Liability** insurance cover with a minimum indemnity limit of €13 million any one accident/occurrence unlimited in the period of insurance;
20.3.2 **Public/Products/Pollution Liability** insurance cover with a minimum indemnity limit of €6.5 million any one accident/occurrence unlimited in the period of insurance under the Public Liability and in the aggregate in respect of Products & Pollution Liability;
20.3.3 **Contractors "All Risks"** insurance for the full reinstatement value of the proposed works in respect of any one claim; and
20.3.4 **Motor** insurance cover with a minimum third party property damage limit of €6.5m for all vehicles owned, leased, rented or run (to include tool of trade use) by the Contractor in connection with the services to be provided by it.

The Insurance policies detailed in this Clause 20.3 with the exception of Motor must include a specific indemnity to Irish Water.

## 21. Data Protection:

21.1 It is necessary for Irish Water to collect and use personal data relating to the Customer in respect of this Connection Agreement, such as your name, address, contact details and financial information (depending on payment method). This data will be used to enable Irish Water to carry out its obligations under this Connection Agreement and manage its relationship with the Customer, such as arranging payments, visits to the Customer's Premises and scheduling construction activities. Irish Water may keep the Customer's data for a reasonable period after the Customer ceases to be supplied with

Water Services but will not keep it for any longer than is necessary and/or as required by law.

21.2 Irish Water may share the Customer's data with other members of the Ervia group and agents who act on behalf of Irish Water in connection with the activities referred to above. Such agents are only permitted to use the Customer's data as instructed by Irish Water. They are also required to keep the Customer's data safe and secure.

21.3 From time to time the Customer may speak to employees of Irish Water (or agents acting on its behalf) by telephone. To ensure that Irish Water can provide a quality service, telephone conversations with the Customer may be recorded. Irish Water will treat the recorded information as confidential and will only use it for staff training/quality control purposes, confirming details of the Customer's conversations with Irish Water or any other purposes mentioned in this notice.

21.4 The Customer has various rights under data privacy laws which include the right to request a copy of his/her personal data. If the Customer wishes to avail of this right or for further information please contact Irish Water in writing at FREEPOST, Irish Water, Data Protection Officer, PO Box 6000, Talbot Street, Dublin 1 or via email to dataprotection@ervia.ie .

21.5 Irish Water endeavours to use appropriate technical and physical security measures to protect your personal data which is transmitted, stored or otherwise processed by Irish Water, from accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access. Irish Water's service providers are also selected carefully and required to use appropriate protective measures.

21.6 As effective as modern security practices are, no physical or electronic security system is entirely secure. The transmission of information via the internet is not completely secure. Although Irish Water will do its best to protect your data, Irish Water cannot guarantee the security of your data transmitted to Irish Water's Site. Any transmission of data is at your own risk. Once Irish Water receives your data, Irish Water will use appropriate security measures to seek to prevent unauthorised access. Irish Water will continue to revise policies and implement additional security features as new technologies become available.

21.7 In the event that there is an interception or unauthorised access to your personal data, Irish Water will not be liable or responsible for any resulting misuse of your personal information.

21.8 For further information on how Irish Water treats the Personal Data of Customers when providing Water Services, please see our Privacy Notice on www.water.ie. Alternatively, please contact us at the details above for Irish Water's Privacy Notice.

21.9 In order to evaluate and improve our Customer's experience, we or agents on our behalf, may from time to time issue surveys to the Customer in relation to the services provided. If you do not wish to receive a survey, please let us know.

21.10 Irish Water reserves the right to change and/or update its Privacy Notice at any time in Irish Water's sole discretion. If Irish Water makes changes, Irish Water will publish same on www.water.ie.

22. **Safety, Health and Welfare at Work (Construction) Regulations 2013**: It is acknowledged and agreed that the works carried out for, or on behalf of, the Customer in relation to the Customer's Pipe Work are entirely separate and distinct to the Connection Works carried out for and on behalf of Irish Water. The Customer shall ensure full compliance with all applicable health and safety legislation including, if necessary and applicable, the Safety, Health and Welfare at Work (Construction) Regulations 2013 in respect of the works to the Customers Pipe Work. The Customer acknowledges that, as client, it may have certain obligations under the Safety, Health and Welfare at Work (Construction) Regulations 2013 in relation to the works to the Customer's Pipe Work and, as such, will ensure full compliance with those obligations. Irish Water shall ensure full compliance with all applicable health and safety legislation including, if necessary and applicable, the Safety, Health and Welfare at Work (Construction) Regulations 2013 in respect of the Connection Works. Irish Water acknowledges that, as client, it may have certain obligations under the Safety, Health and Welfare at Work (Construction) Regulations 2013 in relation to the Connection Work and, as such, will ensure full compliance with those obligations.

23. **No Waiver:** No forbearance, indulgence or relaxation on the part of a Party shown or granted to the other Party shall in any way affect, diminish, restrict or prejudice the rights or powers of Irish Water or operate as or be deemed to be a waiver of any breach of conditions. None of the provisions of this Connection Agreement shall be considered waived by a Party unless such waiver is given in writing and signed by a duly authorised representative of the Party making the waiver. No such waiver shall be a waiver of any past or future default or breach nor shall such waiver constitute a modification of any term provision condition or covenant of the contract unless expressly so provided in such waiver.

24. **Severability:** All of the provisions contained in this Connection Agreement are distinct and severable, and if any provision is held or declared to be unenforceable, illegal or void in the whole or in part by any court, regulatory authority or other Competent Authority it will, to that extent only, be deemed not to form part of this Connection Agreement and the enforceability, legality and validity of the remainder of these terms and conditions will not in any event be affected.

25. **Force Majeure:** If either Party is by reason of Force Majeure rendered unable wholly or in part to carry out its obligations under this Connection Agreement, then upon notice in writing of such Force Majeure from the Party affected to the other Party, as soon as possible after the occurrence of the cause relied on, the Party affected shall be released from its obligations (other than the obligations to pay money) and suspended from the exercise of its rights under the Connection Agreement to the extent to which they are affected by the circumstances of Force Majeure and for the period during which those circumstances exist PROVIDED THAT the Party affected shall use all reasonable endeavours to prevent, avoid, overcome or mitigate the effects of such occurrence.

26. **Entire Agreement:**

26.1 This Connection Agreement shall be the entire agreement between the Parties with respect to the subject matter and expressly excludes any warranty, condition or other undertaking implied at law or by custom and supersedes all previous agreements and

understandings between the Parties (other than as provided for in this Connection Agreement) with respect to its subject matter.

26.2 The Customer acknowledges and confirms that it does not enter into this Connection Agreement in reliance on any representation, any misrepresentation, warranty or other undertaking by Irish Water not fully reflected in this Connection Agreement.

26.3 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from this Connection Agreement.

27. **Amendments:** This Connection Agreement may be updated at any time by Irish Water with replacement terms and conditions published on www.water.ie.

28 **No Derogation from Statutory Responsibilities:**

The Customer acknowledges and accepts:

28.1 their obligations and duties under the Water Services Acts in relation to the protection of human health, repair of leaks and the reasonable conservation of water and the management, consumption and use of water on or at the Customer's Premises to ensure that water is not wasted or consumed in excessive amounts;

28.2 that notwithstanding this Connection Agreement, Irish Water is not limited from exercising its powers under the Water Services Acts in relation to the Customer;

28.3 without prejudice to Clauses 10.1.10 and 10.1.11 of these General Conditions and notwithstanding the carrying out of Connection Works, the Customer Pipe Work (in terms of ownership, maintenance, repair, renewal or otherwise) will remain the sole responsibility of the Customer unless ownership is transferred to Irish Water.

29. **Governing Law:** The Connection Agreement shall be governed and construed in accordance with the laws of Ireland and, subject to Clause 30, the courts of Ireland shall have exclusive jurisdiction to decide disputes arising between the Customer and Irish Water.

30. **Dispute Resolution:**

30.1 **Notification of a Dispute:** Any Dispute between the Parties shall be resolved, if possible, by negotiation. In the event that no agreement is reached within fifteen (15) days of the date on which either Party first notified the other Party that a Dispute exists, either Party shall have the right to have the Dispute determined in accordance with Clause 30.2.

30.2 **Mediation:** The mediator is to be appointed by agreement between the Parties and, in the absence of agreement within five (5) working days of the receipt by one Party of a written notice to concur in the appointment of a mediator, by the Centre for Effective Dispute Resolution ("**CEDR**"). The mediation will be in Dublin and the costs of the mediation shall be shared equally between the Parties. In the event that the matter is not resolved within three (3) months of being referred to the mediator under

this Clause 30.2, then either Party may (but for the avoidance of doubt not be obliged to do so) commence court proceedings for the determination of the Dispute in question.

30.3 **Performance to Continue During Dispute:** Insofar as practicable, the Parties shall continue to implement the terms of this Connection Agreement notwithstanding the initiation of mediation or Court proceedings and any pending Dispute. No payment due to or payable by Irish Water or the Customer shall be withheld on account of a pending reference to the dispute resolution mechanism except to the extent that such payment is the subject of such dispute. However, Irish Water shall not be obliged to carry out the Connection Works unless it is in receipt of the Connection Costs.

30.4 **Survival:** The provisions of Clause 30.2 and 30.3 shall continue after the termination of this Connection Agreement where notice of the existence of the Dispute was given under Clause 30.1 prior to termination. Nothing in this Connection Agreement is intended to prejudice the referral of a dispute to the Commission for Regulation of Utilities for determination in accordance with Irish Water's Customer Handbook.

## 31. New Industry Structure

31.1 If, after execution of this Connection Agreement, there shall be enacted and brought into force any Legal Requirement for:

31.1.1 the further reorganisation of the water industry in Ireland or any material part of it;

31.1.2 the further facilitation of the introduction of third party interests into the affairs of the water industry in Ireland or any part of it; or

31.1.3 the amendment or variation of any policy of Irish Water or the manner in which the Network(s) and any agreements or protocols related thereto are organised;

which necessitates a variation to this Connection Agreement, the Parties shall effect such changes as are reasonably necessary so as to ensure that the operations contemplated by this Connection Agreement shall be conducted in a manner which is consistent with the effect of the new Legal Requirement and most closely reflects the intentions of the same with effect from the date thereof provided that any such amendment will be of no greater extent than is required by reason of the same.

31.2 If any variation proposed under Clause 31.1 has not been agreed by the Parties within three (3) months of it being proposed (the Parties acting as soon as reasonably practicable), either Party may refer to the Commission for Regulation of Utilities for determination and the Parties agree to abide by and to give effect to the Commission's determination, if necessary by entering into an agreement supplemental to this Connection Agreement.

## APPE NDI X3

## Spedal Cond ifo ns

The purpose of this Connection Agreement is to facilitate a connection between the Customer's Premises and the Wastewater Network at the Connection Point.

For the purposes of this Connection Agreement, the Parties agree:

1. that Customer's Pipe Work shall include a private rising main [including a pumping station] and stand-off manhole in the public road between the Customer's Premises and the Connection Point(approx. 6meters from the stand-off manhole; and
2. the modification of elements of the existing Wastewater Network, by agreement with Irish Water to facilitate the regulation of flows from the Customer's Premises to the Wastewater Network in certain circumstances (the costs of which shall be borne by the Customer).

Arising from the above, the Customer acknowledges and agrees as follows:

a) the definition of *Customer's Pipe Work* shall be amended as follows:

**"Custome r's Pipe Wark"** means the pipe, relating fittings and associated accessories to be laid by the Customer in accordance with Relevant Standards and Applicable Laws, and the Distribution System (if connecting to the Waterworks) and the Drain (if connecting to the Wastewater Works), to be used to connect the Customer's Premises at a Connection Point;

b) for the avoidance of any doubt, any elements of the Customer's Pipe Work constructed by the Customer outside of the Customer's Premises will not vest in Irish Water and shall remain entirely the responsibility of the Customer;

c) the Connection Facilities, to be constructed by Irish Water, shall consist of a six-metre section of gravity wastewater pipe between the stand-off manhole (to be constructed as part of the Customer's Pipe Work) and the existing Wastewater Network;

d) the Customer shall be entirely responsible for obtaining any relevant consents, including planning permission, road opening licence, discharge licence, etc. which are required for the construction and operation of any pipe work necessary to connect the Customer's Premises to the Wastewater Network including the Customer's Pumping Station, Pipe Work and the Connection Facilities. Copies of the said permissions/consents or, alternatively, confirmation of any exemptions from the requirement to obtain such permissions/consents, shall be provided to Irish Water as a pre-condition to completion of the Connection Facilities and tie-in to the Wastewater Network;

e) as a pre-condition to commencement of construction of the Customer's Pipe Work, the Customer shall;

i. submit all designs and control processes necessitated by the Customer's Pipe Work and the [likely] impact of discharges on the Irish Water Network to Irish Water for review and approval;

ii. agree all relevant access requirements to Irish Water's existing Wastewater Network, Wastewater Treatment Plant (the "**WWTP**"), and associated pumping stations;

iii. submit construction methodologies, RAMs, etc. to Irish Water for approval;

f) the Customer's Pipe Work shall include:

i. actuated valves on the rising mains to shut the rising mains automatically if the water level at Bachelor's Walk Storm Water Overflow (SWO) rises above a predetermined high level in advance of an overflow occurring. A facility shall be provided in the control panel in the Customers Pumping Station to allow manual operation by Uisce Eireann personnel of the valve in case of an emergency. The final location of actuated valves shall be determined at detailed design stage with consideration given to locating them at the rising main discharge point;

ii. a pressure switch shall be provided in the Customer's Pipe Work at [the point shown X on Drawing No. [ ]] to inhibit pump operation if the pressure exceeds a pre-set setpoint;

iii. flowmeters on the new rising mains to relay readings to the Irish Water Scada system at the Wicklow WWTP. The Customer shall be responsible for all required works at their site and at the WWTP;

iv. adequate storage within the Customer's private pumping station to retain flows during periods when the actuated valves on the Customer's rising mains are closed and when forward pumping is not permitted;

v. the level sensors and associated equipment installed as part of the existing Wastewater Network shall be connected to mains power;

g) Modification of Existing Wastewater Network

i. the Customer shall design, install and commission a level sensor in the stormwater overflow chamber at Bachelor's Walk SWO (SCH0000469). The level sensor shall be required to be connected to the Customer's private pumping station via radio link. When the level in the Wastewater Network reaches a pre-determined set point (before overflow occurs), a signal should be sent to the Customer's private pumping station to turn of the pumps. A further signal will then be sent to the Customer's private pumping station to recommence pumping when the level at the stormwater overflow drops.

ii. **Murrough Pump Station Pump Failure**

The Customer shall design, install and commission a telemetry link between the Murrough pump station and Customer's private pumping station that will send a send a signal to the Customer's private pumping station to stop pumping in the event of a failure of the Murrough pumps. A further signal will then be sent to the Customer's private pumping station to recommence pumping when Murrough pump station returns to normal operation.

h) Post-Construction Hand-Over

i. the Customer shall carry out a handover demonstration to UÉ Operations team (Wicklow Co.Co. Water Services);
ii. the Customer shall provide a safety file to UÉ for any equipment installed within the existing Wastewater Network. The Safety file shall, at a minimum, include as built drawings, commissioning records, calibration records and O&M manuals;
iii. all level sensors and their associated kiosks and local controls will be vested in Irish Water upon connection of the Customer's Premises to the Wastewater Network.

**Notes**

**SECTION 3.0 – Special Conditions pertaining to the Water/Wastewater Service Connection(s)**

**SECTION 3.1 - Water Service Connection(s)**

**SECTION 3.2 - Wastewater Service Connection(s)**

| | | | |
|---|---|---|---|
| 1 | Distance from Customer's Premises to Connection Point in metres (Service Connection). | 4,300.00 | m |
| 2 | Diameter of Service Connection required (internal diameter in mm). | 150 | mm |
| 3 | Distance from Service Connection Point to the existing mains in metres (Mains Extension). | 4300 | m |
| 4 | Prior to any tie-in to the Network(s) being made, the Customer must have obtained a Trade Effluent Discharge Authorisation.<br><br>Trade Effluent Discharge Authorisation means:<br><br>- a trade effluent discharge licence issued to the Customer by Irish Water under section 16 of the Local Government (Water Pollution) Act, 1977 (as amended); or<br>- a trade effluent discharge licence issued to the Customer by Irish Water under section 63 of the Water Services Act, 2007 (as amended); or<br>- an industrial emissions (IE) licence, integrated pollution control (IPC) licence, or waste facility licence issued to the Customer by the Environmental Protection Agency,<br><br>as the case may be.<br><br>To apply to Irish Water for a trade effluent discharge licence or to learn more about trade effluent please visit www.water.ie/tradeeffluent<br><br>Any failure by the Customer to obtain a Trade Effluent Discharge Authorisation, where required, will result in Irish Water refusing to accept discharges to its Network(s). | | |
| 6 | Uisce Eireann will deliver the final tie in connection to the network from the stand off manhole, the Customer is responsible for the construction of the private rising main and all associated consents required, The Customer should contact Uisce Eireann operations to organise the tie-in to the Wastewater Network and all associated works downstream. | | |
| 7 | The design & construction of the new proposed wastewater connection to be in accordance with the IW Codes of Practice and Standard Details. These are available from the IW website at www.water.ie/connections | | |

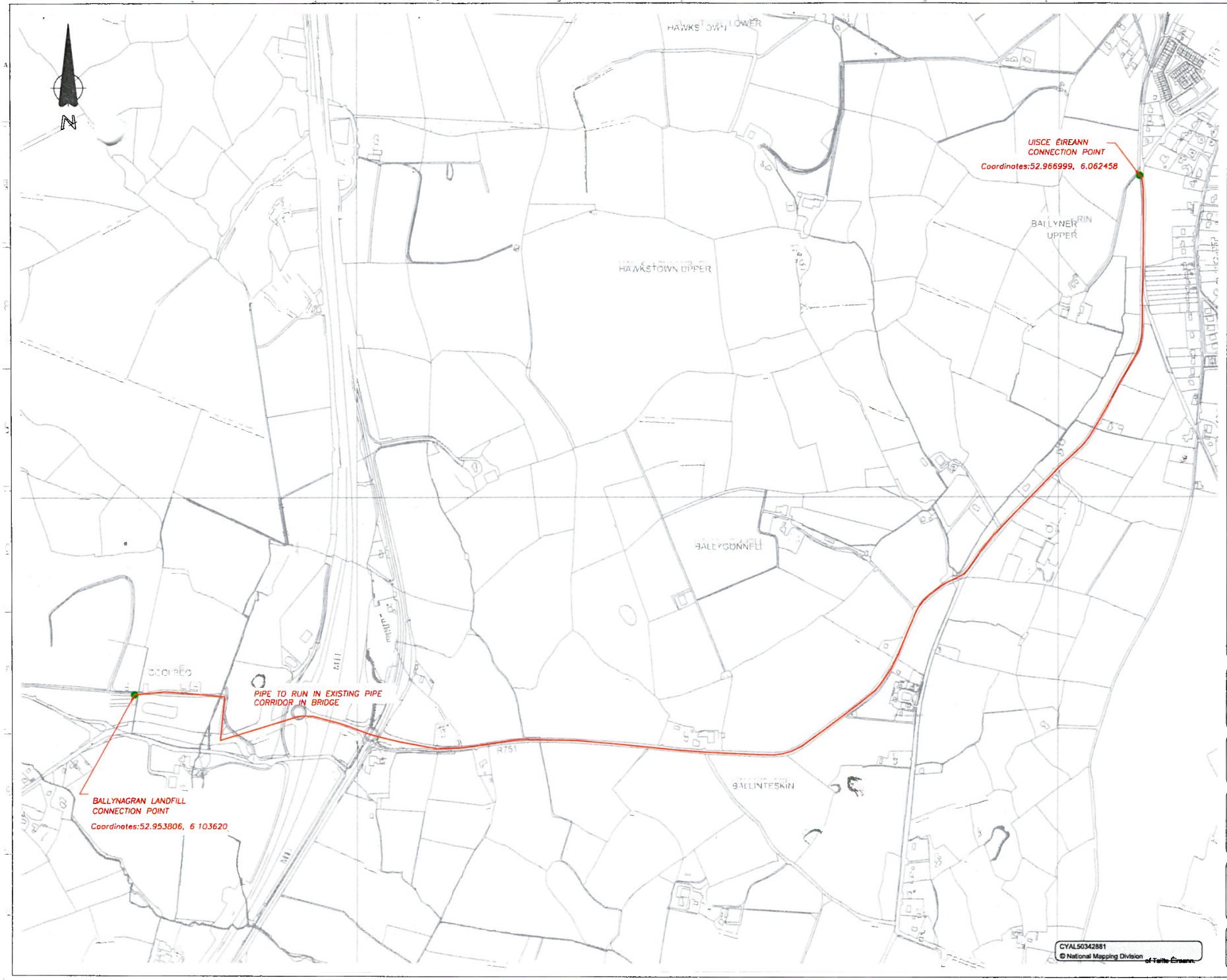
| | |
|---|---|
| 8 | No storm runoff shall drain to the public foul sewer |
| 9 | |
| 10 | |

## APPENDIX 4

## Connection Charge

| | |
|---|---|
| **Connection Charge** | |
| **Wastewater Connection Charge** | |
| Standard Charge | €23,344.00 |
| Standard Charge – Additional Service Length | €0.00 |
| Quotable Charge | |
| Sub total | **€23,344.00** |
| | |
| **Total Connection Charge** | **€23,344.00** |

# APPENDIX B: Pipe Route Drawing




NOTES

FOR INFORMATION

| REV. | DATE | REVISION | BY | CHKD. | APPR. |
|---|---|---|---|---|---|
| 1 | 11/04/24 | FOR INFORMATION | PP | ATR | SM |
| 0 | 02/03/24 | PRELIMINARY ISSUE | PP | ATR | SM |

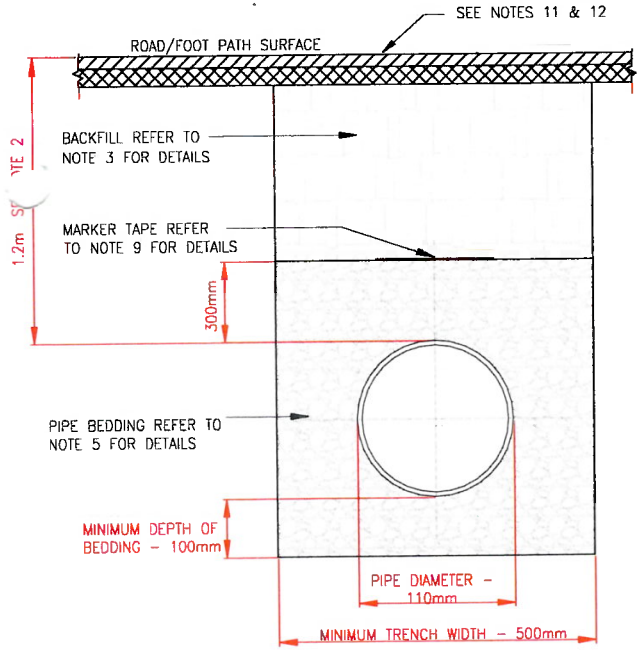
Client
AGB HOLDINGS
BALLYNAGRAN LANDFILL LTD
COOLREG CROSS, Co. WICKLOW
A67DF83

Fingleton White
Bridge Street Centre
Portlaoise
Co. Laois
R32 W0CC
Ireland
T (00353)(0)57 866 5400
www.fingleton.ie

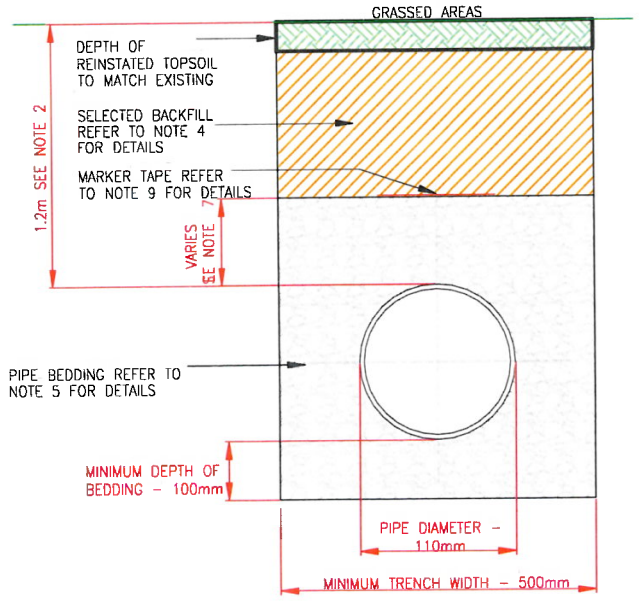
Project
BALLYNAGRAN
PIPE ROUTE

| Drawn | Scale | Drawing Number | Rev. |
|---|---|---|---|
| P.PHILLIPS | 1:5000/A1 | 1371-DG-003 | 1 |
| Chkd. A.T.ROOBY | Date 11/04/24 | sheet 1 of 1 | |
| Appd. S.MORRIN | Status ISSUED | | |

# APPENDIX C: Trench Details




## CROSS SECTION IN ROADS




## CROSS SECTION IN GRASSED AREAS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE.
2. DEPTH OF COVER IN ROADWAYS AND GRASS VERGE TO BE MINIMUM OF 1.2 M FROM FINISHED SURFACE TO THE CROWN OF PIPEWORK. DEPTH OF COVER IN GRASS VERGE MAY BE REDUCED TO 0.9 M WITH PRIOR APPROVAL FROM FINGLETON WHITE. THE DEPTH OF COVER TO PIPEWORK CAN BE REDUCED BY THE INSTALLATION OF PROTECTION MEASURES, BUT AN ABSOLUTE MINIMUM DEPTH OF COVER OF 500MM IN UN-TRAFFICKED AREAS AND 750MM IN TRAFFICKED AREAS SHALL APPLY WHEN PROTECTION MEASURES ARE USED. REDUCED DEPTH OF COVER AND PROTECTION MEASURES TO BE APPROVED BY FINGLETON WHITE IN ADVANCE.
3. CLAUSE 804 / 808 MATERIAL IN ACCORDANCE WITH THE TRANSPORT INFRASTRUCTURE IRELAND SPECIFICATION FOR ROAD WORKS IS TO BE USED AS BACKFILL MATERIAL WHERE THE SEWER MAIN IS LOCATED IN ROADS, FOOTPATHS OR WHEN THE NEAREST PART OF THE TRENCH IS WITHIN 1m OF THE PAVED EDGE OF THE ROADWAY. CLAUSE 804 / 808 IS TO BE COMPACTED AS PER CLAUSE 802 OF THE TRANSPORT INFRASTRUCTURE IRELAND SPECIFICATION FOR ROAD WORKS. CLAUSE 808 IS TO BE USED WITHIN 500mm OF CEMENT BOUND MATERIALS, CONCRETE PAVEMENTS, CONCRETE STRUCTURES OR CONCRETE PRODUCTS. OTHERWISE CLAUSE 804 MAY BE USED. ALTERNATIVE BACKFILL MATERIAL TO THAT DESCRIBED ABOVE (CLAUSE 804 OR CLAUSE 808) OF THE PIPE TRENCH WILL ONLY BE ALLOWED BY FINGLETON WHITE WHERE THE ROADS AUTHORITY IN WHOSE FUNCTIONAL AREA THE DEVELOPMENT IS LOCATED, PROVIDES WRITTEN APPROVAL TO THE DEVELOPER TO THE USE SUCH ALTERNATIVE MATERIAL EVIDENCE OF THIS WRITTEN APPROVAL TO BE PROVIDED TO FINGLETON WHITE IN ADVANCE OF THE COMMENCEMENT OF WORKS.
4. SELECTED EXCAVATED MATERIAL COMPLYING WITH THE REQUIREMENTS OF "ACCEPTABLE MATERIAL" AS OUTLINED ON CLAUSE 601 OF THE TII SPECIFICATION FOR ROADWORKS, TABLE 6/1, CLASS 8, CLASS 2. MAY BE USED IN GREEN-FIELD AREAS ABOVE GRANULAR PIPE SURROUND MATERIAL SUBJECT TO REVIEW BY FINGLETON WHITE.
5. PIPE BEDDING SHALL COMPLY WITH WIS 4-08-02 AND IGN 4-08-01. THE PIPE BEDDING GRANULAR MATERIAL SHALL BE 14mm TO 5mm ( d/D 2/14 ) GRADED AGGREGATE OR 10mm ( d/D 4/10 ) SINGLE SIZED AGGREGATE TO IS EN 13242. CONCRETE BED, HAUNCH, & SURROUND, WHERE REQUIRED, SHALL BE TO STD-WW-08.
6. IN SOFT GROUND CONDITIONS (CBR < 5) THE MATERIAL SHOULD BE EXCAVATED AND DISPOSED OF IN ACCORDANCE WITH THE WASTE MANAGEMENT ACT AND CLAUSE 804 / 808 MATERIAL IN ACCORDANCE WITH THE TRANSPORT INFRASTRUCTURE IRELAND SPECIFICATION FOR ROAD WORKS SHALL REPLACE THE EXCAVATED MATERIAL, WRAPPED IN GEO-TEXTILE WRAPPING. ALTERNATIVELY, SPECIAL PIPE SUPPORT ARRANGEMENTS, INCLUDING PILING ETC. MAY BE REQUIRED WHERE THE DEPTH OF SOFT MATERIAL IS EXCESSIVE. SUCH ARRANGEMENTS SHALL BE SUBJECT TO ASSESSMENT BY FINGLETON WHITE BEFORE ADVANCING WITH THE WORK.
7. IN GREEN FIELD AREAS, TYPE B BACKFILL (SELECTED EXCAVATED MATERIAL COMPLYING WITH THE REQUIREMENTS OF "ACCEPTABLE MATERIAL" AS OUTLINED ON CLAUSE 601 OF THE TII SPECIFICATION FOR ROADWORKS, TABLE 6/1,CLASS 8,CLASS 2. ) WILL BE ALLOWED ABOVE THE SIDE HAUNCH GRANULAR MATERIAL IN THE CASE OF RIGID PIPES. A GRANULAR SURROUND OF A MINIMUM, DEPTH OF 150mm ABOVE THE CROWN OF THE PIPE IS REQUIRED FOR FLEXIBLE PIPES AND TYPE B MATERIAL MAY BE USED AS BACKFILL ABOVE THIS. ALL RISING MAINS IN GREENFIELD AREAS SHALL HAVE A MINIMUM COVER OF 300mm OF GRANULAR MATERIAL ABOVE THE EXTERNAL CROWN OF THE PIPE.
8. PIPES SHALL NOT BE SUPPORTED ON STONES, ROCKS OR ANY HARD OBJECTS AT ANY POINT ALONG THE TRENCH. ROCK SHALL BE EXCAVATED TO A DEPTH OF 150mm BELOW THE ACTUAL DEPTH OF THE TRENCH WITH THE VOID FILLED WITH CLAUSE 804 / 808 MATERIAL IN ACCORDANCE WITH THE TRANSPORT INFRASTRUCTURE IRELAND SPECIFICATION FOR ROAD WORKS. THE GRANULAR MATERIAL SHALL BE LAID ABOVE THIS VOID BACKFILL MATERIAL.
9. NON DEGRADABLE MARKER TAPE SHOULD BE INSTALLED AT THE TOP OF PIPE BEDDING LAYER FOR SEWERS AND RISING MAINS. IT SHOULD RUN CONTINUOUSLY AROUND MANHOLES. IN THE CASE OF NON METAL PIPE MATERIAL, THE MARKER TAPE SHOULD INCORPORATE A TRACE WIRE WHICH IS LINKED TO FITTINGS AND TERMINATED AT THE WASTE WATER PUMPING STATION (IF PROVIDED) AND THE DISCHARGE MANHOLE.
10. TRENCH WIDTHS FOR PIPE SIZES ≤80mm MAY BE <500mm, SUBJECT TO CONSIDERATION BEING GIVEN TO THE TRENCH DEPTH, HEALTH & SAFETY & CONSTRUCTION ACCESS REQUIREMENTS.
11. NEW ROAD CONSTRUCTION & SURFACE FINISH TO BE TO ROAD AUTHORITY REQUIREMENTS.
12. EXISTING ROAD REINSTATEMENT TO COMPLY WITH CURRENT VERSION OF "GUIDELINES FOR MANAGING OPENINGS IN PUBLIC ROADS" BY THE DEPT. OF TRANSPORT, TOURISM & SPORT, OR TRANSPORT INFRASTRUCTURE IRELAND REQUIREMENTS.
13. REINSTATEMENT DETAIL INCLUDING MATERIAL AND WIDTH OF REINSTATEMENT TO BE CONFIRMED BY FINGLETON WHITE AFTER ROAD OPENING LICENCE IS ISSUED WITH REINSTATEMENT CONDITIONS.
14. FOR PIPE SIZES OTHER THAN 110mm, CONFIRM TRENCH BACKFILL AND BEDDING DETAIL WITH FINGLETON WHITE BEFORE PROCEEDING.

FOR INFORMATION

| REV. | DATE | REVISION | BY | CHKD. | APPR. |
|---|---|---|---|---|---|
| 0 | 11/04/24 | FOR INFORMATION | BMcM | AR | SM |

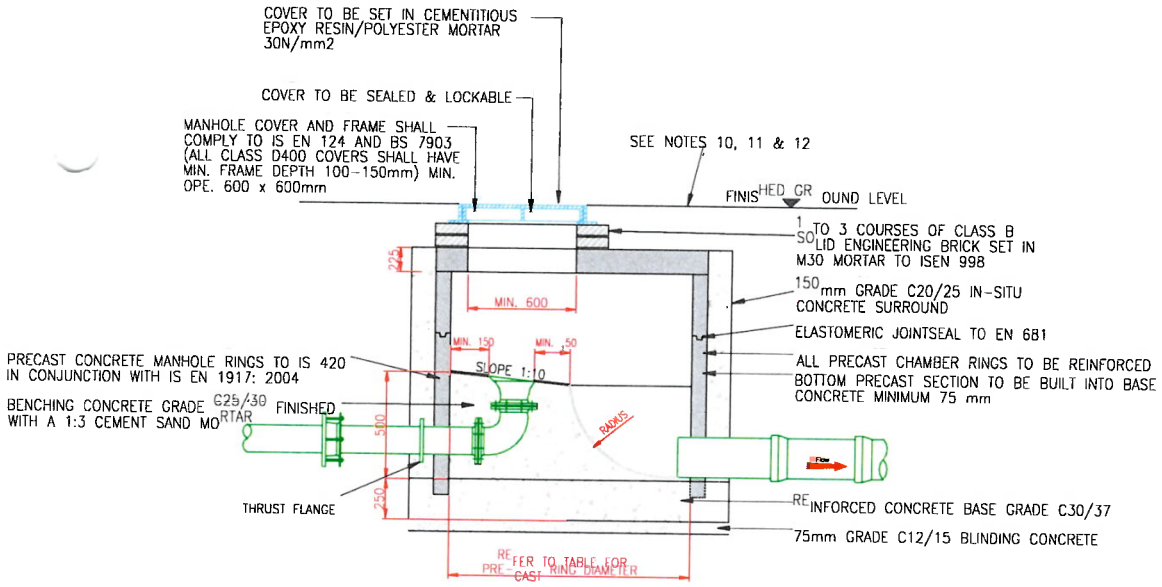
Client
AGB HOLDINGS
BALLYNAGRAN LANDFILL LTD
COOLBEG CROSS, Co. WICKLOW
A67KF63

Fingleton White
Bridge Street Centre
Portlaoise
Co. Laois
R32 W0CC
Ireland
T:(00353)(0)57 866 5400
www.fingleton.ie

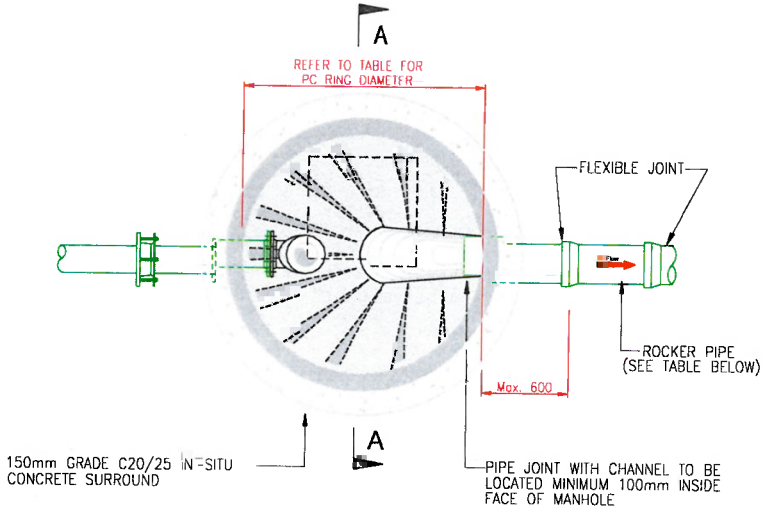
Project
BALLYNAGRAN LANDFILL
TRENCH BACKFILL AND BEDDING

| Drawn | Scale | Drawing Number | Rev. |
|---|---|---|---|
| A.VARCHESE | NTS/A3 | 1371-DC-0003 | 0 |
| Chkd. A.T.ROOBY | Date 11/04/24 | sheet 1 of 1 | |
| Apprd. S.MORRIN | Status ISSUED | | |

# APPENDIX D: Rising Main Discharge Stand Off Manhole




## SECTION A-A




## PLAN

| MINIMUM MANHOLE DIAMETERS | |
|---|---|
| DIAMETER OF LARGEST PIPE IN MANHOLE (mm) | INTERNAL DIAMETER OF MANHOLE (mm) |
| LESS THAN 150 | 1500 |

| ROCKER PIPE LENGTH | |
|---|---|
| PIPE DIAMETER (mm) | ROCKER PIPE LENGTH (mm) |
| 150 TO 600 | 600 |

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE.
2. PRE-CAST MANHOLES UNITS: COMPLYING WITH REQUIREMENTS OF IS EN 1917 AND IS 420.
3. CAST IN-SITU CONCRETE BASE, GRADE C30/35 CONCRETE TO IS EN 206 INCORPORATING CHANNEL BENCHING ETC.
4. MATERIAL DATASHEETS INCLUDING STRUCTURAL DESIGN AND REINFORCEMENT DETAILS TO BE PROVIDED BY THE CONTRACTOR AND SUBMITTED TO FINGLETONWHITE FOR REVIEW AND APPROVAL.
5. MANHOLE ROOF SLABS SHALL BE DESIGNED TO CARRY ALL LIVE AND DEAD LOADS, AND CONSIST OF C30/35 CONCRETE, TO IE EN 206, WITH A MINIMUM THICKNESS OF 225MM. ALTERNATIVELY, PRE-CAST CONCRETE ROOFS MAY BE USED, SUBJECT TO FINGLETON WHITE REVIEW, CONTRACTOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH IS420 & ISEN 1917 IN RESPECT ALL PRECAST UNITS TO FINGLETON WHITE FOR APPROVAL
6. COVERS AND FRAMES SHALL BE SUITABLE FOR ROAD AND TRAFFIC CONDITIONS SUBJECT TO REVIEW BY FINGLETON WHITE.
7. 200mm ALL AROUND, 100mm DEEP CONCRETE PLINTH AROUND COVERS IN GREEN AREAS.
8. ALL CHAMBERS TO BE CHECKED FOR UPLIFT BY FINGLETON WHITE BEFORE INSTALLATION. SHOULD ANTI FLOATATION MEASURES BE REQUIRED THEY SHALL BE SUBJECT TO REVIEW BY FINGLETON WHITE.
9. ALL CONCRETE TO BE IN ACCORDANCE WITH IS EN 206.
10. ANY SPECIAL ROAD REINSTATEMENT AROUND COVER & FRAME SHALL BE TO ROAD AUTHORITY'S REQUIREMENTS.
11. NEW ROAD CONSTRUCTION & SURFACE FINISH TO BE TO ROAD AUTHORITY REQUIREMENTS.
12. EXISTING ROAD REINSTATEMENT TO COMPLY WITH CURRENT VERSION OF "GUIDELINES FOR MANAGING OPENINGS IN PUBLIC ROADS" BY THE DEPT. OF TRANSPORT, TOURISM & SPORT, OR TRANSPORT INFRASTRUCTURE IRELAND REQUIREMENTS.

FOR INFORMATION

| REV. | DATE | REVISION | BY | CHKD. | APPR. |
|---|---|---|---|---|---|
| 0 | 11/04/24 | FOR INFORMATION | BMcM | AR | SM |

Client
AGB HOLDINGS
BALLYNAGRAN LANDFILL LTD
COOLBEG CROSS, Co. WICKLOW
A67KF63

Fingleton White
Bridge Street Centre
Portlaoise
Co. Laois
R32 W0CC
Ireland
T:(00353)(0)57 868 5400
www.fingleton.ie

Project
BALLYNAGRAN LANDFILL
RISING MAIN DISCHARGE
STAND OFF MANHOLE

| Drawn | Scale | Drawing Number | Rev. |
|---|---|---|---|
| A.VARGHESE | NTS/A3 | 1371-DC-0002 | 0 |
| Chkd. A.T.ROOBY | Date 11/04/24 | sheet 1 of 1 | |
| Apprd. S.MORRIN | Status ISSUED | | |

# Appendix C

## Permeate Analysis Results

FITZ SCIENTIFIC
MONITORING & TESTING

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland
Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.fitzsci.ie
email: info@fitzsci.ie

A copy of this certificate is available on www.fitzsci.ie

Customer supplied information appear in italics.

| | | | |
|---|---|---|---|
| **Customer** | *Damien Holmes* | **Lab Report Ref. No.** | 0084/012/01 |
| | *Ballynagran Landfill Ltd* | **Date of Receipt** | 12/10/2021 |
| | *Coolbeg* | **Sampled On** | *11/10/2021* |
| | *Kilbride* | **Date Testing Commenced** | 12/10/2021 |
| | | **Received or Collected** | Delivered by Customer |
| | *Wicklow* | **Condition on Receipt** | Acceptable |
| **Customer PO** | *07648* | **Date of Report** | 20/10/2021 |
| **Customer Ref** | *RO 1* | **Sample Type** | *Water* |
| **Ref 2** | *11/10/21 4pm* | | |
| **Ref 3** | | | |

# CERTIFICATE OF ANALYSIS

| Test Parameter | SOP | Analytical Technique | Result | Units | Acc |
|---|---|---|---|---|---|
| Ammonia | 114 | Colorimetry | 51.7 | mg/L as N | |
| Ammonia as NH3 | 119 | Calculation | 62.73 | mg/L as NH3 | |
| Ammonium as NH4 | 119 | Calculation | 66.42 | mg/L as NH4 | |
| Chloride | 100 | Colorimetry | 33.0 | mg/L | |
| COD | 107 | Colorimetry | 41 | mg/L | |



**Signed :** A Harmon **Date: 20/10/2021**

**Aoife Harmon - Laboratory Supervisor**

Acc. : Accredited Parameters by ISO/IEC 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
All organic results are analysed as received and all results are corrected for dry weight at 104 C
Results shall not be reproduced, except in full, without the approval of Fitz Scientific
Results contained in this report relate only to the samples tested (P) : Presumptive Results
** : The test result for this parameter may be invalid as it has exceeded the recommended holding time (BS EN ISO 5667-3:2018)

Final results will be issued without any estimated uncertainty of measurement being applied This can be supplied on request.
Fitz Scientific maintain allcustomer information in the strictest confidence which is legally enforceable.

FITZ SCIENTIFIC
MONITORING & TESTING

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland
Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.fitzsci.ie
email: info@fitzsci.ie

A copy of this certificate is available on www.fitzsci.ie

Customer supplied information appear in italics.

| | | | |
|---|---|---|---|
| ***Customer*** | ***Damien Holmes*** | ***Lab Report Ref. No.*** | **0084/012/02** |
| | ***Ballynagran Landfill Ltd*** | ***Date of Receipt*** | **12/10/2021** |
| | ***Coolbeg*** | ***Sampled On*** | ***12/10/2021*** |
| | ***Kilbride*** | ***Date Testing Commenced*** | **12/10/2021** |
| | | ***Received or Collected*** | **Delivered by Customer** |
| | ***Wicklow*** | ***Condition on Receipt*** | **Acceptable** |
| ***Customer PO*** | ***07648*** | ***Date of Report*** | **20/10/2021** |
| ***Customer Ref*** | ***RO 2*** | ***Sample Type*** | ***Water*** |
| ***Ref 2*** | ***12/10/21 11am*** | | |
| ***Ref 3*** | | | |

# CERTIFICATE OF ANALYSIS

| Test Parameter | SOP | Analytical Technique | Result | Units | Acc. |
|---|---|---|---|---|---|
| Ammonia | 114 | Colorimetry | 61.6 | mg/L as N | |
| Ammonia as NH3 | 119 | Calculation | 74.75 | mg/L as NH3 | |
| Ammonium as NH4 | 119 | Calculation | 79.15 | mg/L as NH4 | |
| Chloride | 100 | Colorimetry | 35.4 | mg/L | |
| COD | 107 | Colorimetry | 46 | mg/L | |



***Signed :*** A Harmon

***Aoife Harmon - Laboratory Supervisor***

***Date : 20/10/2021***

Acc. : Accredited Parameters by ISO/IEC 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
All organic results are analysed as received and all results are corrected for dry weight at 104 C
Results shall not be reproduced, except in full, without the approval of Fitz Scientific
Results contained in this report relate only to the samples tested (P) : Presumptive Results
** : The test result for this parameter may be invalid as it has exceeded the recommended holding time (BS EN ISO 5667-3:2018)

Final results will be issued without any estimated uncertainty of measurement being applied. This can be supplied on request.
Fitz Scientific maintain all customer information in the strictest confidence which is legally enforceable.

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

O'Callaghan Moran & Associates
Unit 15
Melbourne Business Park
Model Farm
Cork
Ireland

| | |
|---|---|
| **Attention :** | Neil Sandes |
| **Date :** | 28th September, 2021 |
| **Your reference :** | 21-211-02 |
| **Our reference :** | Test Report 21/14364 Batch 1 |
| **Location :** | Ballynagran Landfill Limited |
| **Date samples received :** | 16th September, 2021 |
| **Status :** | Interim report |
| **Issue :** | 1 |

One sample was received for analysis on 16th September, 2021 and was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Authorised By:**

**Phil Sommerton BSc**
**Senior Project Manager**

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

| EMT Sample No. | 1-11 | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |
| Dissolved Antimony | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Arsenic | <2.5 | | | | | | | | | | <2.5 | ug/l | TM30/PM14 |
| Dissolved Barium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Dissolved Beryllium | <0.5 | | | | | | | | | | <0.5 | ug/l | TM30/PM14 |
| Dissolved Boron | 2435 | | | | | | | | | | <12 | ug/l | TM30/PM14 |
| Dissolved Cadmium | <0.5 | | | | | | | | | | <0.5 | ug/l | TM30/PM14 |
| Total Dissolved Chromium | <1.5 | | | | | | | | | | <1.5 | ug/l | TM30/PM14 |
| Dissolved Cobalt | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Copper | <7 | | | | | | | | | | <7 | ug/l | TM30/PM14 |
| Dissolved Lead | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Mercury | <1 | | | | | | | | | | <1 | ug/l | TM30/PM14 |
| Dissolved Molybdenum | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Nickel | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Dissolved Selenium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Dissolved Silver | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Tellurium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Thallium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Dissolved Tin | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Titanium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Uranium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Dissolved Vanadium | <1.5 | | | | | | | | | | <1.5 | ug/l | TM30/PM14 |
| Dissolved Zinc | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Total Antimony | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Total Arsenic | <2.5 | | | | | | | | | | <2.5 | ug/l | TM30/PM14 |
| Total Barium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Total Beryllium | <0.5 | | | | | | | | | | <0.5 | ug/l | TM30/PM14 |
| Total Boron | 2225 | | | | | | | | | | <12 | ug/l | TM30/PM14 |
| Total Cadmium | <0.5 | | | | | | | | | | <0.5 | ug/l | TM30/PM14 |
| Total Chromium | <1.5 | | | | | | | | | | <1.5 | ug/l | TM30/PM14 |
| Total Cobalt | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Total Copper | <7 | | | | | | | | | | <7 | ug/l | TM30/PM14 |
| Total Lead | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Mercury | <1 | | | | | | | | | | <1 | ug/l | TM30/PM14 |
| Total Molybdenum | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Total Nickel | <2 | | | | | | | | | | <2 | ug/l | TM30/PM14 |
| Total Phosphorus | 41 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Selenium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Total Silver | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Tellurium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Thallium | <3 | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| Total Tin | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Titanium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Uranium | <5 | | | | | | | | | | <5 | ug/l | TM30/PM14 |
| Total Vanadium | <1.5 | | | | | | | | | | <1.5 | ug/l | TM30/PM14 |

Please see attached notes for all abbreviations and acronyms

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMTJob No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EMT Sample No.** | 1-11 | | | | | | | | | | | | |
| **Sample ID** | RO PERMATE | | | | | | | | | | | | |
| **Depth** | | | | | | | | | | | | | |
| **COC No / misc** | | | | | | | | | | | | | |
| **Containers** | V H HN Z P BOD G | | | | | | | | | | | | |
| **Sample Date** | 15/09/2021 11:00 | | | | | | | | | | | | |
| **Sample Type** | Liquid | | | | | | | | | | | | |
| **Batch Number** | 1 | | | | | | | | | | | | |
| **Date of Receipt** | 16/09/2021 | | | | | | | | | | | | |
| | | | | | | | | | | | | LOD/LOR | Units | Method No. |
| Total Zinc | <3 | | | | | | | | | | | <3 | ug/l | TM30/PM14 |
| PAH MS | | | | | | | | | | | | | | |
| Naphthalene | <2.0$_{AB}$ | | | | | | | | | | | <0.1 | ug/l | TM4/PM30 |
| Acenaphthylene | <0.260$_{AB}$ | | | | | | | | | | | <0.013 | ug/l | TM4/PM30 |
| Acenaphthene | <0.260$_{AB}$ | | | | | | | | | | | <0.013 | ug/l | TM4/PM30 |
| Fluorene | <0.280$_{AB}$ | | | | | | | | | | | <0.014 | ug/l | TM4/PM30 |
| Phenanthrene | <0.220$_{AB}$ | | | | | | | | | | | <0.011 | ug/l | TM4/PM30 |
| Anthracene | <0.260$_{AB}$ | | | | | | | | | | | <0.013 | ug/l | TM4/PM30 |
| Fluoranthene | <0.240$_{AB}$ | | | | | | | | | | | <0.012 | ug/l | TM4/PM30 |
| Pyrene | <0.260$_{AB}$ | | | | | | | | | | | <0.013 | ug/l | TM4/PM30 |
| Benzo(a)anthracene | <0.300$_{AB}$ | | | | | | | | | | | <0.015 | ug/l | TM4/PM30 |
| Chrysene | <0.220$_{AB}$ | | | | | | | | | | | <0.011 | ug/l | TM4/PM30 |
| Benzo(bk)fluoranthene | <0.360$_{AB}$ | | | | | | | | | | | <0.018 | ug/l | TM4/PM30 |
| Benzo(a)pyrene | <0.320$_{AB}$ | | | | | | | | | | | <0.016 | ug/l | TM4/PM30 |
| Indeno(123cd)pyrene | <0.220$_{AB}$ | | | | | | | | | | | <0.011 | ug/l | TM4/PM30 |
| Dibenzo(ah)anthracene | <0.20$_{AB}$ | | | | | | | | | | | <0.01 | ug/l | TM4/PM30 |
| Benzo(ghi)perylene | <0.220$_{AB}$ | | | | | | | | | | | <0.011 | ug/l | TM4/PM30 |
| PAH 16 Total | <3.900$_{AB}$ | | | | | | | | | | | <0.195 | ug/l | TM4/PM30 |
| Benzo(b)fluoranthene | <0.20$_{AB}$ | | | | | | | | | | | <0.01 | ug/l | TM4/PM30 |
| Benzo(k)fluoranthene | <0.20$_{AB}$ | | | | | | | | | | | <0.01 | ug/l | TM4/PM30 |
| PAH Surrogate % Recovery | 100$_{AB}$ | | | | | | | | | | | <0 | % | TM4/PM30 |
| VOC TICs | ND | | | | | | | | | | | | None | TM15/PM10 |
| SVOC TICs | See Attached | | | | | | | | | | | | None | TM16/PM30 |

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

| EMT Sample No. | 1-11 | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |
| Pesticides | | | | | | | | | | | | | |
| **Organochlorine Pesticides** | | | | | | | | | | | | | |
| Aldrin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Alpha-HCH (BHC) | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Beta-HCH (BHC) | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Chlorothalonil | <2.50 AC | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| cis-Chlordane | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Delta-HCH (BHC) | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Dieldrin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Endosulphan I | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Endosulphan II | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Endosulphan sulphate | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Endrin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Gamma-HCH (BHC) | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Heptachlor | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Heptachlor Epoxide | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Hexachlorobenzene | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Isodrin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| o,p'-DDE | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| o,p'-DDT | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| o,p'-Methoxychlor | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| o,p'-TDE | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| p,p'-DDE | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| p,p'-DDT | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| p,p'-Methoxychlor | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| p,p'-TDE | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Pendimethalin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Permethrin I | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Permethrin II | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Quintozene (PCNB) | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Tecnazene | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Telodrin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| trans-Chlordane | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Triadimefon | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Triallate | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |
| Trifluralin | <0.01 | | | | | | | | | | <0.01 | ug/l | TM149/PM30 |

Please see attached notes for all abbreviations and acronyms

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

| EMT Sample No. | 1-11 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|
| Pesticides | | | | |
| **Organophosphorus Pesticides** | | | | |
| Azinphos ethyl | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Azinphos methyl | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Carbophenothion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Chlorfenvinphos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Chlorpyrifos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Chlorpyrifos-methyl | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Diazinon | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Dichlorvos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Disulfoton | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Dimethoate | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Ethion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Ethyl Parathion (Parathion) | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Etrimphos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Fenitrothion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Fenthion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Malathion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Methyl Parathion | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Mevinphos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Phosalone | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Pirimiphos Methyl | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Propetamphos | <0.01 | <0.01 | ug/l | TM149/PM30 |
| Triazophos | <0.01 | <0.01 | ug/l | TM149/PM30 |

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

| EMT Sample No. | 1-11 | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |
| Acid Herbicides | | | | | | | | | | | | | |
| Benazolin | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Bentazone | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Bromoxynil | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Clopyralid | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| 4-CPA | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| 2,4-D | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| 2,4-DB | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Dicamba | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Dichloroprop | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Diclofop | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Fenoprop | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Flamprop | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Flamprop-isopropyl | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Ioxynil | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| MCPA | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| MCPB | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Mecoprop | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Picloram | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Pentachlorophenol | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| 2,4,5-T | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| 2,3,6-TBA | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Triclopyr | <0.1 | | | | | | | | | | <0.1 | ug/l | TM42/PM30 |
| Mineral Oil (C10-C40) | <200 AB | | | | | | | | | | <10 | ug/l | TM5/PM16/PM30 |
| PCB 28 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 52 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 101 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 118 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 138 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 153 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| PCB 180 | <0.1 | | | | | | | | | | <0.1 | ug/l | TM17/PM30 |
| Total 7 PCBs | <0.7 | | | | | | | | | | <0.7 | ug/l | TM17/PM30 |
| Total Phenols HPLC | <0.15 | | | | | | | | | | <0.15 | mg/l | TM26/PM0 |
| Fluoride | <0.3 | | | | | | | | | | <0.3 | mg/l | TM173/PM0 |
| Sulphate as SO4 | 32.3 | | | | | | | | | | <0.5 | mg/l | TM38/PM0 |
| Chloride | 58.8 | | | | | | | | | | <0.3 | mg/l | TM38/PM0 |
| Nitrate as NO3 | <0.2 | | | | | | | | | | <0.2 | mg/l | TM38/PM0 |
| Ortho Phosphate as PO4 | <0.06 | | | | | | | | | | <0.06 | mg/l | TM38/PM0 |

Please see attached notes for all abbreviations and acronyms

## Element Materials Technology

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle
H=$H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EMT Sample No.** | 1-11 | | | | | | | | | | | | |
| **Sample ID** | RO PERMATE | | | | | | | | | | | | |
| **Depth** | | | | | | | | | | | | | |
| **COC No / misc** | | | | | | | | | | | | | |
| **Containers** | V H HN Z P BOD G | | | | | | | | | | | | |
| **Sample Date** | 15/09/2021 11:00 | | | | | | | | | | | | |
| **Sample Type** | Liquid | | | | | | | | | | | | |
| **Batch Number** | 1 | | | | | | | | | | | | |
| **Date of Receipt** | 16/09/2021 | | | | | | | | | | | | |
| | | | | | | | | | | | | LOD/LOR | Units | Method No. |
| Total Cyanide | <0.10 AA | | | | | | | | | | | <0.01 | mg/l | TM89/PM0 |
| Ammoniacal Nitrogen as N | 62.59 | | | | | | | | | | | <0.03 | mg/l | TM38/PM0 |
| Ammoniacal Nitrogen as NH3 | 76.09 | | | | | | | | | | | <0.03 | mg/l | TM38/PM0 |
| Ammoniacal Nitrogen as NH4 | 80.60 | | | | | | | | | | | <0.03 | mg/l | TM38/PM0 |
| Dissolved Methane | >>1214 | | | | | | | | | | | <1 | ug/l | TM25/PM0 |
| Dibutyltin | <0.1 | | | | | | | | | | | <0.1 | ug/l | TM94/PM48 |
| Tributyltin | <0.1 | | | | | | | | | | | <0.1 | ug/l | TM94/PM48 |
| Triphenyltin | <0.1 | | | | | | | | | | | <0.1 | ug/l | TM94/PM48 |
| Sulphide | <0.01 | | | | | | | | | | | <0.01 | mg/l | TM107/PM0 |
| Anionic Surfactants | 1.4 | | | | | | | | | | | <0.2 | mg/l | TM33/PM0 |
| BOD (Settled) | 40 | | | | | | | | | | | <1 | mg/l | TM58/PM0 |
| cBOD (Settled) | 69 | | | | | | | | | | | <1 | mg/l | TM58/PM0 |
| COD (Settled) | 100 | | | | | | | | | | | <7 | mg/l | TM57/PM0 |
| COD (Shaken) | 111 | | | | | | | | | | | <7 | mg/l | TM57/PM0 |
| Electrical Conductivity @25C | 1376 | | | | | | | | | | | <2 | uS/cm | TM76/PM0 |
| Fats Oils and Grease | 9 | | | | | | | | | | | <4 | mg/l | TM187/PM30 |
| Free/Residual Chlorine | <0.02 | | | | | | | | | | | <0.02 | mg/l | TM66/PM0 |
| Settleable Solids | <2 | | | | | | | | | | | <2 | ml/l | TM67/PM0 |
| Silica | NDP | | | | | | | | | | | <0.01 | mg/l | TM52/PM0 |
| Total Dissolved Solids | 616 | | | | | | | | | | | <35 | mg/l | TM20/PM0 |
| Total Nitrogen | 63.2 | | | | | | | | | | | <0.5 | mg/l | TM38/TM125/PM0 |
| Total Suspended Solids | <10 | | | | | | | | | | | <10 | mg/l | TM37/PM0 |
| Mass of Total Solids incl. Microplastics (Water)* | < 0.001 | | | | | | | | | | | < 0.001 | g | Subcontracted |
| Mass of Microplastics (Water)* | < 0.001 | | | | | | | | | | | < 0.001 | g | Subcontracted |




All solid results are expressed on a dry weight basis unless stated otherwise.

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**SVOC Report :** Liquid

| EMT Sample No. | 1-11 | | | | | | | | | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |
| SVOC MS | | | | | | | | | | | | | |
| **Phenols** | | | | | | | | | | | | | |
| 2-Chlorophenol | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 2-Methylphenol | 1.8 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 2-Nitrophenol | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 2,4-Dichlorophenol | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 2,4-Dimethylphenol | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 2,4,5-Trichlorophenol | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 2,4,6-Trichlorophenol | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Chloro-3-methylphenol | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 4-Methylphenol | 28 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Nitrophenol | <10 | | | | | | | | | | <10 | ug/l | TM16/PM30 |
| Pentachlorophenol | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Phenol | 21 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| **PAHs** | | | | | | | | | | | | | |
| 2-Chloronaphthalene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 2-Methylnaphthalene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| **Phthalates** | | | | | | | | | | | | | |
| Bis(2-ethylhexyl) phthalate | <5 | | | | | | | | | | <5 | ug/l | TM16/PM30 |
| Butylbenzyl phthalate | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Di-n-butyl phthalate | <1.5 | | | | | | | | | | <1.5 | ug/l | TM16/PM30 |
| Di-n-Octyl phthalate | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Diethyl phthalate | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Dimethyl phthalate | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| **Other SVOCs** | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 1,2,4-Trichlorobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 1,3-Dichlorobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 1,4-Dichlorobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 2-Nitroaniline | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 2,4-Dinitrotoluene | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| 2,6-Dinitrotoluene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 3-Nitroaniline | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Bromophenylphenylether | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Chloroaniline | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Chlorophenylphenylether | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| 4-Nitroaniline | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Azobenzene | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Bis(2-chloroethoxy)methane | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Bis(2-chloroethyl)ether | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Carbazole | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Dibenzofuran | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Hexachlorobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Hexachlorobutadiene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Hexachlorocyclopentadiene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Hexachloroethane | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Isophorone | <0.5 | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| N-nitrosodi-n-propylamine | <0.5+ | | | | | | | | | | <0.5 | ug/l | TM16/PM30 |
| Nitrobenzene | <1 | | | | | | | | | | <1 | ug/l | TM16/PM30 |
| Surrogate Recovery 2-Fluorobiphenyl | 125 | | | | | | | | | | <0 | % | TM16/PM30 |
| Surrogate Recovery p-Terphenyl-d14 | 129 | | | | | | | | | | <0 | % | TM16/PM30 |

Please see attached notes for all abbreviations and acronyms

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes
**EMT Job No:** 21/14364

**VOC Report :** Liquid

| EMT Sample No. | 1-11 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | RO PERMATE | | | | | | | | | | | | |
| Depth | | | | | | | | | | | | | |
| COC No / misc | | | | | | | | | | | | | |
| Containers | V H HN Z P BOD G | | | | | | | | | | | | |
| Sample Date | 15/09/2021 11:00 | | | | | | | | | | | | |
| Sample Type | Liquid | | | | | | | | | | | | |
| Batch Number | 1 | | | | | | | | | | | | |
| Date of Receipt | 16/09/2021 | | | | | | | | | | | | |

Please see attached notes for all abbreviations and acronyms

| | | LOD/LOR | Units | Method No. |
|---|---|---|---|---|
| VOC MS | | | | |
| Dichlorodifluoromethane | <2 | <2 | ug/l | TM15/PM10 |
| Methyl Tertiary Butyl Ether | <0.1 | <0.1 | ug/l | TM15/PM10 |
| Chloromethane | <3 | <3 | ug/l | TM15/PM10 |
| Vinyl Chloride | <0.1 | <0.1 | ug/l | TM15/PM10 |
| Bromomethane | <1 | <1 | ug/l | TM15/PM10 |
| Chloroethane | <3 | <3 | ug/l | TM15/PM10 |
| Trichlorofluoromethane | <3 | <3 | ug/l | TM15/PM10 |
| 1,1-Dichloroethene (1,1 DCE) | <3 | <3 | ug/l | TM15/PM10 |
| Dichloromethane (DCM) | <3 | <3 | ug/l | TM15/PM10 |
| trans-1-2-Dichloroethene | <3 | <3 | ug/l | TM15/PM10 |
| 1,1-Dichloroethane | <3 | <3 | ug/l | TM15/PM10 |
| cis-1-2-Dichloroethene | <3 | <3 | ug/l | TM15/PM10 |
| 2,2-Dichloropropane | <1 | <1 | ug/l | TM15/PM10 |
| Bromochloromethane | <2 | <2 | ug/l | TM15/PM10 |
| Chloroform | <2 | <2 | ug/l | TM15/PM10 |
| 1,1,1-Trichloroethane | <2 | <2 | ug/l | TM15/PM10 |
| 1,1-Dichloropropene | <3 | <3 | ug/l | TM15/PM10 |
| Carbon tetrachloride | <2 | <2 | ug/l | TM15/PM10 |
| 1,2-Dichloroethane | <2 | <2 | ug/l | TM15/PM10 |
| Benzene | <0.5 | <0.5 | ug/l | TM15/PM10 |
| Trichloroethene (TCE) | <3 | <3 | ug/l | TM15/PM10 |
| 1,2-Dichloropropane | <2 | <2 | ug/l | TM15/PM10 |
| Dibromomethane | <3 | <3 | ug/l | TM15/PM10 |
| Bromodichloromethane | <2 | <2 | ug/l | TM15/PM10 |
| cis-1-3-Dichloropropene | <2 | <2 | ug/l | TM15/PM10 |
| Toluene | <5 | <5 | ug/l | TM15/PM10 |
| trans-1-3-Dichloropropene | <2 | <2 | ug/l | TM15/PM10 |
| 1,1,2-Trichloroethane | <2 | <2 | ug/l | TM15/PM10 |
| Tetrachloroethene (PCE) | <3 | <3 | ug/l | TM15/PM10 |
| 1,3-Dichloropropane | <2 | <2 | ug/l | TM15/PM10 |
| Dibromochloromethane | <2 | <2 | ug/l | TM15/PM10 |
| 1,2-Dibromoethane | <2 | <2 | ug/l | TM15/PM10 |
| Chlorobenzene | <2 | <2 | ug/l | TM15/PM10 |
| 1,1,1,2-Tetrachloroethane | <2 | <2 | ug/l | TM15/PM10 |
| Ethylbenzene | <1 | <1 | ug/l | TM15/PM10 |
| m/p-Xylene | <2 | <2 | ug/l | TM15/PM10 |
| o-Xylene | <1 | <1 | ug/l | TM15/PM10 |
| Styrene | <2 | <2 | ug/l | TM15/PM10 |
| Bromoform | <2 | <2 | ug/l | TM15/PM10 |
| Isopropylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 1,1,2,2-Tetrachloroethane | <4 | <4 | ug/l | TM15/PM10 |
| Bromobenzene | <2 | <2 | ug/l | TM15/PM10 |
| 1,2,3-Trichloropropane | <3 | <3 | ug/l | TM15/PM10 |
| Propylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 2-Chlorotoluene | <3 | <3 | ug/l | TM15/PM10 |
| 1,3,5-Trimethylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 4-Chlorotoluene | <3 | <3 | ug/l | TM15/PM10 |
| tert-Butylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 1,2,4-Trimethylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| sec-Butylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 4-Isopropyltoluene | <3 | <3 | ug/l | TM15/PM10 |
| 1,3-Dichlorobenzene | <3 | <3 | ug/l | TM15/PM10 |
| 1,4-Dichlorobenzene | <3 | <3 | ug/l | TM15/PM10 |
| n-Butylbenzene | <3 | <3 | ug/l | TM15/PM10 |
| 1,2-Dichlorobenzene | <3 | <3 | ug/l | TM15/PM10 |
| 1,2-Dibromo-3-chloropropane | <2 | <2 | ug/l | TM15/PM10 |
| 1,2,4-Trichlorobenzene | <3 | <3 | ug/l | TM15/PM10 |
| Hexachlorobutadiene | <3 | <3 | ug/l | TM15/PM10 |
| Naphthalene | <2 | <2 | ug/l | TM15/PM10 |
| 1,2,3-Trichlorobenzene | <3 | <3 | ug/l | TM15/PM10 |
| Surrogate Recovery Toluene D8 | 101 | <0 | % | TM15/PM10 |
| Surrogate Recovery 4-Bromofluorobenzene | 97 | <0 | % | TM15/PM10 |

**Job number:** 21/14364 **Method:** SVOC
**Sample number:** 11 **Matrix:** Liquid
**Sample identity:** RO PERMATE
**Sample depth:**
**Sample Type:** Liquid
**Units:** ug/l

***Note:*** Only samples with TICs (if requested) are reported. If TICs were requested but no compounds found they are not reported.

| CAS No. | Tentative Compound Identification | Retention Time (minutes) | % Match | Concentration |
|---|---|---|---|---|
| 57-10-3 | n-Hexadecanoic acid | 11.199 | 99 | 129 |
| 60-33-3 | 9,12-Octadecadienoic acid (Z,Z)- | 11.927 | 98 | 124 |
| 112-80-1 | Oleic Acid | 11.961 | 99 | 312 |



All solid results are expressed on a dry weight basis unless stated otherwise.

**ClientName:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes

Ma : : Liquid

| EMT Job No. | Batch | Sample ID | Depth | EMT Sample No. | Method No. | NDP Reason |
|---|---|---|---|---|---|---|
| 21/14364 | 1 | RO PERMATE | | 1-11 | TM52/PM0 | Sample contains compounds that interfere with this test |

**Client Name:** O'Callaghan Moran & Associates
**Reference:** 21-211-02
**Location:** Ballynagran Landfill Limited
**Contact:** Neil Sandes

| EMT Job No. | Batch | Sample ID | Depth | EMT Sample No. | Analysis | Reason |
|---|---|---|---|---|---|---|
| No deviating sample report results for job 21/14364 | | | | | | |

**Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.**
**Only analyses which are accredited are recorded as deviating if set criteria are not met.**

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

***EMT Job No.:*** 21/14364

**SOILS**

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

**WATERS**

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

**DEVIATING SAMPLES**

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

**SURROGATES**

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

**DILUTIONS**

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

**BLANKS**

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

**NOTE**

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method nu[illegible] not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

**ABBREVIATIONS and ACRONYMS USED**

| | |
|---|---|
| # | ISO17025 (UKAS Ref No. 4225) accredited - UK. |
| SA | ISO17025 (SANAS Ref No.T0729) accredited - South Africa |
| B | Indicates analyte found in associated method blank. |
| DR | Dilution required. |
| M | MCERTS accredited. |
| NA | Not applicable |
| NAD | No Asbestos Detected. |
| ND | None Detected (usually refers to VOC and/SVOC TICs). |
| NDP | No Determination Possible |
| SS | Calibrated against a single substance |
| SV | Surrogate recovery outside performance criteria. This may be due to a matrix effect. |
| W | Results expressed on as received basis. |
| + | AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page. |
| >> | Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher. |
| * | Analysis subcontracted to an Element Materials Technology approved laboratory. |
| AD | Samples are dried at 35°C ±5°C |
| CO | Suspected carry over |
| LOD/LOR | Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS |
| ME | Matrix Effect |
| NFD | No Fibres Detected |
| BS | AQC Sample |
| LB | Blank Sample |
| N | Client Sample |
| TB | Trip Blank Sample |
| OC | Outside Calibration Range |
| AA | x10 Dilution |

| | |
|---|---|
| AB | x20 Dilution |
| AC | x250 Dilution |

**HWOL ACRONYMS AND OPERATORS USED**

| | |
|---|---|
| HS | Headspace Analysis. |
| EH | Extractable Hydrocarbons - i.e. everything extracted by the solvent. |
| CU | Clean-up - e.g. by florisil, silica gel. |
| 1D | GC - Single coil gas chromatography. |
| Total | Aliphatics & Aromatics. |
| AL | Aliphatics only. |
| AR | Aromatics only. |
| 2D | GC-GC - Double coil gas chromatography. |
| #1 | EH_Total but with humics mathematically subtracted |
| #2 | EU_Total but with fatty acids mathematically subtracted |
| _ | Operator - underscore to separate acronyms (exception for +). |
| + | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total |
| MS | Mass Spectrometry. |

**EMT Job No:** 21/14364

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM4 | Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS. | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM5 | Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present. | PM16/PM30 | Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM15 | Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS. | PM10 | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis. | | | | |
| TM16 | Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS. | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM17 | Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS. | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM20 | Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids | PM0 | No preparation is required. | | | | |
| TM25 | Determintaion of Dissolved Methane, Ethane and Ethene by Headspace GC-FID | PM0 | No preparation is required. | | | | |
| TM26 | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection. | PM0 | No preparation is required. | | | | |
| TM30 | Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996 | PM14 | Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified | | | | |
| 33 | Determination of Anionic surfactants by reaction with Methylene Blue to form complexes which are analysed spectrophotometrically. (MBAS) | PM0 | No preparation is required. | | | | |

EMT Job No: 21/14364

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM37 | Modified methods - TSS: USEPA 160.2 (1985), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS | PM0 | No preparation is required. | | | | |
| TM38 | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013 | PM0 | No preparation is required. | | | | |
| TM38/TM125 | Total Nitogen/Organic Nitrogen by calculation | PM0 | No preparation is required. | | | | |
| TM42 | Modified US EPA method 8270D v5:2014. Pesticides and herbicides by GC-MS | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM52 | Silica determination by reaction with Amino Acid F Reagent, Citric acid and Molybdate Reagent which is analysed spectrophotometrically. | PM0 | No preparation is required. | | | | |
| TM57 | Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically. | PM0 | No preparation is required. | | | | |
| TM58 | APHA SMEWW 5210B:1999 22nd Edition. Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am | PM0 | No preparation is required. | | | | |
| TM66 | Determination of Free Chlorine which reacts with DPD (N,N-diethyl-p-phenylenediamine) reagent and measured spectrophotometrically. | PM0 | No preparation is required. | | | | |
| TM67 | Modified US EPA method 160.5 (1974). Volumetric analysis of settleable solids in water using an Imhoff Cone. | PM0 | No preparation is required. | | | | |
| TM76 | Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser. | PM0 | No preparation is required. | | | | |

**EMT Job No:** 21/14364

| Test Method No. | Description | Prep Method No. (if appropriate) | Description | ISO 17025 (UKAS/SANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|---|---|---|---|---|---|---|---|
| TM89 | Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis. | PM0 | No preparation is required. | | | | |
| TM94 | Derivatisation and extraction of Organotins. Analysis by GC-MS | PM48 | Samples are pretreated and derivatised. The derviatised organotins are then extracted using hexane. | | | | |
| TM107 | Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser | PM0 | No preparation is required. | | | | |
| TM149 | Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270D v5:2014 | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |
| TM173 | Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998) | PM0 | No preparation is required. | | | | |
| TM187 | Hexane extractable oil and grease in Waters is determined by IR detection at absorbance 2940cm-1 using calibrated InfraCal 2, ATR-SP | PM30 | Water samples are extracted with solvent using a magnetic stirrer to create a vortex. | | | | |

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | | Chemtest Job No.: | | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | Chemtest Sample ID.: | | 992177 | 992178 |
| | | | Sample Location: | | T104-Conc | T103-Perm |
| | | | Sample Type: | | WATER | WATER |
| | | | Date Sampled: | | 23-Mar-2020 | 23-Mar-2020 |
| Determinand | Accred. | SOP | Units | LOD | | |
| Dioxins (Subcon) | S | | | N/A | See Attached | See Attached |
| Furans (Subcon) | S | | | N/A | See Attached | See Attached |
| Isodrin | N | 1790 | µg/l | 1.5 | < 1.5 | < 1.5 |
| Diuron | N | 1830 | mg/l | 1.0 | < 1.0 | < 1.0 |
| Isoproturon | N | 1830 | mg/l | 1.0 | < 1.0 | < 1.0 |
| Linuron | N | 1830 | mg/l | 1.0 | < 1.0 | < 1.0 |
| pH | U | 1010 | | N/A | 8.1 | 8.2 |
| Electrical Conductivity | U | 1020 | µS/cm | 1.0 | 16000 | 870 |
| Suspended Solids At 105C | U | 1030 | mg/l | 5.0 | 270 | < 5.0 |
| Total Dissolved Solids | N | 1020 | mg/l | 1.0 | 10000 | 570 |
| Biochemical Oxygen Demand | N | 1090 | mg O2/l | 4.0 | [B] 520 | [B] 6.0 |
| Chemical Oxygen Demand | U | 1100 | mg O2/l | 10 | 4400 | 31 |
| Alkalinity (Total) | U | 1220 | mg/l | 10 | 6900 | 42 |
| Chloride | U | 1220 | mg/l | 1.0 | 1300 | 46 |
| Fluoride | U | 1220 | mg/l | 0.050 | 2.6 | 0.17 |
| Ammonia (Free) | U | 1220 | mg/l | 0.050 | 77 | 1.3 |
| Phosphorus (Total) | N | 1220 | mg/l | 0.020 | 5.0 | 0.053 |
| Sulphate | U | 1220 | mg/l | 1.0 | 1000 | 25 |
| Total Oxidised Nitrogen | U | 1220 | mg/l | 0.20 | < 0.20 | < 0.20 |
| Calcium | U | 1415 | mg/l | 5.0 | 200 | 29 |
| Total Hardness as CaCO3 | U | 1270 | mg/l | 15 | 980 | 130 |
| Arsenic (Dissolved) | U | 1450 | µg/l | 1.0 | 250 | 2.2 |
| Boron (Dissolved) | U | 1450 | µg/l | 20 | 7000 | 130 |
| Barium (Dissolved) | U | 1450 | µg/l | 5.0 | 300 | < 5.0 |
| Beryllium (Dissolved) | U | 1450 | µg/l | 1.0 | 1.8 | < 1.0 |
| Cadmium (Dissolved) | U | 1450 | µg/l | 0.080 | 1.1 | < 0.080 |
| Cobalt (Dissolved) | U | 1450 | µg/l | 1.0 | 22 | < 1.0 |
| Chromium (Dissolved) | U | 1450 | µg/l | 1.0 | 340 | 2.0 |
| Copper (Dissolved) | U | 1450 | µg/l | 1.0 | 9.5 | 2.1 |
| Mercury (Dissolved) | U | 1450 | µg/l | 0.50 | 16 | 2.0 |
| Manganese (Dissolved) | U | 1450 | µg/l | 1.0 | 770 | 5.8 |
| Molybdenum (Dissolved) | U | 1450 | µg/l | 1.0 | 3.5 | < 1.0 |
| Nickel (Dissolved) | U | 1450 | µg/l | 1.0 | 200 | 1.5 |
| Lead (Dissolved) | U | 1450 | µg/l | 1.0 | 1.0 | < 1.0 |
| Antimony (Dissolved) | U | 1450 | µg/l | 1.0 | 72 | < 1.0 |
| Selenium (Dissolved) | U | 1450 | µg/l | 1.0 | 69 | < 1.0 |
| Tin (Dissolved) | U | 1450 | µg/l | 1.0 | 12 | < 1.0 |
| Vanadium (Dissolved) | U | 1450 | µg/l | 1.0 | 200 | < 1.0 |
| Zinc (Dissolved) | U | 1450 | µg/l | 1.0 | 130 | 21 |
| Total Organic Carbon | U | 1610 | mg/l | 2.0 | 1500 | 210 |

Chemtest
The right chemistry to deliver results

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | | Chemtest Job No.: | | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | Chemtest Sample ID.: | | 992177 | 992178 |
| | | | Sample Location: | | T104-Conc | T103-Perm |
| | | | Sample Type: | | WATER | WATER |
| | | | Date Sampled: | | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | |
| Aliphatic TPH >C5-C6 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C6-C8 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C8-C10 | N | 1675 | µg/l | 0.10 | 15 | < 0.10 |
| Aliphatic TPH >C10-C12 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C12-C16 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C16-C21 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C21-C35 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aliphatic TPH >C35-C44 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Total Aliphatic Hydrocarbons | N | 1675 | µg/l | 5.0 | 15 | < 5.0 |
| Aromatic TPH >C5-C7 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aromatic TPH >C7-C8 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aromatic TPH >C8-C10 | N | 1675 | µg/l | 0.10 | 28 | < 0.10 |
| Aromatic TPH >C10-C12 | N | 1675 | µg/l | 0.10 | 370 | < 0.10 |
| Aromatic TPH >C12-C16 | N | 1675 | µg/l | 0.10 | 98 | < 0.10 |
| Aromatic TPH >C16-C21 | N | 1675 | µg/l | 0.10 | 31 | < 0.10 |
| Aromatic TPH >C21-C35 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Aromatic TPH >C35-C44 | N | 1675 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Total Aromatic Hydrocarbons | N | 1675 | µg/l | 5.0 | 530 | < 5.0 |
| Total Petroleum Hydrocarbons | N | 1675 | µg/l | 10 | 540 | < 10 |
| Naphthalene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Acenaphthylene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Acenaphthene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Fluorene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Phenanthrene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Anthracene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Fluoranthene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Pyrene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Benzo[a]anthracene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Chrysene | N | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Benzo[b]fluoranthene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Benzo[k]fluoranthene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Benzo[a]pyrene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Indeno(1,2,3-c,d)Pyrene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Dibenz(a,h)Anthracene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Benzo[g,h,i]perylene | U | 1700 | µg/l | 0.10 | < 0.10 | < 0.10 |
| Total [illegible] PAH's | N | 1700 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Organotin (total as TBTO) | N | 1730 | µg/l | 0.050 | < 0.050 | < 0.050 |
| Dibutyl Tin | N | 1730 | µg/l | 0.050 | < 0.050 | < 0.050 |
| Tetrabutyl Tin | N | 1730 | µg/l | 0.0010 | < 0.0010 | < 0.0010 |
| Tributyl Tin | N | 1730 | µg/l | 0.0500 | < 0.050 | < 0.050 |

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | Chemtest Job No.: | | | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | Chemtest Sample ID.: | | | 992177 | 992178 |
| | | Sample Location: | | | T104-Conc | T103-Perm |
| | | Sample Type: | | | WATER | WATER |
| | | Date Sampled: | | | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | |
| Triphenyl Tin | N | 1730 | µg/l | 0.050 | < 0.050 | < 0.050 |
| Monobutyl Tin | N | 1730 | µg/l | 0.050 | < 0.050 | < 0.050 |
| Dichlorodifluoromethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Chloromethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Vinyl Chloride | N | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Bromomethane | U | 1760 | µg/l | 5.0 | < 5.0 | < 5.0 |
| Chloroethane | U | 1760 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Trichlorofluoromethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloroethene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Dichloromethane | N | 1760 | µg/l | 20 | < 20 | < 20 |
| Trans 1,2-Dichloroethene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloroethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| cis 1,2-Dichloroethene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Bromochloromethane | U | 1760 | µg/l | 5.0 | < 5.0 | < 5.0 |
| Trichloromethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,1,1-Trichloroethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Tetrachloromethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloropropene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Benzene | U | 1760 | µg/l | 1.0 | 1.5 | < 1.0 |
| 1,2-Dichloroethane | U | 1760 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Trichloroethene | N | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2-Dichloropropane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Dibromomethane | U | 1760 | µg/l | 10 | < 10 | < 10 |
| Bromodichloromethane | U | 1760 | µg/l | 5.0 | < 5.0 | < 5.0 |
| cis-1,3-Dichloropropene | N | 1760 | µg/l | 10 | < 10 | < 10 |
| Toluene | U | 1760 | µg/l | 1.0 | 8.6 | < 1.0 |
| Trans-1,3-Dichloropropene | N | 1760 | µg/l | 10 | < 10 | < 10 |
| 1,1,2-Trichloroethane | U | 1760 | µg/l | 10 | < 10 | < 10 |
| Tetrachloroethene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,3-Dichloropropane | U | 1760 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Dibromochloromethane | U | 1760 | µg/l | 10 | < 10 | < 10 |
| 1,2-Dibromoethane | U | 1760 | µg/l | 5.0 | < 5.0 | < 5.0 |
| Chlorobenzene | N | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,1,1,2-Tetrachloroethane | U | 1760 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Ethylbenzene | U | 1760 | µg/l | 1.0 | 3.1 | < 1.0 |
| m & p-Xylene | U | 1760 | µg/l | 1.0 | 5.5 | < 1.0 |
| o-Xylene | U | 1760 | µg/l | 1.0 | 3.9 | < 1.0 |
| Styrene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Tribromomethane | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Isopropylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | | Chemtest Job No.: | | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | Chemtest Sample ID.: | | 992177 | 992178 |
| | | | Sample Location: | | T104-Conc | T103-Perm |
| | | | Sample Type: | | WATER | WATER |
| | | | Date Sampled: | | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | |
| Bromobenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2,3-Trichloropropane | N | 1760 | µg/l | 50 | < 50 | < 50 |
| N-Propylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 2-Chlorotoluene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,3,5-Trimethylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 4-Chlorotoluene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Tert-Butylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2,4-Trimethylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Sec-Butylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,3-Dichlorobenzene | N | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 4-Isopropyltoluene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,4-Dichlorobenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| N-Butylbenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2-Dichlorobenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2-Dibromo-3-Chloropropane | U | 1760 | µg/l | 50 | < 50 | < 50 |
| 1,2,4-Trichlorobenzene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Hexachlorobutadiene | U | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| 1,2,3-Trichlorobenzene | U | 1760 | µg/l | 2.0 | < 2.0 | < 2.0 |
| Methyl Tert-Butyl Ether | N | 1760 | µg/l | 1.0 | < 1.0 | < 1.0 |
| Carbon Tetrachloride | N | 1760 | µg/l | 10 | < 10 | < 10 |
| N-Nitrosodimethylamine | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Phenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Chlorophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Bis-(2-Chloroethyl)Ether | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 1,3-Dichlorobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 1,4-Dichlorobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 1,2-Dichlorobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Methylphenol (o-Cresol) | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Bis(2-Chloroisopropyl)Ether | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Hexachloroethane | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| N-Nitrosodi-n-propylamine | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Methylphenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Nitrobenzene | N | 1790 | µg/l | 0.50 | 4.9 | < 0.50 |
| Isophorone | N | 1790 | µg/l | 0.50 | 1.9 | < 0.50 |
| 2-Nitrophenol | N | 1790 | µg/l | 0.50 | 23 | < 0.50 |
| 2,4-Di[illegible]ylphenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Bis(2-Chloroethoxy)Methane | N | 1790 | µg/l | 0.50 | 8.6 | < 0.50 |
| 2,4-Dichlorophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 1,2,4-Trichlorobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Naphthalene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | | | | Chemtest Job No.: | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | | | Chemtest Sample ID.: | 992177 | 992178 |
| | | | | | Sample Location: | T104-Conc | T103-Perm |
| | | | | | Sample Type: | WATER | WATER |
| | | | | | Date Sampled: | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | | |
| 4-Chloroaniline | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Hexachlorobutadiene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Chloro-3-Methylphenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Methylnaphthalene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Hexachlorocyclopentadiene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2,4,6-Trichlorophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2,4,5-Trichlorophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Chloronaphthalene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Nitroaniline | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Acenaphthylene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Dimethylphthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2,6-Dinitrotoluene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Acenaphthene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 3-Nitroaniline | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Dibenzofuran | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Chlorophenylphenylether | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2,4-Dinitrotoluene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Fluorene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Diethyl phthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Nitroaniline | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 2-Methyl-4,6-Dinitrophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Azobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Bromophenylphenyl Ether | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Hexachlorobenzene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Pentachlorophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Phenanthrene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Anthracene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Carbazole | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Di-N-Butyl Phthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Fluoranthene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Pyrene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Butylbenzyl phthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Benzo[a]anthracene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Chrysene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Bis(2-Ethylhexyl)Phthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Di-N-Octyl Phthalate | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Benzo[b]fluoranthene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Benzo[k]fluoranthene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Benzo[a]pyrene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Indeno(1,2,3-c,d)Pyrene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |

Chemtest
The right chemistry to deliver results

# Results - Water

**Project: 20-211-02 BNG Leachate**

| Client: O Callaghan Moran & Associates | | | Chemtest Job No.: | | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | Chemtest Sample ID.: | | 992177 | 992178 |
| | | | Sample Location: | | T104-Conc | T103-Perm |
| | | | Sample Type: | | WATER | WATER |
| | | | Date Sampled: | | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | |
| Dibenz(a,h)Anthracene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| Benzo[g,h,i]perylene | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| 4-Nitrophenol | N | 1790 | µg/l | 0.50 | < 0.50 | < 0.50 |
| PCB 28 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 52 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 90+101 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 118 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 153 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 138 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| PCB 180 | U | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| Total PCBs (7 congeners) | N | 1815 | µg/l | 0.010 | < 0.010 | < 0.010 |
| Demeton-O | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Phorate | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Demeton-S | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Disulfoton | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Fenthion | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Trichloronate | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Prothiofos | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Fensulphothion | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Sulprofos | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Azinphos-Methyl | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Coumaphos | N | 1820 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Atraton | N | 1830 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Simazine | N | 1830 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Atrazine | N | 1830 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Alpha-HCH | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Gamma-HCH (Lindane) | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Beta-HCH | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Delta-HCH | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Heptachlor | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Aldrin | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Heptachlor Epoxide | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Gamma-Chlordane | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Alpha-Chlordane | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Endosulfan I | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| 4,4-D[illegible] | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Dieldrin | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Endrin | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| 4,4-DDD | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |
| Endosulfan II | N | 1840 | µg/l | 0.20 | < 0.20 | < 0.20 |

# Results - Water

project: 20-211-02 BNG Leachate

| Client: O Callaghan Moran & Associates | | | | | Chemtest Job No.: | 20-09440 | 20-09440 |
|---|---|---|---|---|---|---|---|
| Quotation No.: Q20-19673 | | | | | Chemtest Sample ID.: | 992177 | 992178 |
| | | | | | Sample Location: | T104-Conc | T103-Perm |
| | | | | | Sample Type: | WATER | WATER |
| | | | | | Date Sampled: | 23-Mar-2020 | 23-Mar-2020 |
| **Determinand** | **Accred.** | **SOP** | **Units** | **LOD** | | | |
| Endrin Aldehyde | N | 1840 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 4,4-DDT | N | 1840 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| Dichlobenil | N | 1840 | µg/l | 2.0 | | < 2.0 | < 2.0 |
| Endosulfan Sulphate | N | 1840 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| Methoxychlor | N | 1840 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| Endrin Ketone | N | 1840 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,4-D | N | 1930 | µg/l | 0.50 | | < 0.50 | < 0.50 |
| Dichlorprop | N | 1930 | µg/l | 0.010 | | < 0.010 | < 0.010 |
| MCPA | N | 1930 | µg/l | 0.50 | | < 0.50 | < 0.50 |
| MCPB | N | 1930 | µg/l | 0.50 | | < 0.50 | < 0.50 |
| Mecoprop | N | 1930 | µg/l | 0.40 | | < 0.40 | < 0.40 |
| 2,4,5-T | N | 1930 | µg/l | 0.50 | | < 0.50 | < 0.50 |
| Phenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2-Chlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2-Methylphenol (o-Cresol) | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 3-Methylphenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 4-Methylphenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2-Nitrophenol | N | 1900 | µg/l | 0.20 | | 23 | < 0.20 |
| 2,4-Dimethylphenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,4-Dichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,6-Dichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 4-Chloro-3-Methylphenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,4-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,5-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,6-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,4,6-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,4,5-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 4-Nitrophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,4,5-Tetrachlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,4,6-Tetrachlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2,3,5,6-Tetrachlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 3,4,5-Trichlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2-Methyl-4,6-Dinitrophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| Pentachlorophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| 2-Sec-Butyl-4,6-Dinitrophenol | N | 1900 | µg/l | 0.20 | | < 0.20 | < 0.20 |
| Total Phenols | N | 1900 | µg/l | 5.00 | | 23 | < 5.0 |
| Glyphosate (Subcon) | SN | | µg/l | 0.01 | | < 0.02 | < 0.02 |

# Appendix D

## Magherabeg Dunes SAC

## Site Synopsis, Conservation Objectives & Detailed Assessment Summary

**Site Name: Magherabeg Dunes SAC**

**Site Code: 001766**

Magherabeg Dunes SAC is a sand dune system situated at Ardmore Point, about 5 km south of Wicklow Head in Co. Wicklow. The Three Mile Water River enters the sea through the dunes. The site is fairly intact, though some areas are being naturally eroded by wind and sea, in particular at the southern end, where bedrock has been exposed.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

| |
|---|
| [1210] Annual Vegetation of Drift Lines |
| [2110] Embryonic Shifting Dunes |
| [2120] Marram Dunes (White Dunes) |
| [2130] Fixed Dunes (Grey Dunes)* |
| [7220] Petrifying Springs* |

Despite its small size, the dune system at Magherabeg shows most of the developmental stages, with embryonic dunes, white dunes and grey fixed all represented. The embryo dunes occur mainly in the northern sector, in association with a good example of drift line vegetation. Species present include Sea Couch (*Elymus farctus*), Marram (*Ammophila arenaria*) and Sea Sandwort (*Honkenya peploides*). A narrow band of shifting marram dunes then occur, these having been largely washed away by erosion in the southern sector. Stable fixed dunes are well represented, with such species as Red Fescue (*Festuca rubra*), Common Restharrow (*Ononis repens*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Wild Pansy (*Viola tricolor*), Wild Thyme (*Thymus praecox*) and White Clover (*Trifolium repens*). Burnet Rose (*Rosa pimpinellifolia*) is present on the older fixed dunes, with species such as Gorse (*Ulex europaeus*) and Bracken (*Pteridium aquilinum*) also present. The dune system is backed by drift banks, which are well covered by deciduous woodland and scrub. Other species occurring on these drift banks include Hemp-agrimony (*Eupatorium cannabinum*), Yellow-wort (*Blackstonia perfoliata*) and the scarce species Wood Vetch (*Vicia sylvatica*).

Along the low cliffs at Ardmore Point a line of petrifying springs with tufa formations occurs, and a range of specialised moss species are found.

The Three Mile Water River, which flows through the dunes provides habitat for wetland species such as sedges, including Bladder Sedge (*Carex vesicaria*), Fox Sedge

(*C. otrubae*) and Grey Sedge (*C. divulsa*). The very rare hybrid sedge, *Carex* x *grossii* (*C. hirta* x *C. vesicaria*) has also been recorded here. Common Reed (*Phragmites australis*) is also found along the river.

The site is of conservation importance because it is a fine example of a dune system which is fairly intact and which has a well-developed flora. The lack of easy public access to this site has undoubtedly helped in preventing damage and erosion from amenity activities. The presence of wetland vegetation on the site is of additional interest.

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# National Parks and Wildlife Service

## Conservation Objectives Series

# Magherabeg Dunes SAC 001766

An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

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**Series Editor:** Rebecca Jeffrey
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## Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

**Notes/Guidelines:**

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments a re beingcarried out.
5. When using these objectives, it is esse ntia that the relevantbacking/supporting documents are consulted, particularly w hereinstructed in thetargets or notes for a particular attribute.

## Qualifying Interests

***indicates a priority habitat under the Habitats Directive***

| 001766 | Magherabeg Dunes SAC |
|---|---|
| 1210 | Annual vegetation of drift lines |
| 2110 | Embryonic shifting dunes |
| 2120 | Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) |
| 2130 | Fixed coastal dunes with herbaceous vegetation (grey dunes)* |
| 2150 | Atlantic decalcified fixed dunes (Calluno-Ulicetea)* |
| 7220 | Petrifying springs with tufa formation (Cratoneurion)* |

*Supportingdocuments, NPWS reports and publications are available for download from: www.npws.ie/Publications*

## NPWS Documents

| | |
|---|---|
| **Year :** | 2009 |
| **Title :** | Coastal Monitoring Project 2004-2006 |
| **Author :** | Ryle, T.; Murray, A.; Connolly, K.; Swann, M. |
| **Series :** | Unpublished report to NPWS |
| **Year :** | 2013 |
| **Title :** | Conservation status assessment for petrifying springs |
| **Author :** | Lyons, M.D.; Kelly, D.L. |
| **Series :** | Unpublished report to NPWS |
| **Year :** | 2013 |
| **Title :** | Monitoring survey of Annex I sand dune habitats in Ireland |
| **Author :** | Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J. |
| **Series :** | Irish Wildlife Manual No. 75 |
| **Year :** | 2016 |
| **Title :** | Monitoring guidelines for the assessment of petrifying springs in Ireland |
| **Author :** | Lyons, M.D.; Kelly, D.L. |
| **Series :** | Irish Wildlife Manual No. 94 |
| **Year :** | 2017 |
| **Title :** | Magherabeg Dunes SAC (site code: 1766) Conservation objectives supporting document-coastal habitats V1 |
| **Author :** | NPWS |
| **Series :** | Conservation objectives supporting document |

## Other References

| | |
|---|---|
| **Year :** | 2008 |
| **Title :** | The phytosociology and conservation value of Irish sand dunes |
| **Author :** | Gaynor, K. |
| **Series :** | Unpublished Ph.D. Thesis, National University of Ireland, Dublin |
| **Year :** | 2010 |
| **Title :** | Water quality in Ireland 2007-2009 |
| **Author :** | McGarrigle, M.; Lucey, J.; Ó Cinnéide, M. |
| **Series :** | EPA, Wexford |
| **Year :** | 2015 |
| **Title :** | The flora and conservation status of petrifying springs in Ireland |
| **Author :** | Lyons, M.D. |
| **Series :** | Unpublished Ph.D. Thesis, Trinity College Dublin |

## Spatial data sources

| | |
|---|---|
| **Year :** | 2009 |
| **Title :** | Coastal Monitoring Project 2004-2006. Version 1 |
| **GIS Operations :** | QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| **Used For :** | 1210, 2110, 2120, 2130, 2150 (map 2) |
| **Year :** | 2016 |
| **Title :** | Point file associated with Lyons (2015) |
| **GIS Operations :** | Dataset created from spatial references; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising |
| **Used For :** | 7220 (map 3) |

## 1210 Annual vegetation of drift lines

**To maintain the favourable conservation condition of Annual vegetation of drift lin esi n Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

| Attrbute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For the two sub-sites mapped: Magherabeg - 0.03ha; Magheramore - 0.04ha. See map 2 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Annual vegetation of drift lines was mapped at two sub-sites, Magherabeg (CMP site ID: 016) and Magheramore (CMP site ID: 015), giving a total estimated area of 0.07ha within Magherabeg Dunes SAC. The habitat is very difficult to measure in view of its dynamic nature which means that it can appear and disappear within a site from year to year. See the Magherabeg Dunes SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution | Based on data from Ryle et al. (2009). A single clump of annual strandline vegetation at the southern extreme of Magherabeg accounts for the mapped area of 0.03ha and a further 0.04ha was recorded at Magheramore. See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). The embryonic dunes at Magherabeg occur in association with drift line vegetation. See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* spp.) | Based on data from Ryle et al. (2009). Sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*) were noted in the habitat in Magherabeg Dunes SAC. See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details |

## 2110 Embryonic shifting dunes

**To maintain the favourable conservation condition of Embryonic shifting dunes in Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Magherabeg - 1.71ha. See map 2 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Embryonic shifting dunes habitat was mapped at the sub-site Magherabeg (CMP site ID: 016) to give a total estimated area of 1.71ha within the SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Magherabeg Dunes SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution | Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). Magherabeg Dunes SAC supports most sand dune stages with embryonic dunes, white dunes and fixed dunes all represented. See the coastal habitats supporting document for further details |
| Vegetation composition: plant health of foredune grasses | Percentage cover | More than 95% of sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities with typical species: sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) | Based on data from Ryle et al. (2009). Species present in the embryonic dunes in the SAC include sand couch (*Elytrigia juncea*), sea spurge (*Euphorbia paralias*), marram (*Ammophila arenaria*), sea sandwort (*Honkenya peploides*) and sea rocket (*Cakile maritima*). See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Gaynor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details |

## 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

**To maintain the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For the two sub-sites mapped: Magheramore - 0.01ha; Magherabeg - 1.80ha. See map 2 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Shifting dunes along the shoreline with *Ammophila arenaria* was mapped at two sub-sites, Magherabeg (CMP site ID: 016) and Magheramore (CMP site ID: 015), giving a total estimated area of 1.81ha within Magherabeg Dunes SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Magherabeg Dunes SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution | Based on Ryle et al. (2009). The mobile dunes at the Magherabeg sub-site form a continuous strip in excess of 10m wide, apart from the 250m stretch where the Three Mile Water River channel cuts through the strand. See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). Magherabeg Dunes SAC supports most sand dune stages with embryonic dunes, white dunes and fixed dunes all represented. See the coastal habitats supporting document for further details |
| Vegetation composition: plant health of dune grasses | Percentage cover | More than 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present) | Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) | Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Gaynor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details |

## 2[illegible] Fixed coastal dunes with herbaceous vegetation (grey dunes)

**To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes)* in Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Magherabeg - 7.93ha. See map 2 | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Fixed coastal dunes with herbaceous vegetation was mapped at the sub-site Magherabeg (CMP site ID: 016) to give a total estimated area of 7.93ha within the SAC. See the Magherabeg Dunes SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution | Based on data from Ryle et al. (2009). The fixed coastal dunes occur in a band along the length of the southern portion of Magherabeg Dunes SAC. See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Ryle et al. (2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See the coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). Magherabeg Dunes SAC supports most sand dune stages with embryonic dunes, white dunes and fixed dunes all represented. See the coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes | Based on data from Gaynor (2008) and Ryle et al. (2009). At Magherabeg, natural erosion has led to the expansion of blowouts and erosion of the seaward side of dune ridges. See the coastal habitats supporting document for further details |
| Vegetation structure: sward height | Centimetres | Maintain structural variation within sward | Based on data from Gaynor (2008) and Ryle et al. (2009). Areas of the fixed dunes at Magherabeg Dunes SAC are undergoing succession to rank grassland and low scrub, with subsequent loss of flora diversity. See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in Delaney et al. (2013) | Based on data from Ryle et al. (2009). Magherabeg has a good proportion of short turf grassland with a reasonably diverse fixed dune flora including typical species such as lady's bedstraw (*Galium verum*), common bird's-foot trefoil (*Lotus corniculatus*), common restharrow (*Ononis repens*), wild carrot (*Daucus carota*), wild thyme (*Thymus polytrichus*) and kidney vetch (*Anthyllis vulneraria*). See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Gaynor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. Negative indicator species found throughout the fixed dunes at Magherabeg Dunes SAC include common ragwort (*Senecio jacobaea*), creeping thistle (*Cirsium arvense*), common nettle (*Urtica dioica*) and perennial rye-grass (*Lolium perenne*). Bracken (*Pteridium aquilinum*) and burnet rose (*Rosa spinosissima*) appear to be invasive throughout the fixed dunes at Magherabeg Dunes SAC. See the coastal habitats supporting document for further details |

| | | | |
|---|---|---|---|
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from Ryle et al. (2009). Scrub vegetation may be spreading at the landward edge of the fixed dunes where stock grazing has been discontinued. See the coastal habitats supporting document for further details |

## 215( Atlantic decalcified fixed dunes (Calluno-Ulicetea)

**To maintain the favourable conservation condition of Atlantic decalcified fixed dunes (Calluno-Ulicetea)* in Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

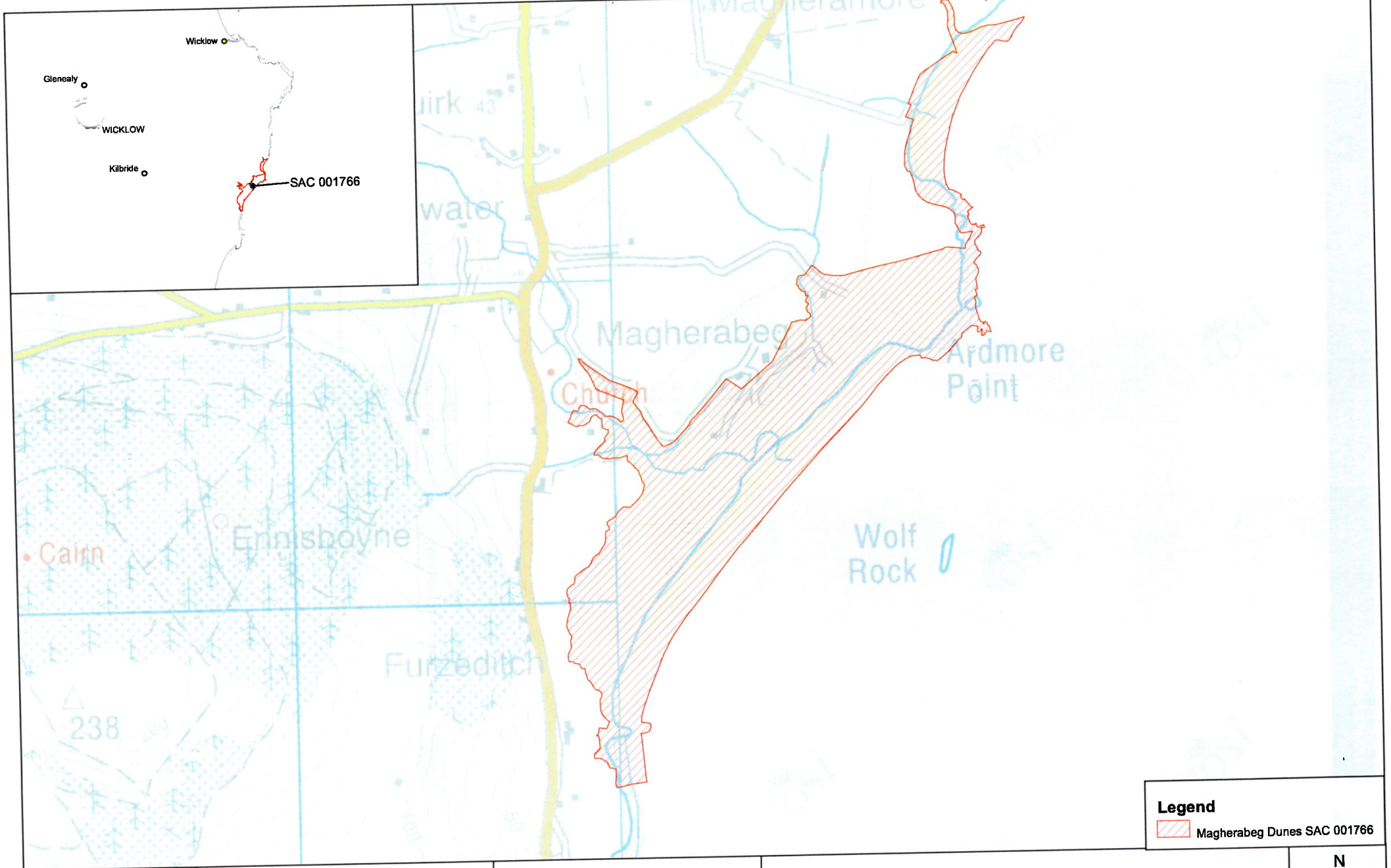
| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Hectares | Area stable or increasing, subject to natural processes including erosion and succession | Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). No area was mapped for Atlantic decalcified dune habitat at Magherabeg Dunes SAC by the CMP, but it is potentially present as evidenced by the occurrence of European gorse (*Ulex europaeus*), in mosaic with fixed coastal dunes with herbaceous vegetation. Thus, the total area of the qualifying habitat within the SAC is unknown. See the Magherabeg Dunes SAC conservation objectives supporting document for coastal habitats for further details |
| Habitat distribution | Occurrence | No decline or change in habitat distribution, subject to natural processes | Based on data from Ryle et al. (2009). This habitat is characterised by the presence of European gorse (*Ulex europaeus*), which occurs on the inland side of the fixed dunes in Magherabeg Dunes SAC. See the coastal habitats supporting document for further details |
| Physical structure: functionality and sediment supply | Presence/absence of physical barriers | Maintain the natural circulation of sediment and organic matter, without any physical obstructions | Based on data from Ryle et al. (2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details |
| Vegetation structure: zonation | Occurrence | Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession | Based on data from Ryle et al. (2009). Magherabeg Dunes SAC supports most sand dune stages with embryonic dunes, white dunes and fixed dunes all represented. See the coastal habitats supporting document for further details |
| Vegetation structure: bare ground | Percentage cover | Bare ground should not exceed 10% of the dune habitat, subject to natural processes | Based on data from Gaynor (2008) and Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Vegetation structure: sward height | Centimetres | Maintain structural variation within sward | Based on data from Gaynor (2008) and Ryle et al. (2009). Areas of the fixed dunes at Magherabeg Dunes SAC are undergoing succession to rank grassland and low scrub, with subsequent loss of flora diversity. See the coastal habitats supporting document for further details |
| Vegetation composition: typical species and sub-communities | Percentage cover at a representative number of monitoring stops | Maintain range of sub-communities with typical species listed in Delaney et al. (2013) | Based on data from Gaynor (2008) and Ryle et al. (2009). See the coastal habitats supporting document for further details |
| Vegetation composition: negative indicator species | Percentage cover | Negative indicator species (including non-native species) to represent less than 5% cover | Based on data from Gaynor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details |
| Vegetation composition: scrub/trees | Percentage cover | No more than 5% cover or under control | Based on data from Ryle et al. (2009). Scrub vegetation may be spreading at the landward edge of the fixed dunes where stock grazing has been discontinued. See the coastal habitats supporting document for further details |

## 7220 Petrifying springs with tufa formation (Cratoneurion)

**To restore the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion) in Magherabeg Dunes SAC, which is defined by the following list of attributes and targets:**

| Attribute | Measure | Target | Notes |
|---|---|---|---|
| Habitat area | Square metres | Area stable or increasing, subject to natural processes | A total of 275m² of this habitat was recorded at three locations within Magherabeg Dunes SAC at Ardmore Point by Lyons (2015) (see map 3). The first (site ID: PS091a) was recorded as tufa-forming seepage and dry, inactive tufa on rocky shore with an area of c.25m², the second (site ID: PS091b) as tufa-forming seepages from coastal cliffs with an area of c.200m² and the third (site ID: PS091c) has been described as a spring line with tufa cascades and stream crust tufa over coastal rocks with an area of c.50m² |
| Habitat distribution | Occurrence | No decline, subject to natural processes. See map 3 for point locations | This habitat has been recorded at three locations at Ardmore Point within Magherabeg Dunes SAC by Lyons (2015). Lyons and Kelly (2016) describe eight plant communities of Irish petrifying springs based on relevé data. Two of the springs in this SAC (PS091a and PS091c) fall into the *Eucladium verticillatum-Pellia endiviifolia* tufa cascades group and the other (PS091b) into the *Schoenus nigricans* springs group (Lyons, 2015). Further information on these and all the vegetation communities associated with this habitat is presented in Lyons and Kelly (2016) |
| Hydrological regime: height of water table; water flow | Metres; metres per second | Maintain appropriate hydrological regimes | Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013). Water flow should not be altered anthropogenically. See Lyons and Kelly (2016) for further details |
| Water quality - nitrate level | mg/l | No increase from baseline nitrate level and less than 10mg/l | Target based on data from McGarrigle et al. (2010). See Lyons and Kelly (2016) for further details |
| Water quality - phosphate level | µg/l | No increase from baseline phosphate level and less than 15µg/l | Based on data from Lyons (2015). See Lyons and Kelly (2016) for further details |
| Vegetation composition: positive indicator species | Number per spring | At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number | Based on Lyons and Kelly (2016), where the lists of positive and high quality indicator species are presented. The positive indicator species *Didymodon tophaceus*, *Eucladium verticillatum* and red fescue (*Festuca rubra*) were found at all three sites, black bog-rush (*Schoenus nigricans*) was recorded at PS091b and PS091c, bog pimpernel (*Anagallis tenella*), *Campylium stellatum*, *Chara vulgaris*, *Rivularia biasolettiana* and broo kweed (*Samolus valerandi*) were recorded at PS091b and the moss *Palustriella commutata* at PS091c (Lyons, 2015) |

| | | | |
|---|---|---|---|
| Vegetation composition: negative indicator species | Cover (DAFOR scale) | Potentially negative indicator species should not be Dominant or Abundant; invasive species should be absent | Based on Lyons and Kelly (2016), where the lists of potentially negative herbaceous, bryophyte (and alga) and woody species are presented. See Lyons and Kelly (2016) also for details on potentially invasive species, including sycamore (*Acer pseudoplatanus*) which is invasive in non-wooded springs and a negative indicator species in wooded springs. If two or more potentially negative bryophyte species are present, and if at least two are Frequent, or at least one is Abundant, then the habitat fails for this attribute. See Lyons and Kelly (2016) for further details. The moss *Cratoneuron filicinum* was recorded as a potentially negative bryophyte species and common reed (*Phragmites australis*) was recorded as a potentially negative herbaceous species at PS091c, but neither species was Dominant or Abundant (Lyons, 2015) |
| Vegetation structure: sward height | Centimetres | Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm) | See Lyons and Kelly (2016) for further details |
| Physical structure: trampling/dung | Cover (DAFOR scale) | Cover should not be Dominant or Abundant | See Lyons and Kelly (2016) for further details |




**MAP 1:**
**MAGHERABEG DUNES SAC**
**CONSERVATION OBJECTIVES**
**SAC DESIGNATION**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:**
**SAC 001766; version 3.**
**CO. WICKLOW**

0 0.1 0.2 0.3 0.4 0.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

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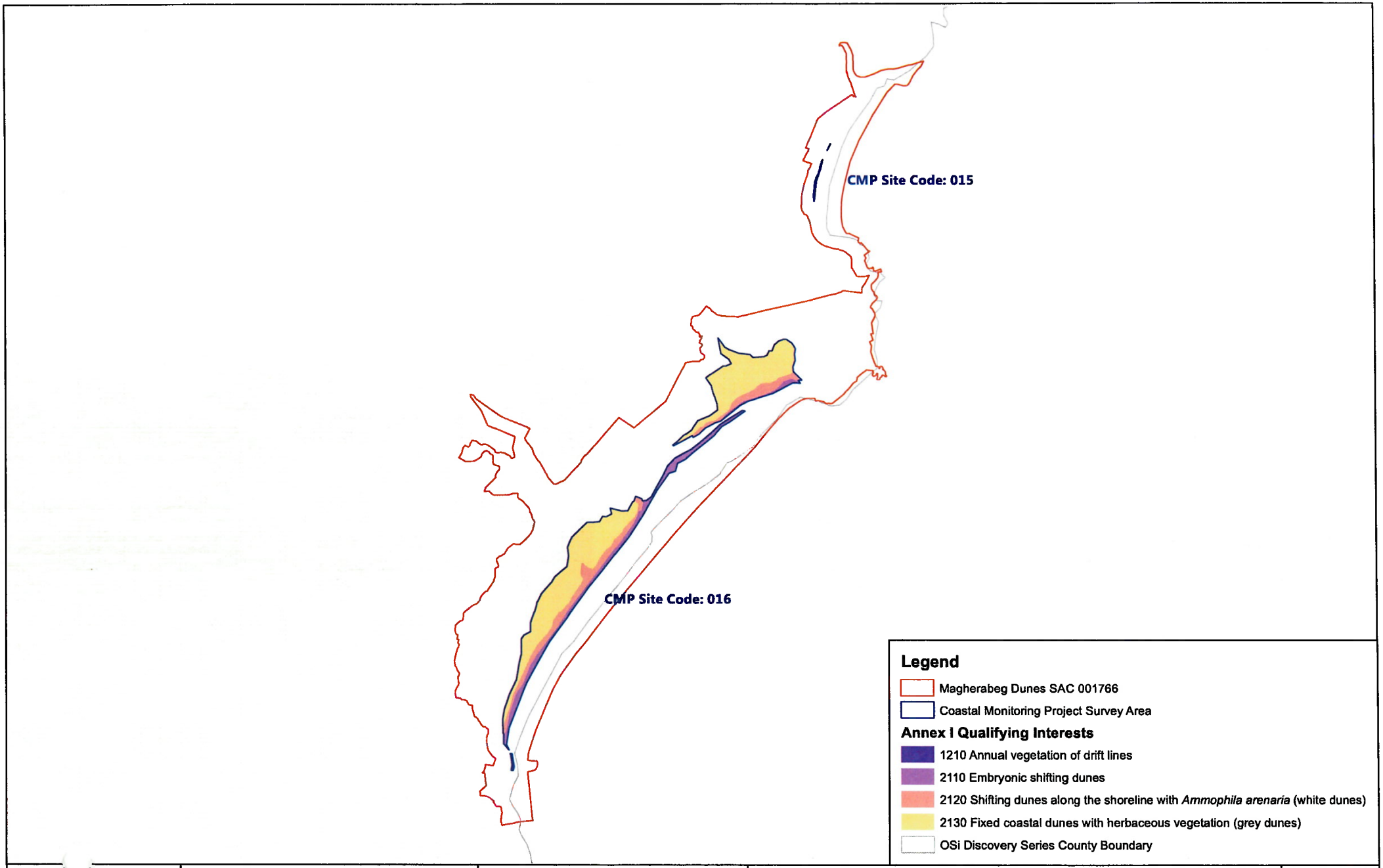
**Map Version 1**
**Date: Nov 2016**




An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

**MAP 2:**
**MAGHERABEG DUNES SAC**
**CONSERVATION OBJECTIVES**
**SAND DUNE HABITATS**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:**
**SAC 001766; version 3.**
**CO. WICKLOW**

0 0.1 0.2 0.3 0.4 0.5 km



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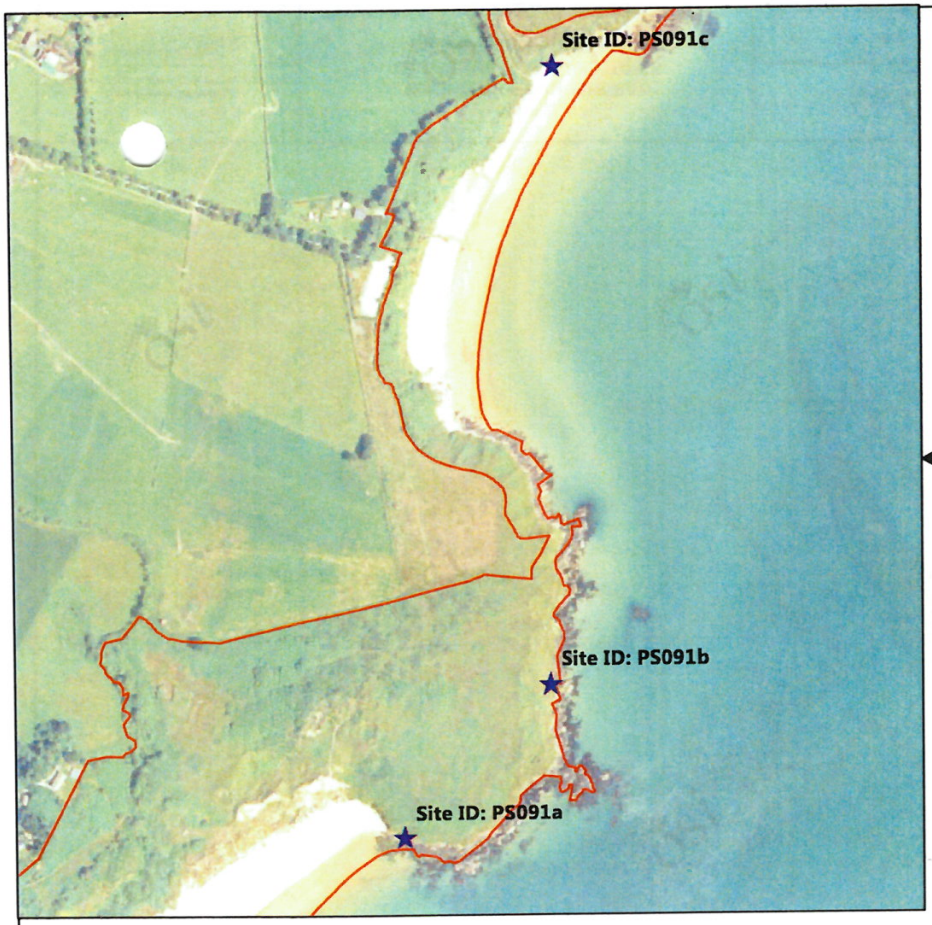
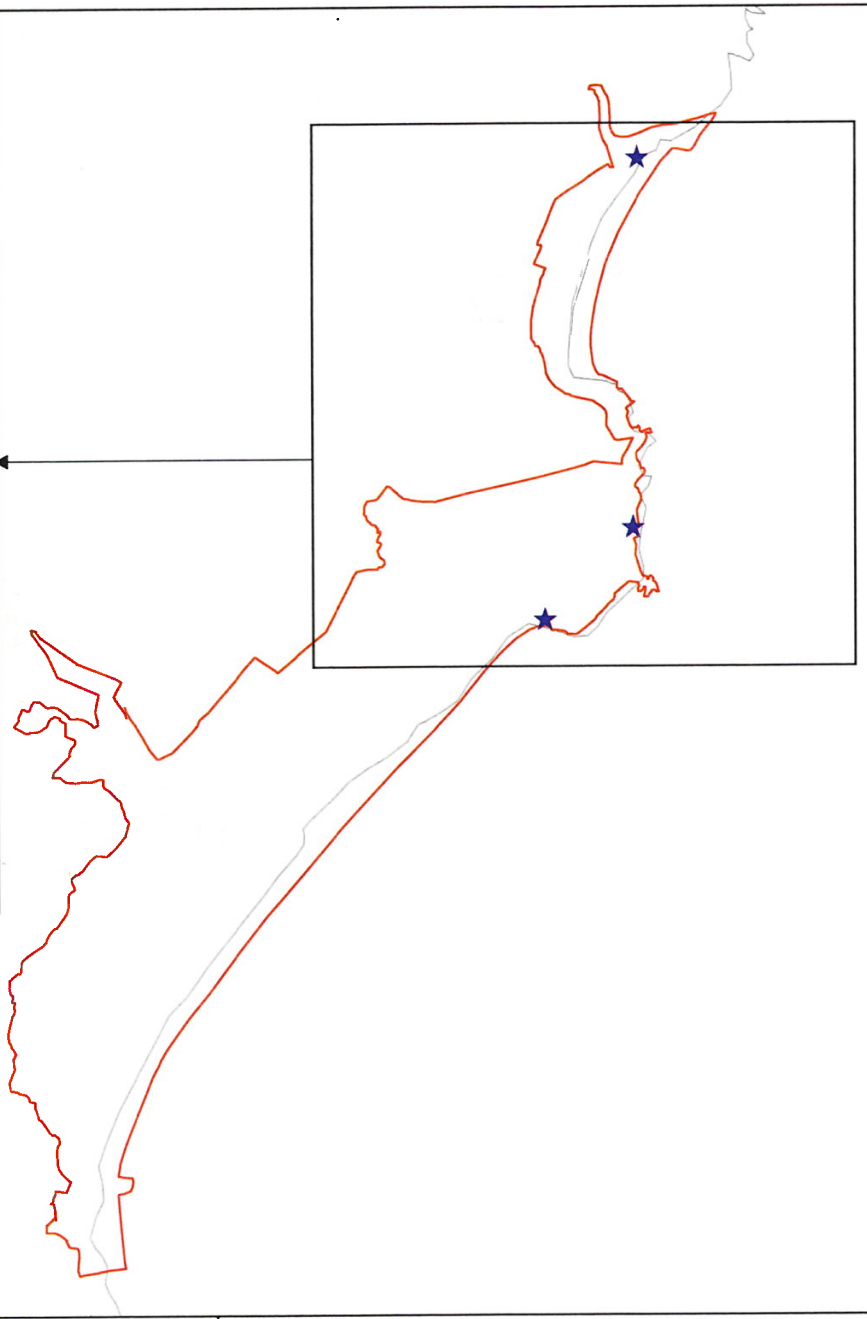
**Map Version 1**
**Date: Nov 2016**



**Legend**

- 7220 Petrifying springs with tufa formation (*Cratoneurion*)
- Magherabeg Dunes SAC 001766
- OSi Discovery Series County Boundary

**MAP 3:**
**MAGHERABEG DUNES SAC**
**CONSERVATION OBJECTIVES**
**PETRIFYING SPRINGS**

Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:**
**SAC 001766; version 3.**
**CO. WICKLOW**

0 0.1 0.2 0.3 0.4 0.5 km



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**Map Version 1**
**Date: Nov 2016**

| Qualifying Interest | 2019 Overall Status & Trend | Habitat Threats & Pressures | | Review |
|---|---|---|---|---|
| 1210 Annual vegetation of drift lines | Unfavourable-Inadequate & Declining | **Pressure** | **Threat** | The SAC is located approximately 6 km downstream/ south east from the proposed pipeline installation project. The project site and SAC are hydrologically connected through the three water crossings, which are tributaries of the Three Mile Water River which in turn flows to the Irish Sea through this SAC. A review of the conservation objectives of the SAC was undertaken along with the Article 17 report for 2019.<br><br>This QI habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms.<br><br>There are no significant impacts anticipated on this QI given the following;<br><br>1. There are no in-stream works planned as part of the project<br>2. Given the limited daily nature of the works associated with the laying of the pipe including the planned practice to open and close trenches on a |
| | | **F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures (H) | **F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures (H) | |
| | | **C01** Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (M) | **C01** Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (M) | |
| | | **F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M) | **F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M) | |
| | | **F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M) | **F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M) | |
| | | **F07** Sports, tourism and leisure activities (M) | **F07** Sports, tourism and leisure activities (M) | |

| | | | |
|---|---|---|---|
| | | | daily basis, storage of materials in the licenced landfill and operational controls in line with Uisce Éireann, Transport Infrastructure Ireland (TII) there are no anticipated impacts on water quality as part of this project.<br>3. The only visible surface water along the route is the crossings associated with Ballynagran Landfill and Woolaghans Bridge. The Ballynagran Landfill has a bridge with an existing pipe corridor which will be utilised. Meanwhile, it is proposed to bury the pipeline in the structure of Woolaghans Bridge. In both cases, there will be no impact on surface waters below.<br>4. The pipe will be laid alongside/ on the verge of existing roadways, buried in the structure of the bridge, which have all previously crossed the rivers, therefore is no significant impact anticipated.<br>5. Water quality of the Three Mile Water River as well as the coastal area is currently ranked as 'high' under the most recent round of the WFD.<br>6. The pipeline will be subject to IE licence requirements during operation. |

| | | | | |
|---|---|---|---|---|
| 2110 Embryonic shifting dunes | Unfavourable-Inadequate & Stable | **Pressure**<br>**F07** Sports, tourism and leisure activities (H)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (H)<br>**L01** Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (H)<br>**C01** Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (M)<br>**E03** Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (M)<br>**F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M)<br>**F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M)<br>**L02** Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (M) | **Threat**<br>**F07** Sports, tourism and leisure activities (H)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (H)<br>**L01** Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (H)<br>**C01** Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (M)<br>**E03** Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (M)<br>**F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M)<br>**F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M)<br>**L02** Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (M) | The SAC is located approximately 6 km from the proposed pipeline installation project. The sites are hydrologically connected through the three water crossings, which are tributaries of the Three Mile Water River which in turn flows to the Irish Sea through this SAC. A review of the conservation objectives of the SAC was undertaken along with the Article 17 report for 2019.<br><br>This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species.<br><br>There are no significant impacts anticipated on this QI given the following;<br><br>1. There are no in-stream works planned as part of the project<br>2. Given the limited daily nature of the works associated with the laying of the pipe including the planned practice to open and close trenches on a daily basis, storage of materials in the licenced landfill and operational controls in line with Uisce |

| | | | |
|---|---|---|---|
| | | | Éireann, Transport Infrastructure Ireland (TII) there are no anticipated impacts on water quality as part of this project.<br>3. The only visible surface water along the route is the crossings associated with Ballynagran Landfill and Woolaghans Bridge. The Ballynagran Landfill has a bridge with an existing pipe corridor which will be utilised. Meanwhile, it is proposed to bury the pipeline in the structure of Woolaghans Bridge. In both cases, there will be no impact on surface waters below.<br>4. The pipe will be laid alongside/ on the verge of existing roadways, buried in the structure of the bridge, which have all previously crossed the rivers, therefore is no significant impact anticipated.<br>5. Water quality of the Three Mile Water River as well as the coastal area is currently ranked as 'high' under the most recent round of the WFD.<br>6. The pipeline will be subject to IE licence requirements during operation. |

| | | | |
|---|---|---|---|
| 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) | Unfavourable-Inadequate & Stable | **Pressure**<br>**F07** Sports, tourism and leisure activities (H)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (H)<br>**L01** Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (H)<br>**E01** Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (M)<br>**E03** (Shipping lanes, ferry lanes and anchorage infrastructure e.g. canalisation, dredging) (M)<br>**F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M)<br>**F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M)<br>**I02** Other invasive alien species (other than species of Union concern) (M) | **Threat**<br>**F07** Sports, tourism and leisure activities (H)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (H)<br>**L01** Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization) (H)<br>**E01** Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (M)<br>**E03** (Shipping lanes, ferry lanes and anchorage infrastructure e.g. canalisation, dredging) (M)<br>**F01** Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (M)<br>**F06** Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning (M)<br>**I02** Other invasive alien species (other than species of Union concern) (M) | The SAC is located approximately 6 km from the proposed pipeline installation project. The sites are hydrologically connected through the three water crossings, which are tributaries of the Three Mile Water River which in turn flows to the Irish Sea through this SAC. A review of the conservation objectives of the SAC was undertaken along with the Article 17 report for 2019.<br><br>**Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")** encompasses most of the vegetation of unstable dunes where there is active sand movement. Under these conditions sand-binding marram *Ammophila arenaria* is always a prominent feature of the vegetation and is usually dominant. The mobile dunes at the Magherabeg sub-site form a continuous strip in excess of 10m wide, apart from the 250m stretch where the Three Mile Water River channel cuts through the strand.<br><br>There are no significant impacts anticipated on this QI given the following;<br><br>1. There are no in-stream works planned as part of the project<br>2. Given the limited daily nature of the works associated with the laying of the pipe including the planned practice to open and close trenches on a daily basis, storage of materials in the licenced |

| | | | |
|---|---|---|---|
| | | | landfill and operational controls in line with Uisce Éireann, Transport Infrastructure Ireland (TII) there are no anticipated impacts on water quality as part of this project.<br>3. The only visible surface water along the route is the crossings associated with Ballynagran Landfill and Woolaghans Bridge. The Ballynagran Landfill has a bridge with an existing pipe corridor which will be utilised. Meanwhile, it is proposed to bury the pipeline in the structure of Woolaghans Bridge. In both cases, there will be no impact on surface waters below.<br>4. The pipe will be laid alongside/ on the verge of existing roadways which have all previously crossed the rivers, there is no significant impact anticipated.<br>5. Water quality of the Three Mile Water River as well as the coastal area is currently ranked as 'high' under the most recent round of the WFD.<br>6. The pipeline will be subject to IE licence requirements during operation. |

| | | | |
|---|---|---|---|
| 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* | Unfavourable- Bad & Declining | **Pressure**<br>**A10** Extensive grazing or undergrazing by livestock (H)<br>**I02** Problems related to invasive alien species other than those covered by EU Regulation 1143/2014 (H)<br>**A02** Conversion from one type of agricultural land use to another (excluding drainage and burning) (M)<br>**A09** Intensive grazing or overgrazing by livestock (M)<br>**F07** Sports, tourism and leisure activities (M)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (M)<br>**L02** Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (M) | **Threat**<br>**A10** Extensive grazing or undergrazing by livestock (H)<br>**I02** Problems related to invasive alien species other than those covered by EU Regulation 1143/2014 (H)<br>**A02** Conversion from one type of agricultural land use to another (excluding drainage and burning) (M)<br>**A09** Intensive grazing or overgrazing by livestock (M)<br>**F07** Sports, tourism and leisure activities (M)<br>**F08** Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures) (M)<br>**L02** Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (M) | The SAC is located approximately 6 km from the proposed pipeline installation project. The sites are hydrologically connected through the three water crossings, which are tributaries of the Three Mile Water River which in turn flows to the Irish Sea through this SAC. A review of the conservation objectives of the SAC was undertaken along with the Article 17 report for 2019.<br><br>Fixed coastal dunes with herbaceous vegetation (grey dunes) are relatively sheltered with sand mobility greatly reduced in comparison to fore-dune habitats, and have developed a more or less closed carpet of vegetation. The sandy substrate is frequently overlain by a layer of humus, and lichens and mosses are often abundant. Species diversity and composition varies, but usually the fixed dune vegetation is typical of herb-rich grassland. Species such as Festuca rubra, Agrostis spp., Achillea millefolium, Lotus corniculatus, Anthyllis vulneraria, Plantago lanceolata, Euphrasia spp., Thymus polytrichus and Galium verum are common. 2130 fixed dunes can also be an important habitat for orchids such as Anacamptis pyramidalis and Ophrys apifera<br><br>There are no significant impacts anticipated on this QI given the following;<br><br>1. There are no in-stream works planned as part of the project |

| | | | |
|---|---|---|---|
| | | | 2. Given the limited daily nature of the works associated with the laying of the pipe including the planned practice to open and close trenches on a daily basis, storage of materials in the licenced landfill and operational controls in line with Uisce Éireann, Transport Infrastructure Ireland (TII) there are no anticipated impacts on water quality as part of this project.<br>3. The only visible surface water along the route is the crossings associated with Ballynagran Landfill and Woolaghans Bridge. The Ballynagran Landfill has a bridge with an existing pipe corridor which will be utilised. Meanwhile, it is proposed to bury the pipeline in the structure of Woolaghans Bridge. In both cases, there will be no impact on surface waters below.<br>4. The pipe will be laid alongside/ on the verge of existing roadways, buried in the structure of the bridge, which have all previously crossed the rivers, therefore is no significant impact anticipated.<br>5. Water quality of the Three Mile Water River as well as the coastal area is currently ranked as 'high' under the most recent round of the WFD.<br>6. The pipeline will be subject to IE licence requirements during operation. |

| | | | |
|---|---|---|---|
| 7220 Petrifying springs with tufa formation (Cratoneurion)* | Unfavourable-Inadequate & Declining | **Pressure**<br>**A06** Abandonment of grassland management (e.g. cessation of grazing of mowing) (M)<br>**A10** Extensive grazing or undergrazing by livestock (M)<br>**E01** Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (H)<br>**F07** Sports, tourism and leisure activities (M)<br>**J01** Mixed source pollution to surface and ground waters (limnic and terrestrial) (H)<br>**K02** Drainage (H)<br>**K04** Modification of hydrological flow (H)<br><br>**Threat**<br>**A06** Abandonment of grassland management (e.g. cessation of grazing of mowing) (M)<br>**A10** Extensive grazing or undergrazing by livestock (M)<br>**E01** Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (M)<br>**F07** Sports, tourism and leisure activities (M)<br>**H08** Other human intrusions and disturbance not mentioned above (H)<br>**J01** Mixed source pollution to surface and ground waters (limnic and terrestrial) (H)<br>**K02** Drainage (H)<br>**L02** Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (M) | The SAC is located approximately 6 km from the proposed pipeline installation project. The sites are hydrologically connected through the three water crossings, which are tributaries of the Three Mile Water River which in turn flows to the Irish Sea through this SAC. A review of the conservation objectives of the SAC was undertaken along with the Article 17 report for 2019.<br><br>There are no significant impacts anticipated on this QI given the following;<br><br>1. There are no in-stream works planned as part of the project<br>2. Given the limited daily nature of the works associated with the laying of the pipe including the planned practice to open and close trenches on a daily basis, storage of materials in the licenced landfill and operational controls in line with Uisce Éireann, Transport Infrastructure Ireland (TII) there are no anticipated impacts on water quality as part of this project.<br>3. The only visible surface water along the route is the crossings associated with Ballynagran Landfill and Woolaghans Bridge. The Ballynagran Landfill has a bridge with an existing pipe corridor which will be utilised. Meanwhile, it is proposed to bury the pipeline in the structure of |

| | | | |
|---|---|---|---|
| | | | Woolaghans Bridge. In both cases, there will be no impact on surface waters below.<br>4. The pipe will be laid alongside/ on the verge of existing roadways, buried in the structure of the bridge, which have all previously crossed the rivers, therefore is no significant impact anticipated.<br>5. Water quality of the Three Mile Water River as well as the coastal area is currently ranked as 'high' under the most recent round of the WFD.<br>6. The pipeline will be subject to IE licence requirements during operation.<br>7. Location of QI in SAC vs River Three Mile Water. |

# Appendix E: Wicklow WWTP Annual Environmental Report 2022 and 2023

# Annual Environmental Report

# 2022


Wicklow

D0012-01

## CONTENTS

# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2022 AER

This Annual Environmental Report has been prepared for D0012-01, Wicklow, in Wicklow in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

## 1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

There were no capital works, significant changes or operational changes undertaken in 2022.

## 1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Wicklow WWTP with a Plant Capacity PE of 34000, the treatment type is 2 - Secondary treatment .

## 1.3 ELV OVERVIEW

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.

| Discharge Point Reference | Treatment Plant | Discharge Type | Compliance Status | Parameters failing if relevant |
|---|---|---|---|---|
| **TPEFF3400D0012SW001** | Wicklow WWTP | Treated | Compliant | N/A |

## 1.4 LICENCE SPECIFIC REPORTING

| Assessment / Report |
| --- |
| **There are no Licence Specific Reports included in this AER.** |

# TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

## 2.1 WICKLOW WWTP - TREATED DISCHARGE

### 2.1.1 INFLUENT MONITORING SUMMARY - WICKLOW WWTP

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

| Parameters | Number of Samples | Annual Max | Annual Mean |
|---|---|---|---|
| **Suspended Solids mg/l** | 12 | 430 | 150 |
| **COD-Cr mg/l** | 12 | 637 | 315 |
| **BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l** | 12 | 359 | 141 |
| **Hydraulic Capacity** | N/A | 17976 | 7307 |

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

#### Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'. The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

## 2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF3400D0012SW001

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **COD-Cr mg/l** | 125 | 250 | N/A | 12 | N/A | N/A | 29 | Pass |
| **Suspended Solids mg/l** | 35 | 88 | N/A | 12 | N/A | N/A | 8.67 | Pass |
| **BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l** | 25 | 50 | N/A | 12 | N/A | N/A | 3.48 | Pass |
| **Total Oxidised Nitrogen (as N) mg/l** | 20 | 24 | N/A | 12 | N/A | N/A | 7.88 | Pass |
| **Ammonia-Total (as N) mg/l** | 10 | 12 | N/A | 12 | N/A | N/A | 0.159 | Pass |
| **pH pH units** | 6.00 | 9.00 | N/A | 12 | N/A | N/A | 7.34 | Pass |
| **Enterococci (Intestinal) cfu/100ml** | N/A | N/A | N/A | 4 | N/A | N/A | 7636 | |
| **Total Nitrogen mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 9.68 | |

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **Dissolved Inorganic Nitrogen (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 8.04 | |
| **Nitrate (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 7.39 | |
| **Conductivity @20°C µS/cm** | N/A | N/A | N/A | 12 | N/A | N/A | 1620 | |
| **E. Coli cfu/100ml** | N/A | N/A | N/A | 4 | N/A | N/A | 41183 | |

Notes:
1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied
2 – For pH the WWDA specifies a range of pH 6 - 9

## Cause of Exceedance(s):

**Not applicable**

## Significance of Results:

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence.

## 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF3400D0012SW001

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish Grid Reference | River Station Code | Bathing Water | Drinking Water | FWPM | Shellfish | WFD Status |
|---|---|---|---|---|---|---|---|
| **Downstream** | 332871,195200 | CW34001016DB6016 | Yes | No | No | No | High |

The results for ambient results and / or additional monitoring data sets are included in the **Appendix 7.1 - Ambient monitoring summary.**

### Significance of Results:

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

The coastal/transitional ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

The discharge from the wastewater treatment plant does not have an observable impact on the coastal/transitional water quality.

The discharge from the wastewater treatment plant does not have an observable impact on the bathing water quality.

## 1.4 OPERATIONAL PERFORMANCE SUMMARY - WICKLOW WWTP

### *2.1.4.1 Treatment Efficiency Report - Wicklow WWTP*

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

| Parameter | Influent mass loading (kg/year) | Effluent mass emission (kg/year) | Efficiency (% reduction of influent load) |
|---|---|---|---|
| **COD** | 872259 | 77664 | 91 |
| **cBOD** | 389823 | 9241 | 98 |
| **SS** | 414399 | 23041 | 94 |

Note: The above data is based on sample results for the number of dates reported

### *2.1.4.2 Treatment Capacity Report Summary - Wicklow WWTP*

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

| Wicklow WWTP | |
|---|---|
| **Peak Hydraulic Capacity (m³/day) - As Constructed** | 22950 |
| **DWF to the Treatment Plant (m³/day)** | 7650 |
| **Current Hydraulic Loading - annual max (m³/day)** | 17976 |
| **Average Hydraulic loading to the Treatment Plant (m³/day)** | 7307.1 |

| Wicklow WWTP | |
|---|---|
| **Organic Capacity (PE) - As Constructed** | 34000 |
| **Organic Capacity (PE) - Collected Load (peak week)**[Note1] | 19195 |
| **Organic Capacity (PE) - Remaining** | 14805 |
| **Will the capacity be exceeded in the next three years? (Yes/No)** | No |

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

## 2.1.5 SLUDGE / OTHER INPUTS - WICKLOW WWTP

'Other inputs' to the waste water treatment plant are summarised in table below.

| Input type | Quantity | Unit | P.E. | % of load to WWTP | Included in Influent Monitoring (Y/N)? | Is there a leachate/sludge acceptance procedure for the WWTP? | Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N) |
|---|---|---|---|---|---|---|---|
| **Domestic /Septic Tank Sludge** | 207.38 | Weight (Tonnes) | 2.5 | 0.01 | Yes | No | No |

# COMPLAINTS AND INCIDENTS

## 3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

| Number of Complaints | Nature of Complaint | Number Open Complaints | Number Closed Complaints |
|---|---|---|---|
| **There were no relevant environmental complaints in 2022.** | | | |

## 3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Uisce Éireann but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

### 3.2.1 SUMMARY OF INCIDENTS

| Incident Type | Cause | No. of incident occurrences | Recurring (Y/N) | Closed (Y/N) |
|---|---|---|---|---|
| **There were no reportable incidents in 2022.** | | | | |

## 3.2.2 SUMMARY OF OVERALL INCIDENTS

| Question | Answer |
|---|---|
| **Number of Incidents in 2022** | 0 |
| **Number of Incidents reported to the EPA via EDEN in 2022** | 0 |
| **Explanation of any discrepancies between the two numbers above** | N/A |

# 4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

## 4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

A summary of the operation of the storm water overflows and their significance where known is included below:

### 4.1.1 SWO IDENTIFICATION

| WWDL Name / Code for Storm Water Overflow (chamber) where applicable | Irish Grid Ref. (outfall) | Included in Schedule of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | Total volume discharged in 2022 (m3) | Monitoring Status |
|---|---|---|---|---|---|---|
| **TBC** | 331743 193989 | Yes | Low Significance | Not Meeting Criteria | Unknown | Monitored |
| **SW004** | 328889 195616 | Yes | Low Significance | Meeting Criteria | 2393 | Monitored |
| **SW5** | 331500 194151 | Yes | Low Significance | Not Meeting Criteria | Unknown | Not Monitored |
| **SW6** | 331921 193940 | Yes | Low Significance | Not Meeting Criteria | Unknown | Not Monitored |
| **SW002** | 331753 194405 | Yes | Low Significance | Meeting Criteria | 100125 | Monitored |
| **SW003** | 327457 196752 | Yes | Low Significance | Meeting Criteria | 7393 | Monitored |

Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

| SWO Summary | |
|---|---|
| **How much sewage was discharged via monitored SWOs in the agglomeration in the year (m3)?** | 109910 |
| **Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?** | N/A |
| **The SWO Assessment included the requirements of relevant of WWDL schedules?** | Yes |
| **Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?** | No |

## 4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS

### 4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| **D0012-SIP:01** | Pumping stations at Ashford and Rathnew to improve primary and secondary discharges | C | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:02** | Pumping stations at Ashford and Rathnew to improve | C | 31/03/2010 | Yes | Works Completed | | |

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| | primary and secondary discharges | | | | | | |
| **D0012-SIP:03** | Secondary discharge from SW2 (outlet from the Murrough storm water holding tank) to be reclassified as a SWO | A | 31/10/2009 | Yes | Works Completed | | |
| **D0012-SIP:04** | Secondary discharge from SW3 Ashford to be reclassified as SWO | A | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:05** | Secondary discharge from SW4 Rathnew to be reclassified as SWO | A | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:06** | WWTP at Knockrobin and ancillary works to improve primary & secondary discharges | C | 31/10/2009 | Yes | Works Completed | | |
| **D0012-SIP:07** | WWTP at Knockrobin and ancillary works to improve primary & secondary discharges | C | 31/10/2009 | Yes | Works Completed | | |

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

## 4.2.2 IMPROVEMENT PROGRAMME SUMMARY

| Improvement Identifier | Improvement Description / or any Operational Improvements | Improvement Source | Expected Completion Date | Comments |
|---|---|---|---|---|
| **No additional improvements planned at this time.** | | | | |

## 4.2.3 SEWER INTEGRITY RISK ASSESSMENT

The utilisation of multiple capital maintenance programmes and the outputs of the workshops with the Local Authority Operations Staff held under the programme can be used to satisfy the requirements of Condition 5 regarding network integrity. Improvement works identified by way of these programmes and workshops will be included in the Improvements Summary Tables 4.2.1 and 4.2.2.

# LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Licence Specific Report | Required by licence | Year included in AER | Included in this AER |
|---|---|---|---|
| **Priority Substances Assessment** | Yes | 2011 | No |

# 6 CERTIFICATION AND SIGN OFF

## 6.1 SUMMARY OF AER CONTENTS

| Parameter | Answer |
|---|---|
| **Does the AER include an Executive Summary?** | Yes |
| **Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?** | Yes |
| **Is there a need to advise the EPA for Consideration of a Technical Amendment/Review of the Licence?** | No |
| **List reason e.g. additional SWO identified** | N/A |
| **Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc** | No |
| **List reason e.g. changes to monitoring requirements** | N/A |
| **Have these processes commenced?** | N/A |
| **Are all outstanding reports and assessments from previous AERs included as an appendix to this AER** | N/A |

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Date: 25/02/2023

This AER has been produced by Uisce Éireann's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of,

Eleanor Roche

Acting Head of Environmental Regulation.

# 7 APPENDIX

| Appendix |
| --- |
| Appendix 7.1 - Ambient Monitoring Summary |

# Ambient Monitoring Data 2022

## Ambient Monitoring Report Summary Table

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish Grid Reference | EPA Code | Bathing Water | Drinking Water | FWPM | Shellfish | WFD Status |
|---|---|---|---|---|---|---|---|
| Downstream | 332871, 195200 | CW34001016DB6016 | Yes | No | No | No | High |

## 2022 Marine Ambient Monitoring Summary

| Date | pH | cBOD (mg/l) | Total Nitrogen (mg/l) | DIN (mg/l) | Dissolved Oxygen (% sat.) | E. Coli (MPN/100ml) | Enterococci (Intestinal) (CFU/100ml) |
|---|---|---|---|---|---|---|---|
| 16-June-2022 | 8 | 3.4 | <0.5 | 0.3 | 108 | 2 | 7 |

## Bathing Water Results 2022 (Source: Beaches.ie)

*Murrough Beach*

| Date | E-Coli Result | Intestinal Enterocci Result | Water Sample Status |
|---|---|---|---|
| 05/09/2022 | 75 | 34 | Excellent |
| 22/08/2022 | <10 | <1 | Excellent |
| 08/08/2022 | <10 | 4 | Excellent |
| 18/07/2022 | <10 | 8 | Excellent |
| 04/07/2022 | <10 | <1 | Excellent |
| 07/06/2022 | <10 | 1 | Excellent |

*Silver Strand*

| Date | E-Coli Result | Intestinal Enterocci Result | Water Sample Status |
|---|---|---|---|
| 05/09/2022 | 121 | 31 | Excellent |
| 22/08/2022 | 359 | 24 | Good |
| 15/08/2022 | 355 | 87 | Good |
| 08/08/2022 | <10 | 5 | Excellent |
| 18/07/2022 | 74 | 43 | Excellent |
| 11/07/2022 | 10 | 5 | Excellent |
| 04/07/2022 | 63 | 5 | Excellent |
| 20/06/2022 | 10 | 3 | Excellent |
| 07/06/2022 | <10 | 1 | Excellent |
| 23/05/2022 | 10 | <1 | Excellent |

# Annual Environmental Report

# 2023

Uisce Éireann
Irish Water

Wicklow

D0012-01

## CONTENTS

# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0012-01, Wicklow, in Wicklow in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

## 1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

There were no capital works, significant changes or operational changes undertaken in 2023.

## 1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Wicklow WWTP with a Plant Capacity PE of 34000, the treatment type is 2 - Secondary treatment.

## 1.3 ELV OVERVIEW

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.

| Discharge Point Reference | Treatment Plant | Discharge Type | Compliance Status | Parameters failing if relevant |
|---|---|---|---|---|
| **TPEFF3400D0012SW001** | Wicklow WWTP | Treated | Compliant | N/A |

## 1.4 LICENCE SPECIFIC REPORTING

| Assessment / Report |
| --- |
| There are no Licence Specific Reports included in this AER. |

# 2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

## 2.1 WICKLOW WWTP - TREATED DISCHARGE

### 2.1.1 INFLUENT MONITORING SUMMARY - WICKLOW WWTP

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

| Parameters | Number of Samples | Annual Max | Annual Mean |
|---|---|---|---|
| **COD-Cr mg/l** | 12 | 447 | 229 |
| **Suspended Solids mg/l** | 12 | 224 | 100 |
| **BOD, 5 days with Inhibition (Carbonaceous) mg/l** | 12 | 122 | 76 |
| **Hydraulic Capacity** | N/A | 18117 | 8423 |

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

### Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'. The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

## 4.1.2 EFFLUENT MONITORING SUMMARY - TPEFF3400D0012SW001

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **COD-Cr mg/l** | 125 | 250 | N/A | 12 | N/A | N/A | 15 | Pass |
| **Suspended Solids mg/l** | 35 | 87.5 | N/A | 12 | N/A | N/A | 8.86 | Pass |
| **BOD, 5 days with Inhibition (Carbonaceous) mg/l** | 25 | 50 | N/A | 12 | N/A | N/A | 1.63 | Pass |
| **Total Oxidised Nitrogen (as N) mg/l** | 20 | 24 | N/A | 12 | N/A | N/A | 8.04 | Pass |
| **Ammonia-Total (as N) mg/l** | 10 | 12 | N/A | 12 | N/A | N/A | 0.363 | Pass |
| **pH pH units** | 6 | 9 | N/A | 12 | N/A | N/A | 6.78 | Pass |
| **Total Nitrogen mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 9.18 | |
| **Enterococci (Intestinal) cfu/100ml** | N/A | N/A | N/A | 4 | N/A | N/A | 419 | |

| Parameter | WWDL ELV (Schedule A) | ELV with Condition 2 Interpretation included Note 1 | Interim % reduction from influent concentration | Number of sample results | Number of exceedances | Number of exceedances with Condition 2 Interpretation included | Annual Mean | Overall Compliance (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|
| **Conductivity @20°C µS/cm** | N/A | N/A | N/A | 12 | N/A | N/A | 2322 | |
| **E. Coli cfu/100ml** | N/A | N/A | N/A | 4 | N/A | N/A | 15772 | |
| **Nitrate (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 8.04 | |
| **Dissolved Inorganic Nitrogen (as N) mg/l** | N/A | N/A | N/A | 12 | N/A | N/A | 8.58 | |

Notes:
1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied
2 – For pH the WWDA specifies a range of pH 6 - 9

## Cause of Exceedance(s):

**Not applicable**

## Significance of Results:

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence.

## 1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF3400D0012SW001

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish Grid Reference | Station Code | Bathing Water | Drinking Water | FWPM | Shellfish | WFD Status |
|---|---|---|---|---|---|---|---|
| **Downstream** | 332871,195200 | CW34001016DB6016 | Yes | No | No | No | High |

The results for ambient results and / or additional monitoring data sets are included in the **Appendix 7.1 - Ambient monitoring summary.**

### Significance of Results:

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

The coastal/transitional ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

The discharge from the wastewater treatment plant does not have an observable impact on the coastal/transitional water quality.

The discharge from the wastewater treatment plant does not have an observable impact on the bathing water quality.

## 2.1.4 OPERATIONAL PERFORMANCE SUMMARY - WICKLOW WWTP

### 2.1.4.1 Treatment Efficiency Report - Wicklow WWTP

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

| Parameter | Influent mass loading (kg/year) | Effluent mass emission (kg/year) | Efficiency (% reduction of influent load) |
|---|---|---|---|
| **COD** | 692519 | 42937 | 94 |
| **cBOD** | 228719 | 4685 | 98 |
| **SS** | 302340 | 25505 | 92 |

Note: The above data is based on sample results for the number of dates reported

### 2.1.4.2 Treatment Capacity Report Summary - Wicklow WWTP

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

| Wicklow WWTP | |
|---|---|
| **Peak Hydraulic Capacity ($m^3$/day) - As Constructed** | 22950 |
| **DWF to the Treatment Plant ($m^3$/day)** | 7650 |
| **Current Hydraulic Loading - annual max ($m^3$/day)** | 18117 |
| **Average Hydraulic loading to the Treatment Plant ($m^3$/day)** | 8423 |
| **Organic Capacity (PE) - As Constructed** | 34000 |

| Wicklow WWTP | |
|---|---|
| **Organic Capacity (PE) - Collected Load (peak week)**[Note1] | 19617 |
| **Organic Capacity (PE) - Remaining** | 14383 |
| **Will the capacity be exceeded in the next three years? (Yes/No)** | No |

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

## 2.1.5 SLUDGE / OTHER INPUTS - WICKLOW WWTP

'Other inputs' to the waste water treatment plant are summarised in the table below.

| Input type | Quantity | Unit | P.E. | % of load to WWTP | Included in Influent Monitoring (Y/N)? | Is there a leachate/sludge acceptance procedure for the WWTP? | Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N) |
|---|---|---|---|---|---|---|---|
| **Domestic /Septic Tank Sludge** | 3224 | Volume ($m^3$) | 39.3 | 0.1 | Yes | No | No |

# 3 COMPLAINTS AND INCIDENTS

## 3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

| Number of Complaints | Nature of Complaint | Number Open Complaints | Number Closed Complaints |
|---|---|---|---|
| **There were no relevant environmental complaints in 2023.** | | | |

## 3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Uisce Éireann but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

### 3.2.1 SUMMARY OF INCIDENTS

| Incident Type | Cause | Recurring (Y/N) | Closed (Y/N) |
|---|---|---|---|
| **Uncontrolled release** | SWO exceptional rainfall and overflow expected | No | Yes |

## 3.2.2 SUMMARY OF OVERALL INCIDENTS

| Question | Answer |
|---|---|
| Number of Incidents in 2023 | 1 |
| Number of Incidents reported to the EPA via EDEN in 2023 | 1 |
| Explanation of any discrepancies between the two numbers above | N/A |

# 4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

## 4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

A summary of the operation of the storm water overflows and their significance where known is included below:

### 4.1.1 SWO IDENTIFICATION

| WWDL Name / Code for Storm Water Overflow (chamber) where applicable | Irish Grid Ref. (outfall) | Included in Schedule of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | No. of times activated in 2023 (No. of events) | Total volume discharged in 2023 ($m^3$) | Monitoring Status |
|---|---|---|---|---|---|---|---|
| **TBC** | 331743 193989 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Monitored |
| **SW004** | 328889 195616 | Yes | Low Significance | Not yet Assessed | 17 | 2,705 | Monitored |
| **SW5** | 331500 194151 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW6** | 331921 193940 | Yes | Low Significance | Meeting Criteria | Unknown | Unknown | Not Monitored |
| **SW002** | 331753 194405 | Yes | Low Significance | Meeting Criteria | 53 | 215,508 | Monitored |
| **SW003** | 327457 196752 | Yes | Low Significance | Meeting Criteria | 0 | 0 | Monitored |

| WWDL Name / Code or Storm Water Overflow (chamber) where applicable | Irish Grid Ref. (outfall) | Included in Schedule of the WWDL | Significance of the overflow(High / Medium / Low) | Assessed against DoEHLG Criteria | No. of times activated in 2023 (No. of events) | Total volume discharged in 2023 ($m^3$) | Monitoring Status |
|---|---|---|---|---|---|---|---|
| **TBC** | TBC | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | TBC |
| **TBC** | TBC | Yes | Low Significance | Not Meeting Criteria | Unknown | Unknown | TBC |
| **TBC** | 331576 194035 | Yes | Low Significance | Not Yet Assessed | Unknown | Unknown | TBC |
| **TBC** | 332539 193682 | Yes | Low Significance | Not Yet Assessed | Unknown | Unknown | TBC |

Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

| SWO Summary | |
|---|---|
| **How much wastewater discharge by metered SWOs during the year ($m^3$)?** | 218213 |
| **Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?** | N/A |
| **The SWO Assessment included the requirements of relevant of WWDL schedules?** | Yes |
| **Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?** | No |

## 4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS

### 4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| **D0012-SIP:01** | Pumping stations at Ashford and Rathnew to improve primary and secondary discharges | C | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:02** | Pumping stations at Ashford and Rathnew to improve primary and secondary discharges | C | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:03** | Secondary discharge from SW2 (outlet from the Murrough storm water holding tank) to be reclassified as a SWO | A | 31/10/2009 | Yes | Works Completed | | |
| **D0012-SIP:04** | Secondary discharge from SW3 Ashford to be reclassified as SWO | A | 31/03/2010 | Yes | Works Completed | | |

| Specified Improvement Programmes (under Schedule A and C of WWDL) | Description | Licence Schedule | Licence Completion Date | Date Expired? (N/NA/Y) | Status of Works | Timeframe for Completing the Work | Comments |
|---|---|---|---|---|---|---|---|
| **D0012-SIP:05** | Secondary discharge from SW4 Rathnew to be reclassified as SWO | A | 31/03/2010 | Yes | Works Completed | | |
| **D0012-SIP:06** | WWTP at Knockrobin and ancillary works to improve primary & secondary discharges | C | 31/10/2009 | Yes | Works Completed | | |
| **D0012-SIP:07** | WWTP at Knockrobin and ancillary works to improve primary & secondary discharges | C | 31/10/2009 | Yes | Works Completed | | |

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

## 4.2.2 IMPROVEMENT PROGRAMME SUMMARY

| Improvement Identifier | Improvement Description / or any Operational Improvements | Improvement Source | Expected Completion Date | Comments |
|---|---|---|---|---|
| **No additional improvements planned at this time.** | | | | |

## 4.2.3 SEWER INTEGRITY RISK ASSESSMENT

N/A

# 5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

| Licence Specific Report | Required by licence | Included in this AER |
|---|---|---|
| **Priority Substances Assessment** | Yes | No |

# CERTIFICATION AND SIGN OFF

## 6.1 SUMMARY OF AER CONTENTS

| Parameter | Answer |
|---|---|
| Does the AER include an Executive Summary? | Yes |
| Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)? | Yes |
| Is there a need to advise the EPA for Consideration of a Technical Amendment/Review of the Licence? | No |
| List reason e.g. additional SWO identified | N/A |
| Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc | No |
| List reason e.g. changes to monitoring requirements | N/A |
| Have these processes commenced? | N/A |
| Are all outstanding reports and assessments from previous AERs included as an appendix to this AER | N/A |

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Date: 28/02/2024

This AER has been produced by Uisce Éireann's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of,

Eleanor Roche

Head of Environmental Regulation.

# APPENDIX

| Appendix |
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| **Appendix 7.1 - Ambient Monitoring Summary** |

# Ambient Monitoring Data 2023

## Ambient Monitoring Report Summary Table

| Ambient Monitoring Point from WWDL (or as agreed with EPA) | Irish Grid Reference | EPA Code | Bathing Water | Drinking Water | FWPM | Shellfish | WFD Status |
|---|---|---|---|---|---|---|---|
| Downstream | 332871, 195200 | CW34001016DB6016 | Yes | No | No | No | High |

## 2023 Marine Ambient Monitoring Summary

| Date | pH | cBOD (mg/l) | Total Nitrogen (mg/l) | DIN (mg/l) | Dissolved Oxygen (% sat.) | E. Coli (MPN/100ml) | Enterococci (Intestinal) (CFU/100ml) |
|---|---|---|---|---|---|---|---|
| 02/10/2023 | 8.2 | 4 | <0.5 | 0.41 | 99.6 | 0 | 1 |

## Bathing Water Results 2023 (Source: Beaches.ie)

*Murrough Beach*

| Date | E-Coli Result | Intestinal Enterocci Result | Water Sample Status |
|---|---|---|---|
| 04/09/2023 | 10 | 5 | Excellent |
| 14/08/2023 | <10 | 6 | Excellent |
| 10/07/2023 | 10 | 10 | Excellent |
| 06/06/2023 | <10 | 3 | Excellent |

*Silver Strand*

| Date | E-Coli Result | Intestinal Enterocci Result | Water Sample Status |
|---|---|---|---|
| 04/09/2023 | 4611 | 5 | Poor |
| 28/08/2023 | 75 | 30 | Excellent |
| 21/08/2023 | 122 | 11 | Excellent |
| 14/08/2023 | 134 | 43 | Excellent |
| 31/07/2023 | 63 | 5 | Excellent |
| 10/07/2023 | 74 | 6 | Excellent |
| 03/07/2023 | 148 | 8 | Excellent |
| 19/06/2023 | 10 | 2 | Excellent |
| 06/06/2023 | 110 | 27 | Excellent |
| 22/05/2023 | 20 | 1 | Excellent |