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CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE DEMOLITION OF AGRICULTURAL STRUCTURES AND THE DEVELOPMENT OF A MATERIALS RECOVERY FACILITY AT DERRYARKIN, RHODE, CO. OFFALY

## VOLUME 2 – MAIN BODY OF THE EIAR

## CHAPTER 10 – HYDROLOGY AND SURFACE WATER QUALITY

**Prepared for: Oxigen Environmental Unlimited Company**

Oxigen
working for a cleaner environment

**Date: September 2022**

J5 Plaza, North Park Business Park,
North Road, Dublin 11, D11 PXT0, Ireland

**T: +353 1 658 3500 | E: info@ftco.ie**

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# 10. HYDROLOGY AND SURFACE WATER QUALITY

## 10.1 Introduction

This chapter has been prepared to examine the potential effects of the proposed development on the hydrology in the local environment, referred to in this chapter as the study area.

The objectives of this assessment are to:

- Produce a baseline study of the existing surface water environment in the area of the proposed development and associated works;
- Identify any likely significant effects of the proposed development on surface water during the construction phase, operational phase and decommissioning phase of the proposed development;
- Identify mitigation measures to avoid, remediate or reduce likely significant negative effects: and,
- Assess whether there are any likely significant residual effects and cumulative effects of the proposed development and other local developments.

### 10.1.1 Proposed Development

The proposed development is defined in Chapter 1 – Introduction and a detailed description of the proposed development is set out in Chapter 4 - Existing and Proposed Development.

The impacts of the proposed development are considered, having taken account of mitigation measures to reduce or eliminate any residual impacts on the surrounding hydrological regime and water quality within the study area.

The following Appendices documents have been prepared in support of this chapter:

- Appendix 10.1 - EPA Surface Water Quality Monitoring Data (Garr Bridge)
- Appendix 10.2 - Laboratory Analytical Certificates (June 2021)

These Appendices documents are included in Volume 3 of this EIAR.

### 10.1.2 Statement of Competency

This chapter of the EIAR was prepared by Daniel Hayden (BSc (Hons), MSc (Hons). Daniel is an Environmental Scientist with 7 years' consultancy experience and has completed numerous impact assessments for hydrology, hydrogeology and geology for industrial and waste management projects in Ireland.

## 10.2 Assessment Methodology

The methodology adopted for this assessment is as follows:

- Desk study review of the proposed development site, third party lands and surrounding areas;
- Characterisation of the receiving hydrological environment;
- Review of the proposed development;
- Review of appropriate guidance and legislation;
- Assessment of Potential Effects;
- Identification of Mitigation Measures; and
- Assessment of Residual Impacts.

### 10.2.1 Relevant Guidance

In addition to the EIA Guidance listed in Chapter 1, other reference documents and online resources used in the preparation of this chapter include the following:

- Construction Industry Research and Information Association (CIRIA) (2001), Control of water pollution from construction sites. Guidance for Consultants and Contractors (C532).
- Construction Industry Research and Information Association (CIRIA) (2001), PUB C571 Sustainable construction procurement - a guide to delivering environmentally responsible projects.
- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive Map Viewer (www.catchments.ie);
- NRA (2009), Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- IFI (2016), Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses;
- OPW and DoEHLG (2009), The Planning System and Flood Risk Management - Guidelines for Planning Authorities.
- Department of Housing, Planning and Local Government (DoHPLG), Draft 3rd Cycle River Basin Management Plan 2022-2027.
- UK Guidance for Pollution Prevention (GPP):
  - GPP5: Works and maintenance in or near water, Version 1.2 (NRW, NIEA, SEPA, February 2018);
  - GPP21: Pollution Incident Response Plans (NRW, NIEA, SEPA, July 2017);
  - GPP22: Dealing with Spills (NRW, NIEA, SEPA, October 2018).

### 10.2.2 Relevant Legislation

The relevant legislation with respect to surface water quality is outlined below:

- Local Government (Water Pollution) Acts 1977, as amended
- The European Union Water Framework Directive (Directive 2000/60/EC)
- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003)
- European Union Freshwater Fish Directive, 2006 (CEC 2006/44/EC)
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), as amended.
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010)
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended
- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014)
- The European Union (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2018 (S.I. No. 65/2018).

### 10.2.3 Site Investigation

A hydrological walkover survey, including detailed drainage mapping and baseline monitoring/sampling, was undertaken by FT on 22nd June 2021. In summary, assessments to address the hydrology and water quality sections of this EIAR included the following:

- A walkover survey and hydrological mapping of the proposed site and the surrounding area were undertaken whereby water flow directions and drainage patterns were recorded;
- Field hydrochemistry measurements (electrical conductivity, dissolved oxygen, pH and temperature) were taken to characterise localised surface water quality;
- A total of 3 no. surface water samples were undertaken to determine the baseline water quality of the surface water drainage channel situated immediately to the south of the development site.

#### *10.2.3.1 Water Framework Directive*

The Water Framework Directive (WFD) (2000/60/EC) was adopted by the (then entitled) European Community in 2000. This Directive was transposed into Irish law from December 2003 by, *inter alia*, the European Communities (Water Policy) Regulations 2003 (S.I. No 722 of 2003), as amended and subsequent amendments.

The overriding purpose of the WFD is to achieve at least "good status" in all European waters and ensure that no further deterioration occurs in these waters. European waters are classified as groundwaters, rivers, lakes, transitional and coastal waters.

The Water Framework Directive [WFD] (2000/60/EC) establishes a legal framework to protect and restore clean water across Europe and to ensure its long-term, sustainable use, requiring an integrated approach across sectors. The main tool for implementing the WFD requires the preparation of River Basin Management Plans (RBMPs) by Member States across 6-year cycles, during which management measures must be implemented so as to achieve good ecological status in all waters. The 1st Cycle RBMP covered the period 2010-2015, with the 2nd Cycle covered the period 2018-2021. The 3rd Cycle of the plan will cover the period 2022-2027. At the time of writing this 3rd cycle plan is in draft form and under review following a period of public consultation on the plan. This plan is expected to come into force shortly.

RBMPs must include a programme of measures to protect and restore bodies of water to at least 'good status' by 2027 (with some limited exemptions). To achieve this, the Draft 3rd Cycle RBMP will build on achievements in the 2nd Cycle to ensure the long-term delivery of water quality improvement. The third plan and further cycles will involve the ongoing protection of water bodies.

The WFD is linked to a number of other EU directives in several ways. These include directives relating to the protection of biodiversity (Birds and Habitats Directives), specific uses of waters (drinking water, bathing waters and urban wastewater directives), regulation of activities undertaken in the environment (Industrial Emissions and Environmental Impact Assessment directives and the protection of waters against agricultural pressures.

Two key principles intended to inform the 3rd Cycle RBMP are:

1. Integrated Catchment Management; and
2. Holistic Approach.

Integrated Catchment Management (ICM) uses the catchment as a means to bring together relevant stakeholders including local authorities, public bodies, communities and industries with a shared purpose. Integrated catchment plans will be put in place for each of the 46 catchments as sub-plans to the national plan. Building over time into fully integrated catchment management plans, these will eventually provide a continuing opportunity for greater public participation and engagement of key stakeholders and sectors at a local and regional level. The structures put in place during the second cycle of the river basin management planning will be fully utilised in this collaborative process, centred on An Fóram Uisce and the water community teams of the Local Authority Waters Programme (LAWPro).

The above ICM principles are supported by an approach that recognises synergies with other environmental challenges such as climate change, biodiversity loss, and environmental degradation. In Ireland, as elsewhere, environmental indicators for water, biodiversity and climate are deteriorating despite policies, investments and actions intended to prevent and reverse deterioration.

The European Green Deal has put forward a response to the challenge aiming to:

- Boost the efficient use of resources by moving to a clean, circular economy;
- Restore biodiversity; and ,
- Cut pollution.



This has in turn been taken on board by the 2020 Programme for Government and the 'Green New Deal' Mission which recognises an integrated approach to these issues is required, including the potential to deliver integrated measures, which benefit all environmental objectives.

### *10.2.3.2 Water Framework Directive Waterbody Status*

The European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009), as amended in 2009, 2012, 2015 (S.I. No. 296 of 2009, S.I. No. 327 of 2012, S.I. No. 386 of 2015) give effect to the criteria and standards to be used for classifying surface waters in accordance with the WFD.

There are five categories of surface water status: 'High', 'Good', 'Moderate', 'Poor' and 'Bad'. The status is used to determine the degree of impact by human activities on water resources.

A surface water body must achieve both good ecological status and good chemical status before it can be considered to be of good status. The chemical status of a water body is assessed based on certain chemical pollutants.

In accordance with the regulations, waters classified as 'High' or 'Good' must not be allowed to deteriorate. Waters classified as less than good must be restored to at least good status within a prescribed timeframe.

The regulations also state that, for the purpose of classification, a status of less than good is assigned in the case of a water body where the environmental objectives for an associated protected area requiring special protection by virtue of obligations arising from specific national legislation for the protection of water, or for the conservation of habitats and species directly dependent on water, are not met.

### *10.2.3.3 Water Framework Directive Risk*

A baseline risk assessment was completed of the water bodies within each River Basin District in 2005. This assessment involved using information on water pollution indicators, point and diffuse pollution sources, water abstraction and existing commercial activities. The risk assessment indicated whether the water body would meet the criteria for "good status" or would be considered "at risk" of not meeting the standards by 2015. This assessment provided the baseline information to prepare the first cycle River Basin Management Plan and Programme of Measures necessary to comply with the WFD standards.

Following the completion of the first cycle, the status information shows that 55% of river water bodies within Ireland achieved good or high status. The river basin characterisation process for the second cycle goes beyond the classification of status and assesses whether a water body is at risk of not meeting its objectives based on the review of such information such as water quality trends, catchment pressures and expert local knowledge. There are three categories of risk, 'not at risk', 'at risk' and 'review'.

'Not at risk' requires maintenance of the existing measures in place to maintain the satisfactory status. 'At risk' waterbodies need new and often more targeted mitigation measures. 'Review' waterbodies need more monitoring and assessment.

Progress in restoring impacted waters and protecting waters from deterioration has been slow and more targeted actions are required for the 3rd cycle RBMP. The proposed themes for the next RBMP are based on the premise of "the right measure, in the right place" supported and delivered by:

- An increased level of ambition - increased compliance and smarter investment.
- Integrated Catchment Management Planning;
- Preventing further waterbody deterioration;
- Meeting the objectives for designated protected areas;
- Protect high status waterbodies.

### 10.2.4 Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Chapter 6 Scoping and Consultation in Volume 2 of the EIAR. The following consultation response has been considered in the preparation of this chapter:

- Offaly County Council noted that Yellow River has a 'Poor' water quality status and is designated as a 'Prioritized Area for Action' under the River Basin Management Plan 2018 – 2021.

### 10.2.5 Impact Appraisal Methodology

The following elements were examined to determine the potential significant effects of the proposed development on hydrology and surface water quality within the study area:

- Characterisation of the hydrological regime within the study area; and,
- Description and assessment of the likely significant effects of the proposed development.



#### *10.2.5.1 Evaluation Criteria*

During each phase (construction, operation, and decommissioning) of the proposed development, several activities will take place on site, some of which will have the potential to cause impacts on the hydrological regime and surface water quality within the study area.

The assessment of the magnitude of an impact incorporates the timing, scale, size and duration of the potential impact. The magnitude criteria for hydrological impacts are defined in the aforementioned NRA guidance and set out in Table 10-1:

**Table 10-1: Estimation of Importance of Hydrology Attributes (NRA, 2009)**

| Importance | Criteria | Typical Examples |
|---|---|---|
| Extremely High | Attribute has a high quality or value on an international scale | River, wetland or surface water body ecosystem protected by EU legislation. |
| Very High | Attribute has a high quality or value on a regional or national scale | River, wetland or surface water body ecosystem protected by national legislation – NHA status<br>Regional important potable water source supplying >2500 homes<br>Quality Class A (Biotic Index Q4, Q5)<br>Nationally important amenity site for wide range of leisure activities. |
| High | Attribute has a high quality or value on a local scale | Salmon fishery<br>Locally important potable water supply source supplying >1000 homes<br>Quality Class B (Biotic Index Q3 -4).<br>Flood plain protecting 5 and 50 residential or commercial properties from flooding.<br>Locally important amenity site for wide range of leisure activities. |

| Importance | Criteria | Typical Examples |
|---|---|---|
| Medium | Attribute has a medium quality or value on a local scale | Coarse fishery<br>Local potable water source supplying >50 homes.<br>Quality Class C (Biotic Index Q3, Q2-3).<br>Flood plain protecting between 1 and 5 residential or commercial properties from flooding. |
| Low | Attribute has a low quality or value on a local scale | Locally important amenity site for small range of leisure activities.<br>Local potable water source supplying <50 homes.<br>Quality Class D (Biotic Index Q2, Q1).<br>Floodplain protecting 1 residential or commercial property from flooding.<br>Amenity site used by small numbers of people. |

Potential impacts are assessed as being of major, moderate, minor or negligible significance. Significance criteria are presented in in Table 10-2:

**Table 10-2: Estimation of Magnitude of Impact on Hydrology Attributes (NRA, 2009)**

| Magnitude | Criterion | Description and Example |
|---|---|---|
| Major | Loss of attribute | Long term changes to the hydrology and water quality e.g., loss of EU-designated salmonid fishery:<br>Change in water quality status of river reach.<br>Loss of flood storage/increased flood risk.<br>Pollution of potable source of abstraction. |
| Moderate | Impact on integrity of attribute or loss of part of attribute | Short to medium term changes to the hydrology and water quality:<br>loss in productivity of a fishery.<br>contribution of significant sediment and nutrient quantities in the receiving water, but insufficient to change its water quality status. |
| Minor | Minor impact on attribute | Detectable but non-material and transitory changes to the hydrology and water quality - measurable change in attribute, but of limited size and/or proportion. |
| Negligible | Impact on attribute but of insufficient magnitude to affect the use/integrity | No perceptible changes to the hydrology and water quality:<br>Discharges to watercourse but no loss in quality, fishery productivity or biodiversity.<br>No increase in flood risk. |

The matrix in Table 10-3 determines the significance of the impacts based on the importance and magnitude of the impacts as determined by Table 10-1 and Table 10-2.

**Table 10-3: Rating of Significance of Impacts (NRA, 2009)**

| | | Magnitude of Impact | | | |
|---|---|---|---|---|---|
| | | Negligible | Small (Minor) | Moderate | Large (Major) |
| Importance of Attribute | Extremely High | Imperceptible | Significant | Profound | Profound |
| | Very High | Imperceptible | Significant / Moderate | Profound / Significant | Profound |
| | High | Imperceptible | Moderate / Slight | Significant / Moderate | Severe / Significant |
| | Medium | Imperceptible | Slight | Moderate | Significant |
| | Low | Imperceptible | Imperceptible | Slight | Slight / Moderate |

The significance of all likely effects for the proposed development at Derryarkin are discussed in Section 10.4.

## 10.3 Baseline Environment

The receiving hydrological and surface water environment is described hereunder. This includes a description of the surface water catchment in which the proposed development site is situated; regional and local hydrology; existing drainage systems present at the proposed development site; designated sites present within receiving hydrologically connected surface waters; and water quality at receiving surface waters within the catchment.

### 10.3.1 Description of the Catchment

The site of the proposed development is situated within the Boyne waterbody catchment (Catchment ID - 07_11) as defined by the EU Water Framework Directive (2000/60/EC). The Boyne catchment is described in the following paragraphs and is shown in Figure 10.1. The risk status and water quality information provided is taken from the online mapping service for catchments (www.catchments.ie).

The Boyne catchment encompasses 66% of Co. Meath with small areas of Co. Cavan and Co. Louth to the north, Co. Westmeath to the west, Co. Offaly and Co. Kildare to the south. The total catchment area is estimated at 2,693 $km^2$ with a main channel length of 113km.

The proposed development site is within the Yellow River sub-catchment and comprises:

- Sub catchment Yellow (Castlejordan) River SC_010;
- River Sub-basin Castlejordan_020 (Code: IE_EA_ 07C040100) and Yellow (Castlejordan)_020 (Code: IE_EA_ 07Y020100).

The Yellow River drains an estimated catchment area of 44.5 km$^2$ in Co. Offaly to the west of Edenderry which includes Rhode and Castlejordan. This catchment includes the area drained by the Yellow River and all streams entering between its confluence with the River Boyne approximately 4.6 km north-west of Edenderry town. The Yellow River / Boyne confluence delineates the county boundaries between Offaly, Meath and Kildare.

The WFD risk status of the Yellow River waterbody is "At Risk". The water quality is Poor due to less than Good biological status and elevated phosphate and ammonia. Peat extraction significant impacts water quality throughout this subcatchment. In addition, urban wastewater treatment and urban diffuse pollution is likely to be also impacting Yellow (Castlejordan) sub-catchment[1].

Under the 2nd Cycle RBMP (2018 – 2021), the Yellow River was designated as a Prioritised Area for Action. Mitigation and protection measures were identified and implemented to achieve the environmental objectives established in the RBMP.

### 10.3.2 Regional and Local Hydrology

Regionally, the wider Derryarkin area lies within the Castlejordan watershed (SC_010) located within the River Boyne surface water catchment within Hydrometric Area 7 of the Eastern River Basin District. Watercourses within the Castlejordan watershed run north-west to south-east eventually flowing into the Yellow River, as shown in Figure 10.1.
Drainage in the local area surrounding the proposed development site consists of manmade drains constructed for the purposes of draining the bog to facilitate peat harvesting and draining local fields,

An existing local surface water drainage channel is situated ca. 20 meters to the south of the development site and flows west - east discharging to the Yellow River 1.1 km south-east of the proposed site. The Yellow River flows in a predominantly south-easterly direction discharging to the River Boyne approximately 12.5km to the east of the proposed development, which in turn flows in a north east direction towards Drogheda where it enters the Irish Sea.

### 10.3.3 Existing Site Drainage

Existing stormwater drainage infrastructure on the site comprises a stone soakaway ca. 33 m$^2$ in area located along the west boundary of the site (see Plate 10-1) which drains clean stormwater from hard surface areas at the site. Foul water generated during past agricultural operations was previously diverted to and collected within the two (2 no.) underground slurry holding tanks beneath the portal frame shed on-site.



[1] EPA Sub-Catchment Assessment: Sub catchment Yellow [Castlejordan]_SC_010 (2018)

Plate 10-1: Overgrown Open Stone Soakaway Pit

Path: R:\Map Production\2020\P2344\Workspace\EIAR\P2344_GIS_Fig10-1_WFDCatchmentsAndWiderDrainageNetwork_A3.mxd



DYSART STREAM (LOUGH ENNELL)_010
BROSNA_030
RIVERSTOWN_010
BALLYHAW_010
DEEL (RAHARNEY)_050
DEEL (RAHARNEY)_060
BROSNA_040
DUNBODEN PARK STREAM_010
KINNEGAD_030
KINNEGAD_010
MILLTOWNPASS_010
KINNEGAD_020
BOYNE_040
MONAGHANSTOWN_010
ROCHFORTBRIDGE STREAM_010
GAGEBOROUGH_010
BROSNA_050
CASTLEJORDAN_030
CASTLEJORDAN_010
CASTLEJORDAN_020
GAGEBOROUGH_020
YELLOW (CASTLEJORDAN)_030
BOYNE_010
BROSNA_060
YELLOW (CASTLEJORDAN)_020
BOYNE_030
YELLOW (CASTLEJORDAN)_010
BROSNA_070
CASTLETOWN TARA STREAM_010
Cornaher_010
TONAPHORT_010
SILVER (TULLAMORE)_010
BOYNE_020
SILVER (TULLAMORE)_020
ESKER STREAM_010
DURROW ABBEY STREAM_010
ESKER STREAM_020
DAINGEAN_020
FIGILE_030
SILVER (TULLAMORE)_030
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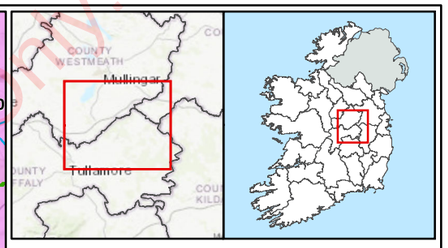
TULLAMORE_020
FIGILE_050
TULLAMORE_040
KILLEENMORE_010




## Legend

- Site Boundary
- WFD River Sub Basins
- Rivers

**WFD Catchments**

Catchment Name:

- Barrow
- Boyne
- Lower Shannon



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| | | | |
|---|---|---|---|
| **TITLE:** Water Framework Directive (WFD) Catchments and Wider Drainage Network | | | |
| **PROJECT:** Oxigen Derryarkin Materials Recovery Facility | | | |
| **FIGURE NO:** | 10.1 | | |
| **CLIENT:** | Oxigen Environmental Unlimited Company | | |
| **SCALE:** | 1:100000 | **REVISION:** | 0 |
| **DATE:** | 14/06/2022 | **PAGE SIZE:** | A3 |

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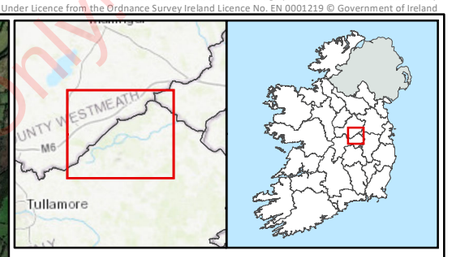


## Legend

- Site Boundary
- Rivers

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| | | | |
|---|---|---|---|
| **TITLE:** | Hydrological Features Map | | |
| **PROJECT:** | Oxigen Derryarkin Materials Recovery Facility | | |
| **FIGURE NO:** | 10.2 | | |
| **CLIENT:** | Oxigen Environmental Unlimited Company | | |
| **SCALE:** | 1:50000 | **REVISION:** | 0 |
| **DATE:** | 14/06/2022 | **PAGE SIZE:** | A3 |

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### 10.3.4 Designated Sites at Receiving Surface Waters

Designated sites include Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC), Special Protection Areas (SPAs), National Heritage Areas (NHAs) and Proposed National Heritage Areas (pNHAs), The proposed development site is not located within any designated conservation site.

There are four sites of European Importance within a 15km radius of the proposed project:

- Raheenmore Bog SAC (000582);
- Lough Ennell SAC (000685);
- Split Hills and Long Hill Esker SAC (001831);
- Lough Ennell SPA (004044).

Three are designated as Special Areas of Conservation (SACs) and one is designated as a Special Protected Areas (SPAs) (Refer to Chapter 8, Biodiversity for further information).

There is no hydrological connection between the proposed development site and any of the above sites.

There are four further sites of European Importance beyond a 15km radius of the proposed development site which are hydrologically connected to the development via the River Boyne. These are as follows:

- River Boyne and River Blackwater SAC (002299);
- The River Boyne and River Blackwater SPA (004232);
- Boyne Coast and Estuary SAC (001957);
- Boyne Estuary SPA (004080).

Table 10-4 lists these sites, details the distance between the designated site and the proposed development, and describes the nature of each hydrological connection.

The River Boyne is also a protected river under the EU Freshwater Fish Directive (2006/44/EC) and is identified as having hydrological connectivity to the proposed development site.

**Table 10-4: Hydrologically Connected to European Designated Sites,**

| Site | Code | Distance between site and Proposed Development | Summary of Hydrological Setting |
|---|---|---|---|
| River Boyne and River Blackwater SAC | 002299 | 18.5 km | Hydrological connectivity to this site via existing manmade bog draining that flows into the Yellow River which discharges into the River Boyne. |
| The River Boyne and River Blackwater SPA | 004232 | 18.5 km | Hydrological connectivity to this site via existing manmade bog draining that flows into the Yellow River which discharges into the River Boyne. |
| Boyne Coast and Estuary SAC | 001957 | 74.0 km | Hydrological connectivity to this site via existing manmade bog draining that flows into the Yellow River which discharges into the River Boyne, which in turn discharges to the Boyne Estuary and Coast. |
| Boyne Estuary SPA | 004080 | 74.0 km | Hydrological connectivity to this site via existing manmade bog draining that flows into the Yellow River which discharges into the River Boyne, which in turn discharges to the Boyne Estuary and Coast. |

### 10.3.5 Water Quality

#### *10.3.5.1 Offaly County Development Plan 2021-2027*

A review of the Offaly County Development Plan 2021 - 2027 was carried out to determine their specific objectives in relation to water quality. The relevant policies and objectives relating to water quality are referenced as follows:

**Protection of Surface Water Quality**

Under the Water Framework Directive and the national River Basin District Management Plan (RBMP), Offaly County Council has an obligation as the competent Authority to protect all high-status sites (Q4-5, Q5) and catchments. All proposed developments which may impact on these sites or catchments will be subject to the most stringent requirements to prevent any release of pollutants.

There are three river basins districts applicable to County Offaly:

1. The Shannon catchment is in the Shannon River Basin District and covers 73% of the county.
2. The Barrow catchment is in the South-Eastern River Basin District Authority and covers 20% of the county.
3. The Boyne catchment is in the Eastern River Basin District Authority and covers 7% of the county.

Offaly County Council is the competent authority in the implementation of the Water Framework Directive (WFD) for the County. Under the WFD, the Council is required to improve water quality and achieve 'good' ecological status in all water bodies (rivers and lakes) in the county by 2027.

The Council take cognisance of the various river basin district management plans and their associated programme of measures to protect and improve water quality. To this end the Council implement the Programme of Measures for the three River Basin Districts (RBDs) relevant to County Offaly and any other water quality management plans prepared for the county or the Region.

## POLICIES

| | |
|---|---|
| **ENVP-01** | It is Council policy to ensure that the Water Framework Directive, the River Basin Management Plan and any subsequent Water Management Plans are fully considered throughout the planning process. |
| **ENVP-02** | It is Council policy to manage, protect and enhance surface water and ground water quality to meet the requirements of the Water Framework Directive. |
| **ENVP-03** | It is Council policy to support the implementation of the Water Framework Directive, the River Basin Management Plan and the Local Authority Waters Programme in achieving and maintaining at least good environmental status for all water bodies in the county. Development proposals shall not have an unacceptable impact on the water environment, including surface waters, groundwater quality and quantity, river corridors and associated woodlands. |
| **ENVP-04** | It is Council policy that in assessing applications for developments, that consideration is had to the impact on the quality of surface waters having regard to targets and measures set out in the River Basin Management Plan, and any subsequent local or regional plans. |
| **ENVP-06** | It is Council policy to promote and comply with the environmental standards and objectives established by the European Communities (Surface Waters) Regulations 2009, made to give effect to the measures needed to achieve the environmental objectives established for bodies of surface water by the European Water Framework Directive. |
| **WSP-22** | It is Council policy to ensure adequate surface water drainage systems are in place which meet the requirements of the Water Framework Directive and the River Basin Management Plan and to promote the use of Sustainable Drainage Systems. |
| **WSP-23** | It is Council policy to limit and manage the permitted stormwater run-off from all new developments. The maximum permitted surface outflow from any new development shall be restricted to that of a greenfield site before any development takes place unless otherwise agreed with Offaly County Council. |
| **WSP-24** | It is Council policy to require new development to provide a separate foul and surface water drainage system and to incorporate Sustainable urban Drainage Systems (SuDS). |
| **WSP-25** | It is Council policy to promote the use of green infrastructure, for example green roofs, green walls, planting and green spaces for surface water run-off retention purposes, in the interests of flood mitigation and climate change adaptation. |

**OBJECTIVES**

**ENVO-01** It is an objective of the Council to ensure, through the implementation of the River Basin Management Plan, and any other associated legislation, the protection and improvement of all drinking water, surface water and ground waters throughout the county.

**ENVO-02** It is an objective of the Council to protect through its regulatory controls and in conjunction with the Local Authority Waters Programme, water bodies with 'high ecological status'; to restore water bodies that have fallen below 'high ecological status'; to maintain water bodies at 'Good Status'; and to mitigate threats to water bodies identified as 'At Risk' i.e. 'Moderate and Poor Status'.

**ENVO-03** It is an objective of the Council to protect both ground and surface water resources; to work with Irish Water to develop and implement Drinking Water Safety Plans to protect sources of public water supply and their contributing catchment; and to work with the National Federation of Group Water Schemes in respect of Source Protection Plans for Group Water Schemes to protect these sources.

**ENVO-04** It is an objective of the Council to comply with the Blue Dot Catchments Programme.

#### *10.3.5.2 Water Framework Directive Status*

Eight out of nine river water bodies within the Yellow River sub-catchment are classed as 'At Risk' of failing to meet their Water Framework Directive (2000/60/EC) objectives by 2027. This classification was applied by the EPA Catchment unit in 2020. Two water bodies with the codes 'IE_EA_07Y020070' and 'IE_EA_07Y020100' at the Yellow River downstream hydrologically from the proposed development site are classed as 'At Risk' of failing to meeting their WFD objectives by 2027 due to these water bodies having a 'less than good' biological status and elevated phosphate and ammonia concentrations. The Yellow River reduced in biological status from Good to Moderate between the 2013 and 2018 EPA monitoring cycle.

For the protection of fisheries, Ireland supports a network of Salmonid Waters designated under the EU Freshwater Fish Directive (CEC, 2006). The River Boyne and its tributaries are designated salmonid waters under the EU Freshwater Fish Directive.

#### *10.3.5.3 EPA Water Quality Monitoring*

A water quality monitoring programme was established by the Environmental Protection Agency (EPA) under the Water Framework Directive to determine the surface water status of the waterbodies. Physiochemical and biological / ecological quality of surface waters is monitored at several locations within the Yellow River sub catchment. The following sections discuss the water quality status of the Yellow River watershed using available data obtained as part of sampling undertaken by the EPA.



**Biological Q-Value**

A number of water quality monitoring stations are situated along the Yellow River to the south of the proposed development. One water quality monitoring station is situated upstream of the point where the surface water drainage channel immediately south of the proposed development site enters the Yellow River, one is situated at the confluence where the drainage channel enters the Yellow River, and one is situated downstream of this confluence.

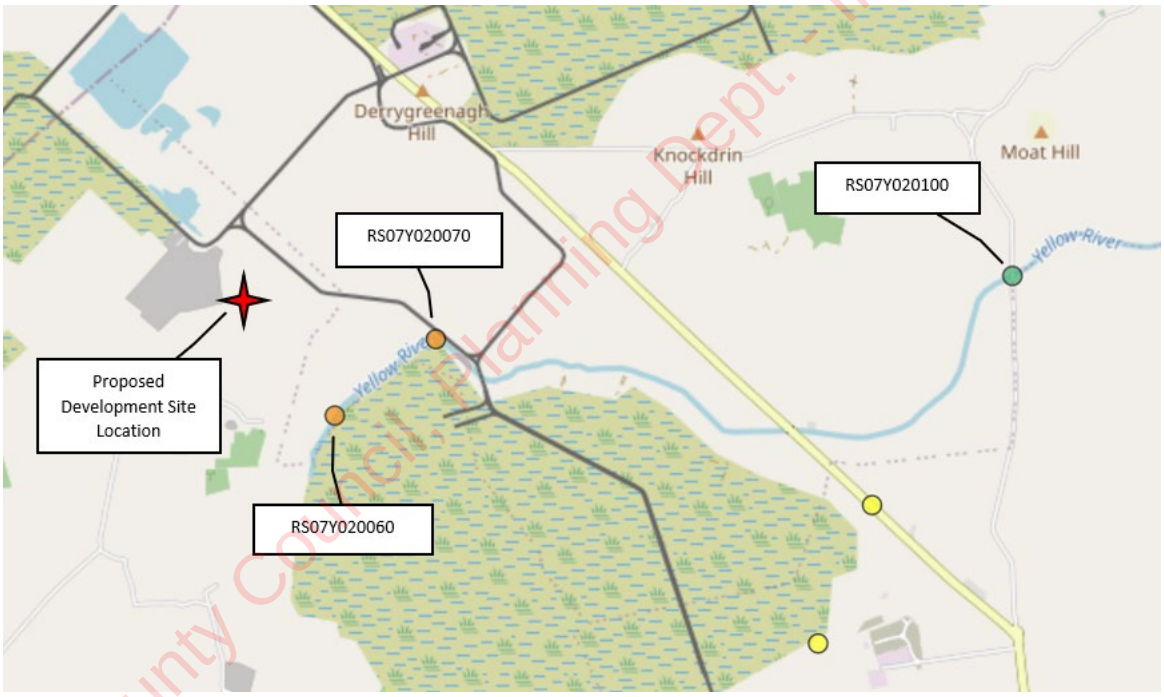
Biological quality monitoring for these monitoring stations is presented in Table 10-5. A map showing the location of these monitoring points is shown below this:

**Table 10-5: EPA Water Quality Monitoring Q-Rating Values**

| Water Body | EPA Location and Station Code | Easting | Northing | EPA Q-Rating Status |
|---|---|---|---|---|
| Yellow River | Derryarkin - RS07Y020060 | 249087 | 236018 | Q3 – Poor |
| Yellow River | Field Drain / Yellow River Confluence - RS07Y020070 | 249694 | 236485 | Q3 – Poor |
| Yellow River | Garr Bridge - RS07Y020100 | 253181 | 236904 | Q4 – Good |

The Q value at the upstream monitoring station is currently Q3 or 'Poor.' The Q value at the monitoring station at the confluence between the drainage channel and Yellow River is currently Q3 or 'Poor.' The Q value at the monitoring station which is downstream of where the drainage channel enters the river is currently Q4 or 'Good'.

EPA Water Quality Monitoring Stations in the vicinity of the site



## Physiochemical

Physiochemical water quality monitoring of the Yellow River is undertaken by the EPA at Garr Bridge (Ref Code: RS07Y020100) located 4.6km downstream of the proposed development site. A discussion into the available surface water quality results from the Yellow River are presented in the following sections.

### *EPA Monitoring – Yellow River (Garr Bridge)*

Physiochemical monitoring results obtained over the sampling period 2007 – 2018 were compared to the Ecological Quality Standard (EQS) values for BOD, ammonia, ortho-phosphate and suspended solids presented in the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), as amended.

Mean and 95%-ile results from Garr Bridge are presented in Table 10-6.

**Table 10-6: Physio-chemical water quality at Garr Bridge (2007 - 2018)**

| Parameter | Result | | | Water Quality Standard |
|---|---|---|---|---|
| | Mean | Min | Max | |
| BOD (mg/l) | 2.29 | 1.3 | 2.7 | ≤1.5 (mean) or ≤2.6 (95%ile) |
| Ammonia as NH3-N (mg/l) | 0.136 | 0.03 | 0.269 | </=0.065 (mean) or </=0.14 (95%ile |
| Orthophosphate as PO4 (mg/l) | 0.018 | 0.006 | 0.04 | </=0.035 (mean) or </= 0.075 (95%ile) |
| Suspended Solids (mg/l) | 11.68 | 5.3 | 21.9 | </=25 |
| pH (pH Units) | 7.88 | 7.705 | 8.08 | 6.0< pH <9.0 |
| Nitrate (mg/l) | 2.12 | 2.06 | 3.714 | <50 |

Notes: Water Quality Standards for Biological Oxygen Demand (BOD), Ammonia (NH3-N) and Ortho-phosphorous (PO4-P) refers to the Environmental Quality Standards (EQS) specified in the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009), as amended,

Total suspended solids compared to European Communities (Quality of Salmonid Waters) Regulations 2006 (EU Directive 2006/44/EEC),

Nitrate levels compared to European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014), as amended

The physiochemical monitoring data in Table 10-6 demonstrates that concentrations of BOD, ammonia, orthophosphate, suspended solids and nitrate are representative of water quality which is of good status at Garr Bridge. This is reflective of the 'Good' status classification for the lower reaches of the Yellow River upstream of the River Boyne confluence.

Full results from this monitoring is provided in Appendix 10.1 - EPA Surface Water Quality Monitoring Data (Garr Bridge) – in Volume 3 of this EIAR.

### *10.3.5.4 Baseline Water Quality Monitoring Data*

One round of surface water quality monitoring was undertaken at three surface water sampling locations along the surface water drainage channel immediately south of the proposed development site. These locations were identified as part of the baseline assessment of surface water quality within the study area. These locations are detailed in Table 10-7 and depicted on mapping in Figure 10-4.

Field hydrochemistry measurements of unstable parameters, electrical conductivity (µS/cm), pH (pH units) and temperature (°C) were taken at various locations in the surface watercourse located south of the proposed development area on 22nd June 2021. The field measurements and the locations are listed in Table 10-7:

**Table 10-7: Surface Water Monitoring Locations and Hydro-Chemistry Measurements**

| Monitoring Location | Easting | Northing | Receiving Surface Water Body | Conductivity (µS/cm) | pH | Temp °C | Dissolved Oxygen (%-sat) |
|---|---|---|---|---|---|---|---|
| SW-1 (Proposed Site Discharge location) | 248604 | 236695 | Yellow River, via drainage channel | 0.693 | 8.004 | 11.2 | 94.59 |
| SW-2 (Upstream) | 248505 | 236687 | Yellow River, via drainage channel | 0.689 | 8.012 | 11.2 | 93.84 |
| SW-3 (Downstream) | 248666 | 236695 | Yellow River, via drainage channel | 0.690 | 7.986 | 11.4 | 94.5 |

A separation distance of approximately 500m was chosen between the sampling locations. Electrical conductivity values for the receiving water remained consistent and ranged between 689µS/cm and 693µS/cm. pH values which were all slightly alkaline and ranged from 7.986 to 8.012. This is consistent with the bedrock geology in the area being limestone bedrock and sub-soils in the area being derived from this limestone bedrock. Temperature readings were normal for the time of year visited (June 2021). Dissolved oxygen levels ranged from 93.84 – 94.59 %age saturation and is representative of water quality in peatland areas.

Surface water samples collected on 22nd June 2021 from locations SW-1 to SW-3 were analysed for a range of surface water quality indicator parameters.

Results of the laboratory analysis are shown alongside relevant water quality regulations in Table 10-8:

### Table 10-8: Baseline Surface Water Quality

| Parameter | Units | EU Directives | | Sample ID | | |
|---|---|---|---|---|---|---|
| | | EU SW Regs 2009 (as amended) | EU DW Regs 2014 | SW-1 | SW-2 | SW-3 |
| **Inorganics** | | | | | | |
| Conductivity | mS/cm | | 2.5 | 0.677 | 0.67 | 0.68 |
| pH | pH Units | 6.0< pH < 9.0 | | 7.94 | 7.95 | 7.9 |
| Sulphate | mg/l | | | 69.5 | 68.9 | 71.5 |
| Chloride | mg/l | | 250 | 15.1 | 15.2 | 15.3 |
| BOD | mg/l | 1.5 | | <1 | <1 | <3 |
| COD | mg/l | | | 43.6 | 29.6 | 42.9 |
| Phosphate (Ortho as P) | mg/l | Good status ≤0.035 (mean) or ≤0.075 (95%ile) | | <0.02 | <0.02 | <0.02 |
| Ammoniacal Nitrogen as N | mg/l | ≤0.065 (mean) or ≤0.140 (95%ile) | 0.30 | 0.15 | 0.162 | 0.162 |
| Nitrate as N | mg/l | | 50 | 1.77 | 1.77 | 1.83 |
| Nitrite as NO2 | mg/l | | 0.5 | 0.095 | 0.095 | 0.098 |
| Alkalinity, Total as CaCO3 | mg/l | | | 320 | 314 | 325 |
| Suspended solids, Total | mg/l | 25 | | 4.65 | 4.4 | 3.75 |
| Total Organic Carbon | mg/l | NAC | NAC | 14.7 | 14.7 | 15.2 |
| **Heavy Metals** | | | | | | |
| Mercury | µg/l | 0.05 | 1.0 | 0.0244 | <0.01 | 0.0272 |
| Arsenic | µg/l | 25 | 10 | 0.953 | 0.823 | 0.991 |
| Cadmium | µg/l | 0.08 | 5.0 | <0.08 | <0.08 | <0.08 |
| Chromium | µg/l | 4.7 | 50 | <1 | <1 | 1.17 |
| Copper | µg/l | 5 | 2000 | 2.27 | 2.15 | 5.24 |
| Lead | µg/l | 1.29 | 10 | 0.367 | 0.238 | 0.461 |
| Nickel | µg/l | | 20 | 8.51 | 8.03 | 9.34 |
| Selenium | µg/l | | | <1 | <1 | <1 |
| Zinc | µg/l | 40 | | 11.1 | 7.43 | 12.6 |

| Parameter | Units | EU Directives | | Sample ID | | |
|---|---|---|---|---|---|---|
| | | EU SW Regs 2009 (as amended) | EU DW Regs 2014 | SW-1 | SW-2 | SW-3 |
| **TPH Criteria Working Group (CWG)** | | | | | | |
| GRO > C5-C12 | µg/l | | | <50 | <50 | <50 |
| Methyl tertiary butyl ether (MTBE) | µg/l | | | <3 | <3 | <3 |
| Benzene | µg/l | 10 | | <7 | <7 | <7 |
| Toluene | µg/l | | | <4 | <4 | <4 |
| Ethylbenzene | µg/l | | | <5 | <5 | <5 |
| m,p-Xylene | µg/l | | | <8 | <8 | <8 |
| o-Xylene | µg/l | | | <3 | <3 | <3 |
| Sum of detected Xylenes | µg/l | | | <11 | <11 | <11 |
| Sum of detected BTEX | µg/l | | | <28 | <28 | <28 |
| Aliphatics >C5-C6 | µg/l | | | <10 | <10 | <10 |
| Aliphatics >C6-C8 | µg/l | | | 10 | <10 | <10 |
| Aliphatics >C8-C10 | µg/l | | | <10 | <10 | <10 |
| Aliphatics >C10-C12 | µg/l | | | <10 | <10 | <10 |
| Aliphatics >C12-C16 | µg/l | | | <10 | <10 | <10 |
| Aliphatics >C16-C21 | µg/l | | | <10 | <10 | <10 |
| Aliphatics >C21-C35 | µg/l | | | <10 | <10 | <10 |
| Total Aliphatics >C12-C35 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC5-EC7 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC7-EC8 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC8-EC10 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC10-EC12 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC12-EC16 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC16-EC21 | µg/l | | | <10 | <10 | <10 |
| Aromatics >EC21-EC35 | µg/l | | | <10 | <10 | <10 |
| Total Aromatics >EC12-EC35 | µg/l | | | <10 | <10 | <10 |
| Total Aliphatics & Aromatics >C5-35 | µg/l | | | 19 | <10 | <10 |
| **EPH CWG** | | | | | | |
| Aliphatics > C16-C35 | µg/l | | | <10 | <10 | <10 |

Total suspended solids (TSS) ranged between 3.75 mg/l and 4.65 mg/l. TSS levels are below the Freshwater Fish Directive (2006/44/EC) for both Salmonid and Cyprinid waters.

In comparison to the Environmental Objectives Surface Water Regulations (S.I. 272 of 2009), all results for ammonia-N exceeded the "Good Status" threshold. Ammonia as N ranged between 0.15 and 0.162mg/l, which is above the mean and 95%ile EQS limit. The presence of higher ammonia concentrations at this location is likely due to the natural decomposition of peat.

For ortho-phosphate all results were below the "Good Status" threshold. All BOD results were below the limit of detection and likely within the "Good Status" threshold.

Suspended solids results were between 3.75 and 4.65mg/l. All samples were below the surface water regulation (75/440/EEC) values of 50mg/l.

Nitrite ranged between 0.095 and 0.098mg/L and results were typically low which is what would be expected in a peatland environment.

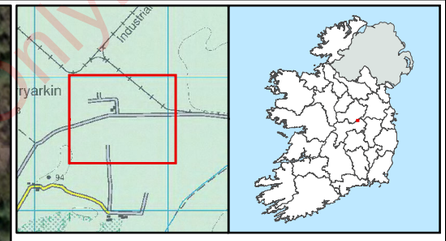
Nitrate ranged between 1.77 and 1.83 mg/L and were typically low which is what would be expected in a peatland environment.

Results for the TPH Criteria Working Group parameters indicated there was no evidence of gasoline or diesel range hydrocarbons detected at the site or within the receiving watercourse upstream and downstream of the proposed site.

The full results for this monitoring are contained in Appendix 10.2 - Laboratory Analytical Certificates (June 2021) – of Volume 3 of this EIAR.

Path: R:\Map Production\2020\P2344\Workspace\EIAR\P2344_GIS_Fig10-3_WaterQualityMonitoringLocations_A3.mxd




## Legend

- Site Boundary
- Sample Location



Comhairle Chontae Uíbh Fhailí
Offaly County Council
PLANNING
**PL2 / 22 / 490**
21 / 09 / 2022

N
W E
S

0 50 100 200 Meters

| | | | |
|---|---|---|---|
| **TITLE:** Baseline Water Quality Monitoring Locations | | | |
| **PROJECT:** Oxigen Derryarkin Materials Recovery Facility | | | |
| **FIGURE NO:** | 10.3 | | |
| **CLIENT:** | Oxigen Environmental Unlimited Company | | |
| **SCALE:** | 1:2500 | **REVISION:** | 0 |
| **DATE:** | 08/07/2022 | **PAGE SIZE:** | A3 |

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## 10.4 Potential Effects

The potential impacts of the construction, operation and decommissioning phases of the proposed development, as described in Chapter 4 of this EIAR, on receiving environment hydrology and surface water quality are assessed in the following sections:

The potential impacts are assessed in accordance with the evaluation criteria outlined in Section 10.2. The potential hydrological effects are summarised in Table 10-9. The proposed mitigation measures to reduce or eliminate potential effects are then presented in Section 10.5 and residual effects are identified in Section 10.6.

### 10.4.1 'Do Nothing' Effects

If the proposed development did not proceed , it is likely that the site would likely remain inactive as a site was previously used for agricultural purposes. The do-nothing scenario will have a neutral impact on the receiving environment (i.e. no effect).

### 10.4.2 Construction Phase Impacts

During the construction period, the proposed development has the potential to impact on the hydrological regime near the site. To assess these potential impacts the main construction activities have been defined as described in Chapter 4, Description of the Existing and Proposed Development. From a hydrology and surface water quality perspective, the main construction elements are:

- Advance works and installation of temporary construction site compound
- Demolition and site clearance:
    - Existing agricultural buildings and ancillary structure to be demolished and/or removed by specialist demolition contractor.
    - Existing earth bund to be removed for reuse on site or recovery/disposal elsewhere.
    - Existing concrete yard to be broken out and concrete to be crushed and reused as fill.
    - All existing stormwater and foul drainage services to be excavated and removed as appropriate.
    - Existing vegetation situated to the southwest of the site will be cleared and removed from the site.
- Construction of the MRF and ancillary infrastructural elements, and all associated activities including:
    - Excavations and infilling
    - Material stockpiling
    - Concrete pours, grouting and concrete wash out
    - On-site re-fuelling and temporary domestic wastewater from welfare units.
- Rerouting of ESB Lines, involving the following activities:
    - Installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables.
- Junction upgrade works at the junction between the private access road leading to the site and the R400 (as per Condition 4 of Kilmurray Precast Concrete Limited's Planning Permission 21247).

The potential impacts from the construction phase elements of the proposed development are outlined in the sections below.

#### *10.4.2.1 Potential Direct Effects*

Advance Works and Installation of Temporary Construction Site Compound

Direct potential effects on local hydrology associated with advance works are as follows:

- Soil and fill material disturbance as a result of preliminary clearance and hardcore area formation represents a potential source of increased sediment in surface water runoff. Suspended solids could potentially lead to siltation and physical effects on receiving water quality.
- The use of plant and machinery during demolition and site clearance will require the use of fuels and oils. Their use presents potential for spills and leaks which could contaminate the adjacent watercourse.

The magnitude of the unmitigated effect from these works is considered to be **Minor** in nature. The sensitivity of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential effects, prior to mitigation, is considered to be **Slight / Moderate.**



Demolition and Site Clearance

The proposed development will include the demolition and removal of all existing above ground structures and infrastructure as described in Chapter 4: Existing and Proposed Development. This includes excavation and stripping of all existing concrete yard surfaces where required, excavation of an existing earthen bund on-site, and removal of foundations. Site levelling and removal of vegetation will also occur during these works.

Residual soil and stone not reused on-site will be removed from the site and transported to the adjacent Kilmurray Precast Concrete Ltd Construction and Demolition (C&D) / Soil Recovery Facility, in Derryarkin, Rhode, Co. Offaly (WFP Reference: WFP-OY-19-0204-01).

Direct potential effects on local hydrology associated with the demolition and excavation of materials, levelling of the site and removal of vegetation which may occur during the demolition and site clearance phase of the proposed project are:

- Soil erosion as a result of earthworks and traffic heavy machinery movements represents a potential source of increased sediment in surface water runoff. Suspended solids could potentially lead to siltation and physical effects on receiving water quality.
- The use of plant and machinery during demolition and site clearance will require the use of fuels and oils. Their use presents potential for spills and leaks which could contaminate the adjacent watercourse.
- Temporary rubble stockpiles created from the breaking out of the existing concrete hardstanding and portal frame foundations may result in the generation of alkaline surface water run-off to the receiving surface water environment.

Prior to mitigation, the magnitude of the effect from these works is considered to be **Moderate** in nature. The importance of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential effects, prior to mitigation, is considered to be **Significant.**

## Construction of the Materials Recovery Facility

The proposed development will involve the construction of a Materials Recovery Facility (MRF) with the built elements of this development described in Chapter 4: Existing and Proposed Developments.

The proposed development will require construction phase earthworks to facilitate the development / installation of proposed foundations, tanks and the drainage network. Excavated areas will be appropriately backfilled where required utilising a suitable fill material. Where possible, excavated material from the site will be reutilised as fill material.

These earthworks have the potential to result in the generation of silt laden surface water run-off, which may adversely impact the receiving surface water environment.

Residual soil and stone not reused on-site will be removed from the site and transported to the adjacent Kilmurray Pre-cast Concrete Construction and Demolition (C&D) / Soil Recovery Facility, in Derryarkin, Rhode, Co. Offaly (WFP Reference: WFP-OY-19-0204-01).

Direct potential hydrological effects associated with construction activities are:

- Soil erosion as a result of earthworks and excavations, temporary storage of materials and traffic/mobile plant movements represents a potential source of increased sediment in surface water runoff. Suspended solids could potentially lead to siltation and physical effects on receiving water quality.
- Potential for contamination to surface water from spills/leakages of hydrocarbons on-site during works. Mobile plant will be powered using diesel. Given the length of this stage of construction, this plant will be re-fuelled on-site using a mobile re-fuelling vehicle. These activities may cause spills/leakages of hydrocarbons on-site, which in turn could result in surface water contamination.
- Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. Entry of cement-based products into the site drainage system, migrating into surface water runoff, and then to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Wash out of machinery, and outfall construction are the activities most likely to generate a risk of cement-based pollution.

The magnitude of the unmitigated effect from these works is considered to be **Moderate** in nature. The sensitivity of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential effects, prior to mitigation, is considered to be **Significant.**

## Rerouting of Overhead Powerline

An existing overhead powerline is required to be diverted as an underground cable. Connection works will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables.

Direct impacts to the existing environment associated with the proposed cabling works include:

- The excavations for the underground cabling trenches and joint bays can have a direct impact on the exposed soils in the form of increased erosion from surface water ingress. This may lead to an increase in the discharge of silt laden surface water run-off to the receiving surface water body. The proposed underground cabling associated excavations and ducting may present a preferential pathway for the movement of surface water runoff to the adjacent watercourse.

Given that the open sections of the trench will be backfilled following the installation of each section of ducting the potential effect on hydrological receptors, prior to mitigation, is **Moderate**. The sensitivity of the hydrological receptors (Yellow River) is considered to be **High**. The significance of these potential effects on hydrological receptors, prior to mitigation, is considered to be **Significant.**

Junction upgrade works at the junction between the private access road leading to the site and the R400

Junction upgrade works will not have any direct impact on receiving surface water bodies given the minor nature and scale of the works, given that there is no hydrological connection between this junction and any receiving surface water body, and given the distance to receiving surface water bodies. The closest watercourse to the junction is c. 150m north east (Yellow(Castlejordan)_20) and the Yellow River is c. 600m south.

### 10.4.3 Operational Phase Impacts

Potential direct effects of the proposed development's operation on local hydrology during this phase would be related to contamination from accidental spills/leakages. The sources for potential impacts could be:

- Normal operational traffic and other traffic necessary for the maintenance of the proposed development may result in minor accidental leaks or spills of fuel/oil;
- Storage of fuel and oils on-site;
- On-site refuelling activities;
- Traffic movement along site access road may result in discharge of silt laden run-off to drainage channel to the south of the site;
- Pooling and insufficient percolation from the installed wastewater treatment system (which will consist of a secondary treatment / soil polishing system) due to inadequate maintenance procedures. This may result in increased ammonia and phosphorus migration to groundwater and eventually to surface water;
- External storage of green waste giving rise to foul water;
- Risk of accidents which could include the following:
    - Uncontrolled spillages arising from the accidental release from the underground tanks or the wastewater treatment system;
    - Outbreak of fire at the facility which could result in the discharge of contaminated firefighting water to surface waters.

Prior to mitigation, the magnitude of the effect from the operational activities is considered to be **Moderate** in nature. The sensitivity of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential effects, prior to mitigation, is considered to be **Significant.**

### 10.4.4 Decommissioning Phase

In the event a cessation of waste processing activities occurs at this facility, the site will be decommissioned in accordance with a Closure, Restoration, Aftercare Management Plan (CRAMP) for the facility (which will be prepared as a condition of the prospective IE Licence).

Impacts associated with decommissioning are likely to be of a much smaller magnitude than impacts associated with the construction of the proposed development.

It is intended to wind the operation down gradually until such time that all residual wastes and materials are removed from the site. Residual materials will be classified before being dispatched to an appropriately authorised waste management facility for treatment. All residual waste will be managed in accordance with the CRAMP for the facility.

All built infrastructural elements of the site will remain in-situ. As such, there will be no disturbance of soils, earthworks or demolition activities during the decommissioning phase of the proposed development.

The proposed stormwater drainage and attenuation will remain as constructed and will continue functioning and controlling stormwater run-off from the site.

All hard-standing areas and drainage systems including interceptors and underground tanks will be cleaned and washed down. Any foul water and wash-water present in underground storage tanks on-site will be taken up and removed for disposal at an appropriately authorised wastewater treatment facility.

Prior to mitigation, the magnitude of the effect from the decommissioning activities is considered to be **Minor** in nature. The sensitivity of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential effects, prior to mitigation, is considered to be **Moderate.**

An overview of the construction, operational and decommissioning phase activities, the potential effects and the magnitude of the effects are presented in Table 10.9.



### 10.4.5 Cumulative Impacts

There is potential for the construction, operation and decommissioning of the proposed development to coincide with the operation of the:

- Piggery operated by Skeagh Farms located immediately north/north-west of the development site; and
- The active quarry / concrete batching facility / C&D / Soil Recovery facility operated by Kilmurray Precast Concrete Ltd located c.80m west of the site (at its closest point).
- The Yellow River Windfarm project

The remaining surrounding area is in a largely rural setting with limited industrial/commercial activity.

As identified in the EPA Sub-Catchment Assessment for the Yellow (Castlejordan) sub-catchment, peat extraction, urban wastewater treatment and urban diffuse pollution are likely to be impacting water quality in this sub-catchment.

Potential exists for aqueous discharges from the proposed development, Skeagh Farms Piggery, the Kilmurray site, the Yellow River Windfarm project, and wider land uses contained in the sub-catchment, to combine and have a cumulative impact on the receiving hydrological environment.

During both the construction and operational phases of the proposed development the potential cumulative effect on surface water quality from construction and operational phase activities, in combination with other land uses in the study area, is considered to be **Moderate** (prior to mitigation). The sensitivity of the hydrological receptor (Yellow River) is considered to be **High.** The significance of these potential cumulative effects, prior to mitigation, is therefore considered to be **Significant.**

During the decommissioning phase of the proposed development, the potential cumulative effect on surface water quality from decommissioning phase activities, in combination with other land uses in the study area, is considered to be **Low** (prior to mitigation). The sensitivity of the hydrological receptor (Yellow River) is considered to be **High**. The significance of these potential cumulative effects, prior to mitigation, is therefore considered to be **Moderate.**

### 10.4.6 Summary of Potential Effects

A summary of unmitigated potential effects on the catchment hydrology associated with the proposed development is provided in Table 10-9.

## Table 10-9: Summary of Potential Unmitigated Impact Significance on Hydrological Features

| Activity | Potential Impact | Receptor | Sensitivity | Prior to Mitigation | |
|---|---|---|---|---|---|
| | | | | Magnitude | Significance |
| **Construction Phase** | | | | | |
| Advance Works and Installation of Temporary Construction Site Compound | Advance works may cause increased sediment loads in surface water.<br>Potential for surface water contamination from fuel spills/leakages. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Minor | Slight / Moderate |
| Demolition and Site Clearance | Earthworks and heavy machinery movements contributing to increased sediment loads in surface water.<br>Potential for surface water contamination from fuel spills/leakages during construction phase earthworks.<br>Generation of alkaline surface water run-off from temporary rubble stockpiles | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant |
| Construction of the Materials Recovery Facility | Earthworks, temporary stockpiles and traffic/mobile plant movements contributing to increased sediment loads in surface water.<br>Potential for surface water contamination from spills/leakages during construction phase earthworks.<br>Release of cement-based product to temporary drainage system which may lead to increased alkalinity in the receiving watercourse and degradation of aquatic environment. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant |
| Rerouting of ESB Line | The excavations for the underground cabling trenches and joint bays can have a direct impact on the exposed soils in the form of increased erosion from surface water ingress.<br>This may lead to an increase in the discharge of silt laden surface water run-off to the receiving surface water body. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant |

| Activity | Potential Impact | Receptor | Sensitivity | Prior to Mitigation | |
|---|---|---|---|---|---|
| | | | | Magnitude | Significance |
| | The proposed underground cabling associated excavations and ducting may present a preferential pathway for the movement of surface water runoff to the adjacent watercourse. | | | | |
| **Operational Phase** | | | | | |
| Facility Traffic, fuel / oil storage, and refuelling of vehicles | Release of hydrocarbons or fuel spill with potential for contamination. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant |
| Accidents | Traffic movement along site access road may result in discharge of silt laden run-off to drainage channel to the south of the site.<br>Uncontrolled spillages arising from the accidental release from the underground tanks or wastewater treatment system, with potential for contamination resulting in increased ammonia and phosphorus in surface water.<br>Spills/leaks of oil from the transformers in the substation with potential for contamination.<br>Outbreak of fire at the facility which could result in the discharge of contaminated firefighting water to surface waters. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant |
| **Decommissioning Phase** | | | | | |
| Facility Traffic, fuel storage and refuelling of vehicles | Operational traffic which could result in minor accidental leaks or spills of fuel/oil.<br>Storage of fuel on site and refuelling of vehicles. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Low | Moderate |

## 10.5 Mitigation Measures

The following sections outline appropriate mitigation measures to avoid or reduce the potential impact of the proposed development on receiving watercourses during the construction, operation and decommissioning phases.

### 10.5.1 Mitigation by Design and Best Practice

With regard to the construction phase of the proposed development, the following design and best practice measures will be implemented to prevent the occurrence of water pollution and ensure the protection of the receiving surface water:

- The works will be designed and checked by a civil engineer, suitably qualified and experienced in demolition and site clearance and construction methodologies.
- Any excavation and construction related works will be subject to a design risk assessment at detailed design stage to evaluate risk levels for the construction, operation, and maintenance of the works. Identified impacts will be minimised by the application of principles of avoidance, prevention, and protection.
- A method statement for each element of the works will be prepared by the Contractor prior to any element of the work being carried out.
- The Contract will require programming of the works such that earthworks are not scheduled during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works. The Project Manager is the person responsible for determining when works are to be stopped due to weather.

With regard to the operational phase of the proposed development, the following design and best practice measures will be implemented to prevent the occurrence of water pollution and ensure the protection of the receiving surface water:

- To ensure the highest standards of environmental protection, the proposed development has been designed to operate in accordance with the following environmental protection standards:
    - European Commission (2018) BREF on Waste Treatment.
    - European Commission (2018) BATC on Waste Treatment.
    - EPA (2011) BAT Guidance Note on the Waste Sector.
- Stormwater entering the drainage system will be directed to a pre-cast attenuation tank. A slam shut valve and hydrobrake (limiting flow to 9.0 l/s) will be situated prior to the point of site discharge. The slam shut valve will ensure site containment in the event of any spill of hazardous material or environmental emergency.

## 10.5.2 Construction Phase Mitigation

### *10.5.2.1 Construction Environmental Management Plan*

A Construction Environmental Management Plan (CEMP) has been prepared for the proposed development and is included in Volume 3, Appendix 4.3. The CEMP defines the work practices, environmental management procedures and management responsibilities relating to the construction phase of the proposed development. The CEMP describes how the Contractor for the main construction works will implement a site Environmental Management System (EMS) to meet the specified contractual, regulatory and statutory requirements including the requirements identified as part of the environmental impact assessment process.

The CEMP will be updated prior to construction to take account of any amendments arising during the consenting process and relevant conditions attached to the planning permission and will be implemented for the duration of the construction phase of the project. The CEMP will be a live document and will be reviewed and updated as required.

The CEMP defines the following construction phase control measures in relation to surface water management.

### *10.5.2.2 Mitigation Measures for Earthworks*

The proposed works are designed and checked by suitably qualified a civil engineer, with experience in demolition and site clearance and construction methodologies. The excavation and construction related works will be subject to a design risk assessment at detailed design stage to evaluate risks posed to the hydrological regime from the construction, operation, and maintenance of the works. Identified risks will be minimised by the application of principles of avoidance, prevention, and protection.

A method statement for each element of the works will be prepared by the Contractor prior to any element of the work being carried out. The Contract will require programming of the works such that earthworks are not scheduled during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

To mitigate against erosion of exposed soils, all excavations will be constructed and backfilled as quickly as possible. Excavations will stop during or prior to heavy rainfall events. All excavations will be carried out such that they are stable or adequately supported. Unstable excavations will not be left unsupported. Where appropriate and necessary, excavations will be protected against the ingress of water or erosion by using cut-off trenches to minimise the flow of surface water through construction areas. Excavations will be designed in manner that maximizes the percolation of surface water to ground and prevents run-off of surface water to the stream to the south of the site.

To mitigate against possible contamination of the exposed soils and surface runoff, refuelling of machinery and plant will only occur at designated refuelling areas with drip trays and spill kits available.

Material removed from site during site clearance activities and earthworks will be reused on-site, where possible. Residual material will be taken to Kilmurray Soil Recovery site. The Kilmurray C&D / Soil Recovery Facility has a Waste Facility Permit for their Soil Recovery Activity (WFP References: WFP-OY-19-0204-01).

### *10.5.2.3 Sediment Control Measures*

The following sediment control measures are proposed to prevent sediment becoming entrained in surface water run-off during the construction phase of the proposed development:

- Temporary cut-off trenches and earthen bunds will be used to prevent entry of surface water into excavations, temporary stockpiles, and disturbed working areas, thereby preventing surface waters from being exposed to disturbed soils.
- All temporary stockpiles will be situated to the north of the development as far away from the drainage channel to the south of the site as possible. Temporary stockpiles will be compacted to minimise sediment-laden runoff. No spoil stockpiles will be left on site after construction.
- Standing water, which could arise in excavations, has the potential to gradually become affected by an increased concentration of suspended solids as a result of the disturbance to soils. These waters, where they arise, will be pumped from these excavations promptly to prevent this from occurring.
- Good housekeeping will be practiced on-site to prevent discharge of polluting material to the surface water environment (I.e. post work clean down, end of day clean down, visual inspection and maintenance of the site drainage system elements).

### *10.5.2.4 Measures for Preventing Hydrocarbons Spills*

No fuels will be stored on-site during the construction phase. Refuelling of construction vehicles and mobile will be carried out on an ad hoc basis using a mobile on-site re-fuelling truck.

Specific mitigation measures relating to the management of hydrocarbons are as follows:

- Refuelling of plant and machinery will be carried out at within the concrete yard at the designated refuelling location. The station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site.
- Refuelling of plant during construction will only be carried out by trained personnel.
- Appropriately sized drip trays will be utilized on-site to prevent the release of fuels or oils during refuelling operations or other work activities.
- Spill kits containing oil soakage pads and booms will be made available on-site to ensure prompt and adequate clean-up of any accidental fuel or oil spills.
- An Emergency / Spill Response Procedure will be prepared, and all construction site operatives will be briefed on the response measures required during the site inductions and routine toolbox talks.
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed. Only emergency breakdown maintenance will be carried out on site and appropriate containment facilities will be provided to ensure that any spills from breakdown maintenance vehicles are contained and removed off site. All major repair and maintenance operations will take place off-site. Vehicles entering the site will be in good working order, free from leakage of fuel or hydraulic fluid.

### *10.5.2.5 Measure for Preventing the Release of Cement Based Products*

The following mitigation measures are proposed to prevent the release of cement-based products to the receiving surface water environment during the construction phase of the proposed development:

- All rubble arising due to demolition will be collected and safely contained in skips / storage containers before immediate dispatch off-site.
- When cast-in-place concrete is required, all work must be done in dry conditions and must be completed isolated from any flowing water which may enter the drainage channel to the south of site.
- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- A designated impermeable cement washout container should be provided on-site at a designated area for chute cleaning. This washout facility shall be situated away from surface water drains. This area will be effectively isolated from any flowing water which may enter the drainage channel to the south of the site.
- Weather forecasting will be utilized to ensure concrete pours are only undertaken during dry weather conditions.
- Concrete pour sites will be made free of standing water prior to carry out the pour. Plastic covers will be available on-site to prevent entrain of surface water in poured concrete in the case of sudden rainfall.
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.
- pH levels in surface water discharges from the site and at receiving surface waters downstream of the site will be regularly monitored to ensure they are within the required pH range of ≥6 ≤9, (I.e. the Environmental Quality Standard for pH in surface water bodies defined in the Surface Water Regulations, as amended).

### *10.5.2.6 Measures to Prevent Adverse the Discharge of Pollution material during Near and In-Stream Works*

The installation of a surface water discharge pipeline from the site to the surface water channel to the south of the site will take place during the construction phase of the proposed development. A discharge outfall to this surface water drainage channel will be constructed. This will consist of a pre-cast concrete headwall on 100mm thick bed of lean mix concrete. Extra precaution will be taken when installing this outfall given its proximity to a receiving surface water body. Some works will need to take place within the drainage channel during headwall construction.

The following mitigation measures will be adopted during outfall installation works.

- These works will only be carried out during the period advised by Inland Fisheries Ireland for 'in-stream' works in their guidance note entitled 'Guidelines on the Protection of Fisheries during Construction Works in and adjacent to Waters,' that is, July to September inclusive.

This time period coincides with the period of lowest expected rainfall, and therefore minimum run-off rates. This will minimise the risk of entrainment of polluting material in surface water run-off, and transport via this pathway to the adjacent surface water drainage channel.

- These works will only be carried out after a during a period of dry weather conditions in order to prevent the run-off of polluting material from the working area to the adjacent drainage channel.
- Outfall construction will be undertaken in a careful and precautionary manner, and in accordance with a defined method statement. The working area will be kept as tidy as possible for the duration of the works. All excavated / excess material will be immediately removed from the working area on an ongoing basis as works progress.
- All personnel carrying out outfall construction works will be obliged to read and fully understand the method statement for the proposed works. A toolbox talk regarding the method statement, the carrying out of the works generally, and the need to protect the drainage channel will be carried out immediately prior to the commencement of works.
- Silt fencing will be utilized at along the bank of the drainage channel to prevent the discharge of polluting material to the drainage channel during earthworks associated with outfall construction.
- As an extra precaution, sediment mats will be employed within the drainage channel during outfall construction.
- An inspection of the working area should be undertaken on completion of the outfall construction works to assess and confirm the implementation of the agreed prevention and control measures.
- Any machines working in or around the watercourse must be protected against leakage or spillage of fuels, oils, greases, and hydraulic fuels (e.g. using drip trays).
- Watercourse banks should be left intact insofar possible. Areas along the riverbanks and margins shall be fenced off in order to restrict movement of people and machinery in these and prevent their disturbance.
- The headwall itself will be pre-cast whilst the bed in which the headwall will be situated within will be lean mix concrete, thereby substantially reducing the potential for concrete materials becoming entrained in surface water run-off.

Some works will need to take place within the drainage channel during headwall construction. The surface water drainage channel will need to be temporarily dammed during outfall construction. The stream area adjacent to the outfall working area will be dammed (E.g. Using pea gravel bags and geosynthetic textile during the installation of the outfall). Water arising upstream of the dammed area will be transferred downstream of the dammed area by pump during the course of the headwall construction works. This temporary arrangement will allow outfall construction works (E.g. earthworks, concrete works) to be isolated from flowing water in the drainage channel. These works will occur over a period of one day.

A detailed method statement for the damming and outfall construction works will be developed by the construction contractor. The method statement for these works will be sent to the Eastern Office of Inland Fisheries Ireland (IFI) for their approval, as required by Inland Fisheries Ireland guidelines entitled 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.' Prior to dewatering, the dammed area will be electrofished, as necessary, to temporarily remove fish (under appropriate IFI section 14 or derogation license).

### *10.5.2.7 Measures for Preventing Nutrient Run-off*

Felling of trees present on-site will be undertaken using chainsaw. All brash / felled wood will be removed from the site and sent to an appropriately authorized waste management facility for recovery / recycling. No brash / felled wood will be left on site overnight. This measure will reduce the risk of potential for sediment and nutrient run-off to the drainage channel to the south of the site.



### *10.5.2.8 Construction Phase Monitoring*

A programme of water monitoring will be carried out during the construction phase. The monitoring programme shall include daily checks, weekly inspections and monthly audits to ensure compliance with the CEMP. Such monitoring will be required in order to:

- Demonstrate that the mitigation measures and surface water management plan is performing as designed
- Provide reassurance that the in-place mitigation measures are not having a significant impact upon the environment
- Indicate whether further investigation is required and, where any risks are unacceptable, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

Given the proximity of the development to a receiving watercourse, it is considered that the surface water monitoring programme will comprise:

- Weekly visual inspections of surface water management features, such as earthen bunds, cut-off trenches, refuelling areas and receiving watercourses, to identify any obstructions to channels, increased erosion or deposition of sediment and to allow for appropriate maintenance of the drainage regime.
- Daily visual inspections of watercourses, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities.
- If excessive suspended solids are noted, construction work will be stopped, and remediation measures will be put in place immediately.

A detailed water quality monitoring programme will be implemented on a weekly and monthly basis during the construction phase of the proposed development, in addition to the visual inspections outlined above, to ensure the effective implementation of the proposed mitigation measures. This monitoring will commence prior to the start of work activities to establish the baseline conditions at the development site.

Field measurements and grab samples will be taken at the site discharge point and at suitable upstream and downstream locations at the drainage channel to the south of the development site. The field measurements will be recorded at the site and will include measurement of the following parameters, electrical conductivity (µs/cm), pH, temperature (ºC) and dissolved oxygen (mg/l).

The field measurements and sampling will be undertaken on a weekly basis during site clearance, demolition and earthworks stages of construction. Following this stage, it is proposed that the measurements/sampling will be undertaken on a monthly basis during the subsequent stages of construction.

Parameters have been defined based on the baseline surface water quality monitoring results. A summary of proposed monthly monitoring parameters is provided in Table 10-10:

**Table 10-10: Water Quality Monitoring Parameters**

| Parameter |
|---|
| Conductivity |
| pH |
| Sulphate |
| Chloride |
| BOD |
| COD |
| Phosphate (Ortho as P) |
| Alkalinity, Total as CaCO3 |
| Suspended solids, Total |
| Total Organic Carbon |
| TPH CWG |

All monitoring results will be compared with the baseline surface water monitoring undertaken as part of this assessment, as well as surface water related Environmental Quality Standards defined in the Surface Water Regulations, as amended, to ensure construction phase activities are not having an adverse impact on water quality in the drainage channel to the south of the site.

### 10.5.3 Operational Phase Mitigation

This section sets out the mitigation measures that will be employed during the operational stage of the proposed development.

#### *10.5.3.1 Regulatory Control*

Phase 1 of operations will be carried out in accordance with the conditions a Waste Facility Permit enforced by Offaly County Council. Phase 2 operations will be carried out in accordance with the conditions an IE licence enforced by the EPA. Both these authorisations will define strict environmental protection standards in relation to the proposed facility. These authorizations will necessitate the development and implementation of an Environmental Management System (EMS) for the proposed facility.

### *10.5.3.2 Proposed Surface Water Management Measures*

The following Surface Water Management Measures have been proposed to prevent the discharge of polluting material to the receiving surface water environment during the operational phase of the proposed development:

- Stormwater Attenuation Systems;
- Full Retention Separator;
- Emergency Slam Shut Valve;
- Foul Water and Washwater Management;
- Firewater Retention Systems;
- Accident Prevention / Management Plans;
- Surface Water Quality Monitoring.



**Stormwater Attenuation System**

A stormwater drainage and attenuation system will be provided on-site. External yard areas (excluding external waste storage bays) and building roof areas will be served by this system. The yard will be formed in a manner that allows all surface water generated in it to fall toward an underlying drainage network. Stormwater entering the drainage system will be directed to a pre-cast attenuation tank. This tank will be 480.5 m3 in size (41 m x 6.5 m x 1.8 m), providing an attenuation volume of 253 m3, a rainwater harvesting volume of 151 m3, and a firewater volume 76.5 m3. The attenuation volume provided has been designed to accommodate a 1:100-year event in addition to a 20% climate change allowance volume. A hydrobrake will be situated after the attenuation tank and will also be used to limit/control flow off-site. These systems will serve to prevent the rapid release of stormwater generated on hard-standing areas on-site to the receiving surface water drainage channel to the south of the site.

**Full Retention Separator**

Stormwater generated on-site and exiting the stormwater attenuation tank will drain to a Class I Full Retention Separator (2.610m length x 1.225m wide) before being discharged off-site to the drainage channel to the south of the site. This system will serve to prevent the uncontrolled the release of spilled fuels of oils that may have accidentally become entrained in stormwater on-site. This Separator will be inspected regularly and serviced periodically in accordance with manufacturer specifications to ensure it functions correctly at all times.

**Emergency Slam Shut Valve**

Uncontrolled releases (E.g. associated with a sizeable fuel spill) can be prevented from leaving the site via the drainage system by utilizing a slam shut valve situated prior to the point of discharge from the site. This slam shut valve will serve to contain polluting material released on-site through rendering the site and its underlying drainage system impervious and water-tight. The utilization of this slam shut valve during spills and emergencies will be formalized within emergency response procedures developed for the facility.

**Foul Water and Washwater Management**

Foul water generated at external waste storage bays, and washwater generated during internal process and storage area clean down in the MRF building, will drain to and be collected in an underground retention tank on-site.

This tank will be hydrostatically tested upon commencement of operations and every three years thereafter in accordance with EPA requirements to demonstrate its ongoing water tightness and integrity. Aqueous arisings generated in this tank will be collected from the site and transferred to a wastewater treatment plant periodically for final treatment.

**Firewater Retention Systems**

The aforementioned slam shut valve serving the proposed site stormwater drainage system will be utilised during a fire event to render the site impervious/water tight. In such an event, underground tanks, internal floors in the MRF building and external yard areas will be utilised for firewater retention in the event of a fire on-site. The hard stand of the whole site itself will be surrounded by a concrete wall perimeter and will be formed in a dished manner to allow for a greater amount of firewater retention on-site.

**Wastewater Treatment**

An on-site wastewater treatment system (WWTS), consisting of a secondary treatment and soil polishing treatment system and adjoining percolation area will be developed in the southeast corner of the site. Domestic wastewater arising at sanitary facilities situated in the proposed Administration Building will be directed by a wastewater drain to this WWTS for treatment. Treated wastewater will then percolate to ground. A site suitability assessment has been carried out in support of this planning application and demonstrates that the ground is suitable for the proposed wastewater treatment and will safely filter treated wastewater exiting this system.

The wastewater treatment system will be serviced periodically in accordance with manufacturer specifications to ensure its ongoing efficacy. This will prevent the discharge of pollutants to groundwater and the subsequent flow of this polluting material in groundwater to the surface water body to the south of the site.

### *10.5.3.3 Accident Prevention / Management Plans*

A Fire Protection and Prevention Plan, Accident Prevention Policy, Emergency Response Procedures and Spill Control Procedures will be developed and implemented during the operational phase of the facility to prevent, control and manage potential fire and spill events that may lead to the discharge of polluting material to the receiving surface water environment. All employees will be made aware of these plans and will be provided training in the implementation of these plans relevant to their role.

### *10.5.3.4 Additional Fuel/Oil Spill Mitigation*

The following mitigation measures will also be implemented to prevent the release of fuel or oils during the operational phase of the proposed development:

- Any diesel, hydraulic fluids, greases and oils stored on site will be bunded. The diesel tank on-site will be double skinned. Oils stored in the workshop on-site will be stored in sump pallets. The bund capacity of these secondary retention systems will be sufficient to contain 110% of the maximum capacity of primary containers;
- Appropriate spill control equipment, such as oil soakage pads, will be kept within the refuelling areas and in each item of plant to deal with any accidental spillage;

- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and cleaned using the spill control equipment provided on-site;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and will be stored in sump pallets prior to removal from the site.

#### *10.5.3.5 Surface Water Quality Monitoring*

Surface water quality monitoring will be implemented on an ongoing basis at the site during both Phase 1 and 2 of facility operations in accordance with the requirements of the facility's WFP / IE licence to ensure the efficacy of the operational phase surface water management mitigation measures proposed, and to ensure that only uncontaminated surface water is discharged from the site to the drainage channel to the south of the site.

A list of monitoring parameters to be tested during the operational phase surface water monitoring programme, and the frequency of monitoring for each parameter, is presented in Table 10-11. This monitoring will be undertaken under the WFP / IE licence for the facility. This monitoring programme has been developed in accordance with provisions relating to emissions to waters prescribed in the European Commissions' Commission Implementing Decision (EU) establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council.

**Table 10-11: Operational Phase Surface Water Quality Monitoring**

| Parameter | Monitoring Frequency |
|---|---|
| Visual | Daily |
| pH | Quarterly |
| Chemical Oxigen Demand | Quarterly |
| Total Suspended Solids | Quarterly |
| Mineral Oils | Quarterly |
| Total Nitrogen | Quarterly |
| Total Phosphorus | Quarterly |
| Metals | Quarterly |



The adoption and implementation of the monitoring programme will ensure and verify that only uncontaminated stormwater is discharged from the site to the surface water body to the south of the site and will ensure that operational phase stormwater discharges will have no impact on the water quality of that body.

### 10.5.4 Decommissioning Phase Mitigation

Decommissioning and closure of the facility will take place in accordance with the Closure, Restoration and Aftercare Management Plan developed for the facility, and in accordance with the requirements of the EPA's Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites (2012).

Where appropriate, the same mitigation measures defined for construction and operational phase activities will be applied during the decommissioning phase (I.e. spill prevention measures, slam shut valve, full retention separator).

All site decontamination will take place in accordance with defined method statements. The slam shut off valve on-site will be shut during site decontamination. All wash water arisings will be collected in the underground tanks on-site before being take up and dispatched to an appropriately authorized wastewater treatment plant for final treatment.

### 10.5.5 Mitigation Measures to prevent Cumulative Impacts

The mitigation measures as defined have been developed to ensure that only uncontaminated surface water is released to the receiving adjacent drainage channel throughout all phases of the proposed development. Upon the adoption of these mitigation measures the proposed development will have no impact on receiving surface water body and will not contribute to any cumulative impact land use in the wider area may be having on receiving surface waters present in the catchment.

## 10.6 Residual Impacts

The proposed development will not impinge on the Water Framework Directive objectives to achieve good water quality status at the Yellow River (identified as a Prioritized Area for Action in the RBMP). The proposed development will be constructed, operated and decommissioned in a manner that ensures it will have no impact water quality in the receiving water environment, or on the water quality status of the Yellow River.

A comprehensive set of design and mitigation measures have been developed to robustly protect the receiving hydrological environment, and to ensure that only uncontaminated waters are discharged from the proposed development site to the receiving surface water environment. The construction, operational and decommissioning phase mitigation measures defined will be implemented in a robust manner so as to prevent the discharge of any polluting material to the hydrological environment and the deterioration of water quality. The proposed development will not contravene the principles and policies defined under the Water Framework Directive (I.e. Article 4(1)), or on the objectives defined in the current 2nd RBMP, or the drafted objectives defined in the draft 3 RMBP, which is expected to come into force shortly.

The residual significance of the effects of the proposed development on the receiving surface water environment, including the receiving surface water drainage channel, and the downstream Yellow River and River Boyne, will be negligible taking account of mitigation measures as outlined in Section 10.5.

A summary of residual impacts is summarised in Table 10-12.

## 10.7 Interactions

Hydrology and Surface Water Quality interacts with other environmental attributes as follows:

Population and Human Health (Chapter 7) – the protection of the health of human receptors and the mitigation of potential impacts is closely linked to the maintenance of surface water quality and the prevention of impacts to sensitive hydrological features.

Biodiversity (Chapter 8) – the protection of biodiversity is integral to the existing hydrological regime and surface water quality. The prevention of potential impacts to the biodiversity are directly linked to the protection of hydrological features and surface water quality.

Soils, Geology and Hydrogeology (Chapter 9) – the development and disturbance of the underlying land and soil and potential impacts is directly linked to the existing hydrological regime and surface water quality. The protection of the hydrogeological regime is integral to the protection of hydrological features and surface water quality. The prevention of potential impacts to the underlying hydrogeological regime are directly linked to the protection of hydrological features and surface water quality.

It has been concluded in this EIAR that the proposed development will not have any significant effect population and human health, biodiversity, or soils, geology and hydrogeology, respectively. There will therefore be no potential for these environmental topics interacting with hydrological elements and having a significant impact on hydrology or surface water quality

Conversely, the proposed development will not result in any significant impact the receiving surface water environment that my in-turn result in indirect effects on population and human health, biodiversity, or soils, geology and hydrogeology.

## Table 10-12: Residual Impact Significance for Sensitive Receptors

| Activity | Potential Impact | Receptor | Sensitivity | Prior to Mitigation | | Post Mitigation | |
|---|---|---|---|---|---|---|---|
| | | | | Magnitude | Significance | Magnitude | Significance |
| **Construction Phase** | | | | | | | |
| Advance Works and Installation of Temporary Construction Site Compound | Advance works may cause increased sediment loads in surface water.<br>Potential for surface water contamination from fuel spills/leakages. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Minor | Slight / Moderate | Negligible | Imperceptible |
| Demolition and Site Clearance | Earthworks and heavy machinery movements contributing to increased sediment loads in surface water.<br>Potential for surface water contamination from fuel spills/leakages during construction phase earthworks.<br>Generation of alkaline surface water run-off from temporary rubble stockpiles | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant | Negligible | Imperceptible |
| Construction of the Materials Recovery Facility | Earthworks, temporary stockpiles and traffic/mobile plant movements contributing to increased sediment loads in surface water.<br>Potential for surface water contamination from spills/leakages during construction phase earthworks. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant | Negligible | Imperceptible |

| Activity | Potential Impact | Receptor | Sensitivity | Prior to Mitigation | | Post Mitigation | |
|---|---|---|---|---|---|---|---|
| | | | | Magnitude | Significance | Magnitude | Significance |
| | Release of cement-based product to temporary drainage system which may lead to increased alkalinity in the receiving watercourse and degradation of aquatic environment. | | | | | | |
| Rerouting of ESB Line | The excavations for the underground cabling trenches and joint bays can have a direct impact on the exposed soils in the form of increased erosion from surface water ingress. This may lead to an increase in the discharge of silt laden surface water run-off to the receiving surface water body. The proposed underground cabling associated excavations and ducting may present a preferential pathway for the movement of surface water runoff to the adjacent watercourse. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant | Negligible | Imperceptible |
| **Operational Phase** | | | | | | | |
| Facility Traffic, fuel / oil storage, and refuelling of vehicles | Release of hydrocarbons or fuel spill with potential for contamination. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant | Negligible | Imperceptible |

| Activity | Potential Impact | Receptor | Sensitivity | Prior to Mitigation | | Post Mitigation | |
|---|---|---|---|---|---|---|---|
| | | | | Magnitude | Significance | Magnitude | Significance |
| Accidents | Uncontrolled spillages arising from the accidental release from the underground tanks or wastewater treatment system, with potential for contamination resulting in increased ammonia and phosphorus in surface water.<br>Spills/leaks of oil from the transformers in the substation with potential for contamination.<br>Outbreak of fire at the facility which could result in the discharge of contaminated firefighting water to surface waters. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Moderate | Significant | Negligible | Imperceptible |
| **Decommissioning Phase** | | | | | | | |
| Facility Traffic, fuel storage and refuelling of vehicles | Operational traffic which could result in minor accidental leaks or spills of fuel/oil.<br>Storage of fuel on site and refuelling of vehicles. | Local Surface Water Drainage Channel to the south of the site<br>Yellow River<br>River Boyne | High | Low | Moderate | Negligible | Imperceptible |

## 10.8 References

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FEHILY TIMONEY

**CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING**

**www.fehilytimoney.ie**





**CORK OFFICE**
Core House
Pouladuff Road,
Cork, T12 D773,
Ireland
**+353 21 496 4133**

**Dublin Office**
J5 Plaza,
North Park Business Park,
North Road, Dublin 11, D11 PXT0,
Ireland
**+353 1 658 3500**

**Carlow Office**
Unit 6, Bagenalstown Industrial Park, Royal Oak Road,
Muine Bheag,
Co. Carlow, R21 XW81,
Ireland
**+353 59 972 3800**