HYDROLOGICAL AND HYDROGEOLOGICAL

IMPACT ASSESSMENT

PROPOSED SILVERBIRCH WIND FARM

COUNTY KERRY.

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March 2017
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1. INTRODUCTION

Silverbirch Renewables Limited (Silverbirch) propose to construct a wind farm 1.2 km and 5km southwest of Ballydesmond. The project comprises the following:

- Upgrading of approximately 1,900 m of existing access track’ - including associated drainage and sediment control infrastructure;

- Construction of approximately 7,800 m of new site access track’ - including associated drainage and sediment control infrastructure;

- Construction of 14 No. turbine foundations and crane hardstanding areas, including associated drainage and sediment control infrastructure;

- Formation of 3 No. temporary borrow pits/repositories, including associated drainage and sediment control infrastructure, to provide a source of crushed stone aggregate for use in the upgrading and construction of the access tracks, and hardstanding areas and backfilling of foundation excavations. They will also be used as repositories for the temporary storage of overburden stripped from the borrow-pit locations, and for the deposition of surplus excavated materials from the works;

- Construction of 13 site entrances to the wind farm site off the public road;

- Construction of alterations to the public road network at a number of locations including local widening of bends along the L2032, L11132 and L3013 to facilitate access for the delivery of turbine components;

- Construction of 2 No. MV Wind Farm Substations including Control Buildings, External Electrical Equipment, compound fencing, etc.;

- Construction of 110 kV Grid Connection Substation including Control Buildings, External Electrical Equipment, and treated effluent holding tank, compound fencing, etc.;

- Construction of up to 2 Meteorological Masts;

- Excavation, medium voltage cable installation, and backfilling of cable trenches between turbines and MV Substations, including sections along existing public road. Construction of cable jointing bays, as appropriate, along the route of the above cable;

- Excavation, 110 kV cable installation and backfilling of cable trenches between the 110 kV Substation and the Eirgrid 220 kV Substation at Ballynahulla, including section along the L11128 Third Class Road;

- Construction of 2 No. temporary construction compounds to facilitate safe storage of equipment and materials during construction of wind farm;
• Delivery, installation and commissioning of 14 No. wind turbines with a maximum rotor diameter of 120 m and a maximum blade tip height of 150 m above ground level;

• Landscaping/ reinstatement works.

Site Layout Drawings are in the Environmental Impact Statement.

An Environmental Impact Assessment is required as part of the planning application for the proposed development, and Silverbirch appointed O'Callaghan Moran & Associates (OCM) to assess the impacts on the Soils, Geology Hydrology and Hydrogeology.

1.1 Relevant Legislation and Best Practice Guidance

This report has been prepared having regard to the following guidance and regulations:

• EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements
• Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-scheduled minerals), 2006;
  ▪ Quarries and Ancillary Activities, Guidelines for Planning Authorities, 2004;
  ▪ Water Framework Directive (2000/60/EC);
  ▪ Local Government (Water Pollution) Act, 1977-1990;
  ▪ Water Quality (Dangerous Substances) Regulations, 2000;
  ▪ Arterial Drainage Act, 1945;
  ▪ S.I. No 41 of 1999 Protection of Groundwater Regulations, resulting from the EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
  ▪ S.I No 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations;
  ▪ S.I No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations;
  ▪ European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.
1.2 Methodology

The assessment was based on a site inspection undertaken in February 2016, a review of reports on geophysical surveys undertaken by Apex Geophysics in December 2015 and May 2016, and a site investigation completed by MRG Consulting Engineers (MRG) in January 2016, and a review of databases maintained by the Geological Survey of Ireland (GSI), the Environmental Protection Agency (EPA), Teagasc, Met Eireann and the Southwestern River Basin Management Plan.
2 Soils, Geology, HYdrogeology and Hydrology

2.1 Site Location & Layout

The wind farm is divided into two sections. Barna West, which comprises Turbines No. 1 -7 is 5 km to the south-west of Ballydesmond. Barna East, which comprises Turbines No. 8-14, is 1.5 km to the west-southwest of Ballydesmond. The site locations are shown in Figure 2.1 and Figure 2.2.

2.2 Existing Environment

2.2.1 Soils

The Teagasc map (Figure 2.3 and 2.4) indicates the soils and subsoil across both sections of the wind farm comprises blanket peat. The geotechnical site investigations confirmed the presence of peat ranging in thickness from 1-4 m overlying glacial till comprising Silt/Clay with shale and sandstone gravels.

During the site inspection, OCM observed that the peat in the vicinity of turbines T8-14 was generally between 0.5-2.5 m thick and was underlain by glacial till. The geophysical survey indicated an average thickness of 1.03 m with the deepest depth of 2.5-3.5m near Turbine 9.

In the southern section OCM noted the peat was 1-2 m thick. Here the geophysics survey indicated an average peat thickness of 1.15 m, with the deepest being 0.0-1.0m m near Turbine 6. The peat was harvested in parts and drained for the forestry plantations which increases the stability.

2.2.2 Bedrock

The GSI bedrock geology map (Figure 2.5 and 2.6) indicates the site and the surrounding area is underlain by undifferentiated Namurian Shales and sandstones. The geotechnical site investigations established that the depth to bedrock ranges from 1-5m.

2.2.3 Hydrogeology

The bedrock comprises Namurian shales and sandstones that are characterised by the GSI as Locally Important Aquifers that are productive only in local zones (LI) (Figure 2.7 and 2.8). In this type of aquifer the transmissivity is likely to range from 2 to 20 m²/d, with groundwater velocities of less than 1 m/day and flow paths in the 10s to 100s of metres.
The effective rainfall for the Ballydesmond area is 1252 mm/yr. The GSI recharge database indicates that the recharge rate varies across the site depending on the composition of the subsoil, with an average recharge of 15% (188 mm/yr) in the shale and sandstone derived till, and 4% (37.5mm/yr) in the blanket peat areas.
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CLIENT
Silver Birch
TITLE Proposed Wind Farm (North)
Site Locations

Details:
- Turbine Locations
- Substation
- Construction Compound
- Borrow Pit
- Repository Pit
- Proposed Access Roads

Figure 2.1
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TITLE
Proposed Wind Farm (South)
Site Locations

Details:
- Turbine Locations
- Substation
- Borrow Pit
- Repository Pit
- Proposed Access Roads

Figure 2.2
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CLIENT: Silver Birch
TITLE: Proposed Wind Farm (South) Subsoils

Details:
- Turbine Locations
- Substations
- BktPt - Blanket peat
- Rck - Bedrock at surface
- TNSSs - Shales and sandstones till (Namurian)
- Proposed Access Roads
- A - Alluvium undifferentiated

Figure 2.4
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CLIENT: Silver Birch
TITLE: Proposed Wind Farm (North)

Details:
- Turbine Locations
- Construction Compound
- Substation
- Repository Pit
- Borrow Pit
- Proposed Access Roads
- Cloone Flagstone Formation - Greywacke, siltstone & silty shale
- Namurian (undifferentiated) - Shale & sandstone

Figure 2.5
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Figure 2.6

Bedrock Geology

- Dinantian Limestones (undifferentiated)
- Cloone Flagstone Formation - Greywacke, siltstone & silty shale
- Clare Shale Formation - Mudstone, cherty at base
- Namurian (undifferentiated) - Shale & sandstone

Details:
- Turbine Locations
- Proposed Access Roads
- Substation
- Repository Pit
- Borrow Pit

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Proposed Wind Farm (South)
Silver Birch

Provisional Construction Compound

Substation

Figure 2.7

Details:
- LI - Locally Important Aquifer. Mod. Productive only in Local Zones
- Turbine Locations
- Substation
- Construction Compound
- Borrow Pit
- Repository Pit
- Proposed Access Roads

CLIENT

Silver Birch

TITLE

Proposed Wind Farm (North)

Aquifer Classification

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CLIENT
Silver Birch

TITLE
Proposed Wind Farm (South)

Aquifer Classification

Details:
- Turbine Locations
- Substation
- Borrow Pit
- Repository Pit
- Proposed Access Roads

Figure 2.8

Kilometers

Lk - Locally Important Karstified Aquifer
Ll - Locally Important Aquifer. Mod. Productive only in Local Zones
Pu - Poor Aquifer. Unproductive
These recharge rates indicate that much of the incident rainfall will preferentially run-off to the surface water system rather than enter the underlying bedrock aquifer.

Three borrow pits will be used during the construction phase, one in the northern section and two in the southern part. It is likely that groundwater inflows during the excavation of the pits will be very limited given the nature of the bedrock and the upland location of the site.

In the northern section the direction of groundwater flow is expected to be toward the Yellow River to the south, and the Blackwater River to the east. In the southern part of the wind farm, the groundwater flow will be generally from west to east toward tributaries of the Torenencahill Stream.

2.2.3.1 Aquifer Vulnerability

Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities, it is largely controlled by the nature and thickness of the sub-soils.

There are four vulnerability categories that are based on the geological and hydrogeological factors described above: Extreme (E), High (H), Moderate (M) and Low (L). The GIS database and maps (Figure 2.9 and 2.10) show the vulnerability classification in the vicinity of the site is currently Low (L).

2.2.3.2 Groundwater Wells

The GSI Well database has records of seven private wells within 1 km of the northern section and eight wells within 1km of the southern part. All these wells are described as agriculture and domestic use wells with generally low yields. (Figure 2.11 and 2.12).

The site is located in the Rathmore West Groundwater Body (IE-SW-G-070). The Groundwater Body (GWB) status as designated in the SWRBD Plan (2009 – 2015) is Good with the objective to protect the status. A copy of the GWB Report is in Appendix 1.

2.2.4 Hydrology

The site is within the catchment of the Blackwater River (Figure 2.13 and 2.14). The River Blackwater (EPA code 18B02) rises approximately 6.5 km northwest of Ballydesmond. In the northern section of the site, in the vicinity of turbines T-8, 9, the surface water drainage is toward a tributary of the Yellow River (also known as the Carhoonoe River), which is a tributary of the Blackwater River joining it c. 1.5km to the south-east. Turbines T-9 and T10 drain toward a more northerly tributary of the Yellow River known as the Toreengarev Stream. The drainage at T-12 and 13 is directly to the Blackwater River. Turbines T-11 and T-14 drain directly to the Yellow River.
In the southern section in the vicinity of T-5, 6 and 7, the drainage is toward the Toreencahill Stream (also known as the Mountinfant River) which is a tributary of the Blackwater River and which it joins c. 1.5 km to the east of the site. Site T-5 and T-6 are close to the boundary between the Blackwater River Catchment in the east and the Laune River catchment to the west. Drainage from the site will be into the Blackwater catchment.

Drainage from the area of T-1, 2, 3 and 4 is to the Reanasup River which is also a tributary of the Blackwater discharging into it c.1km to the east of Turbine T-1.

The Surface Water Body (SWB) status is currently (2009 – 2015) Moderate with the objective to restore the status. The physio-chemical status of the surface water body is High. A copy of the SWB Report is included in Appendix 2.

Because the rainfall recharge is low (4-15%) the majority of the rainfall is expected to run-off to the drains, and the first and second order streams that run through the site all of which ultimately discharge to the Blackwater River to the east and southeast of the site. Within the site the drains run primarily through sections of conifer plantations and cut-away bog and wet grasslands. Some of the drains have been broadened to improve drainage on agricultural lands in the vicinity of TP-5 and 14.

2.2.5 Rainfall and Evapotranspiration

Long term 30-year rainfall and evaporation data was sourced from Met Eireann. The closest synoptic station is Valentia. The 30 year average annual rainfall is 1558 mm/yr. The effective rainfall for the Ballydesmond area is 1,252 mm/yr.

2.2.6 Flood Hazard

The National Preliminary Flood Risk Assessment (PFRA) was reviewed to determine the risk of flooding of the site. The mapping has been prepared on behalf of the Office of Public Works (OPW) on a national scale as part of the Catchment Flood Risk Mapping (CFRAMS) project. The flood extent maps were produced for various flood events of a given probability of occurrence. These are the 10%, 1% and 0.1% annual exceedance probability (AEP) events for fluvial flooding, which are equivalent to the 1 in 10, 1 in 100 and 1 in 1,000 year flood events respectively.

The Preliminary Flood Risk Assessment Maps for the area are in Appendix 3. They show that none of the turbine sites, or met masts are located in areas liable to flooding. Given the upland nature of the wind farm location flood risk is likely to be low.
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CLIENT

Silver Birch

TITLE

Proposed Wind Farm (North)
Groundwater Vulnerability

Details:
- Turbine Locations
- Construction Compound
- Borrow Pit
- Substation
- Repository Pit
- Proposed Access Roads

Figure 2.9

- Bedrock near Surface
- Extreme
- High
- Moderate
- Low

Kilometers

0

1

0

1

N

112000

113000

114000

115000

00000

00300

00600

00900

112000

113000

114000

115000

00000

00300

00600

00900
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CLIENT
Silver Birch

TITLE
Proposed Wind Farm (South)
Groundwater Vulnerability

Details:
- Turbine Locations
- Bedrock near Surface
- Extreme
- High
- Moderate
- Low
- Borrow Pit
- Substation
- Repository Pit
- Proposed Access Roads
- Proposed Wind Farm (South)
- Bedrock near Surface
- Extreme
- High
- Moderate
- Low

Figure 2.10
Unfortunately many of the borehole logs in the GSI database do not contain accurate location information. The size of the circles shown above is inversely proportional to the accuracy of the well location (i.e. small circles represent high accuracy, where relatively larger circles represent lower accuracy).
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CLIENT
Silver Birch

TITLE
Proposed Wind Farm (North) Hydrology

Details:
- Turbine Locations
- Construction Compound
- Borrow Pit
- Substation
- Repository Pit
- Proposed Access Roads
- Rivers

Figure 2.13
3 proposed development

In the northern section of the wind farm the works comprise the construction of seven turbines (T-8 – T14) and associated turbine components include the foundations, hard stands and set down areas, the development of 4,600 m of new access roads and the upgrading of 895 m of exiting access roads, the development of six new wind farm access points from the public road, the development of a borrow pit and two adjacent substations. There will be 3,450 m of underground cable route developed linking the turbines to the substation. There will be a high voltage cable connecting the wind farm to an existing high voltage Eirgrid substation for export of energy. There will also be two new stream crossings. The existing stream crossing will be upgraded where the existing unsurfaced tertiary road crosses the Tooreengarriv stream east of the substation. It will also require tree felling over c. 4.9 ha.

In the southern section the works will comprise the construction of seven turbines (T-1 – T-7), the development of 3,100 m of new access roads, the upgrading of 1,170 m of existing private access roads, the development of six new wind farm access points from the public road, the development of two borrow pits and the construction of a substation. There will be 3,900 m of underground cable route developed linking the turbines to the substation. There are no new stream crossings proposed in this area. It will also require tree felling over c. 3.6 ha area.

It is proposed to excavate three borrow pits to provide aggregate for the construction of new and the upgrade of existing access tracks. Adjacent to each borrow pit will be a designated repository area for the stockpiling of the peat and subsoil stripped from the borrow pits, the turbine foundations and the crane standing areas.

The rock will be excavated using hydraulic breakers, crushed and graded and transported using dump-trucks/tractors and trailers. On completion of the construction phase the borrow pits will be re-instated and landscaped using the stockpiled soils.

The locations of the borrow pits are shown on Figures 2.1 and 2.2. Borrow Pit No. 3 is in the north of the site, to the east of Turbine T-10. Approximately 32,000 m³ of stone will be excavated from this pit. Borrow Pit No. 2 is in the south part, immediately south of Turbine No.7. Approximately 12,000 m³ of stone will be excavated from this borrow pit. Borrow Pit No. 1 is also in the southern section and is a worked small quarry area c. 250 m north of turbine T-3. Approximately 18,000 m³ of stone will be excavated from this borrow pit.

Two Meteorological Masts will also be constructed within the wind farm site.
4 IMPACTS

4.1 Impacts

The assessment of impacts was based on the National Roads Authority (NRA) Guidance 2008 which is recommended by the Institute of Geologists of Ireland to assess impacts on Soils, Geology and Hydrogeology. The NRA guidance recommends a stepped approach to impact assessment.

Step 1: Quantify the Importance of a feature for geology, hydrogeology and hydrology;

Step 2: Estimate the Magnitude of the impact on the feature from the proposed development;

Step 3: Determine the Significance of the impact on the feature based on the Importance of the feature and the Magnitude of the impact.

4.2 Construction Stage

4.2.1 Tree Felling

Felling of small areas of existing coniferous forestry will be required to facilitate the construction of the wind farm. In the northern area approximately 4.9 ha will be felled. In the southern section of the wind farm approximately 3.6 ha of forestry will be removed to facilitate the wind farm infrastructure.

Replanting will be required to replace the trees that have been felled.

The removal of the trees is a permanent low level impact. The scale of the impact is low relative to the area under plantation in the region. The felling has the potential to result in short term moderate impact on surface water quality and flow if not undertaken in accordance with best practice. It can result in blockage of drains and streams, and excessive silt run-off due to removal of vegetation near drains and streams. Measures will be required to mitigate potential impacts on hydrology. Impacts on soils, geology and hydrogeology are not considered to be significant.

4.2.2 Construction of New Access Tracks

4,600 m of new access roads will be developed in the northern section of the site and this will include two new stream crossings. New roads will be constructed in wet grassland, cut away bog, and coniferous plantation.
3,100 m of new access road will be constructed in the southern part of the site. New roads will be constructed in wet grassland, cut away bog, and coniferous plantation.

The construction of new access roads has the potential to result in moderate, temporary impacts on surface water quality and flow if not undertaken in accordance with best practice. It can result in damage to drains and streams at crossing points, and excessive silt run-off from the developed access road. It can also have a short term, temporary slight impact on soils and geology where material is quarried from borrow pits to construct the roads. Measures will be required to mitigate impacts on hydrology.

4.2.3 Widening/Upgrading of Existing Access Tracks

In total there will be approximately 7,700m of public road to be upgraded and 2,060m of existing track to be upgraded.

In the southern section 1,170m of widening/upgrading will be required.

Widening of existing access roads has the potential to have a moderate, temporary impact on surface water quality and flow in drains and streams if not undertaken in accordance with best practice. It can result in damage to drains and streams at crossing points and excessive silt run-off from the extended surface area of the access road. Measures will be required to mitigate impacts on hydrology. It will have a permanent, slight impact on soils and geology where material is quarried from borrow pits to construct the roads. However the scale of the impact is not considered to be significant at local or regional scale. The impact on hydrogeology is considered to be imperceptible.

4.2.4 Construction of Turbine Foundations and Hardstanding Areas

The turbines will be supported on large reinforced concrete foundations founded on a competent substratum below the peat and any weaker subsoils.

Hardstanding areas will be constructed adjacent to each of the turbines to facilitate the off-loading, laydown, assembly and erection of the turbines. The construction of the crane hardstanding areas will involve excavating down to a competent subgrade, on the underlying clay/rock and the placement of a layer/layers of compacted stone fill on a competent subgrade.

Turbine base and hard stand area construction have the potential to have temporary slight level impacts on surface water, due to silt run off from excavations and the use of concrete for turbine foundations and stone to construct hard stand areas. Low level permanent impacts will occur on soils and geology due to soil removal, and the use of quarried stone from borrow pits being used in foundations.

However, the scale of the development is such that these impacts are not considered to be significant in terms of soils and geology at the local or regional scale. Slight temporary impacts could occur on surface and groundwater if/where dewatering of hard stand excavations are required. The elevated nature of the site and observations during the geotechnical site investigations indicate that groundwater inflows are unlikely to be significant. Measures will be required to mitigate potential impacts on hydrology.
Turbines 3, 5 and 7 lie on the border of the Laune and Blackwater catchments. Drainage will divert the water to the Blackwater catchment. The impact of this will be temporary and slight.

4.2.5 Construction of Meteorological Masts

It is proposed to construct two Meteorological Masts, one located c.100m south west of T12 and the second located south of T7. They will be supported on reinforced concrete foundations founded on a competent substratum below the peat and any weaker subsoils. The anemometer base and hard stand area construction have the potential to have temporary slight impacts on surface water, due to silt run off from excavations and the use of concrete to construct foundations. Low level permanent impacts will occur on soils and geology due to soil removal, and the use of quarried stone from borrow pits being used in foundations.

However, the scale of the development is such that these impacts are not considered to be significant in terms of soils and geology at the local or regional scale. Low level, slight, temporary impacts could occur on surface and groundwater if/where dewatering of foundation excavations are required. The elevated nature of the site and observations during the geotechnical site investigations indicate that groundwater inflows are unlikely to be significant. Measures will be required to mitigate potential impacts on hydrology.

4.2.6 Borrow Pits and Repositories

Borrow-Pit No. 3 is located in wet grassland/existing coniferous forestry plantation in the townland of Ballynahulla, and will provide stone fill for use in the construction of turbines T8, T9, T10, T11, T12, T13 and T14 including associated access tracks and crane hardstanding areas, and for the wind farm and grid connection substations and temporary construction compound in that area. It is estimated that c. 32,000 m$^3$ of stone fill will be sourced from this borrow-pit.

Borrow-Pit No. 1 is located in wet grassland in the townland of Reansup and will provide stone fill for use in the construction of turbines T1, T2, T3 and T4, including associated access tracks and crane hardstanding areas. It is estimated that the borrow pit will provide c. 18,000 m$^3$ of stone fill.

Borrow-Pit No. 2 is located in wet grassland in the townland of Reaboy and will be used to provide stone fill for use in the construction of turbines T5, T6 and T7, including associated access tracks and crane hardstanding areas, and for the wind farm substation and temporary construction compound in the townland of Knocknagoeaha. It is estimated that c. 12,000 m$^3$ of stone fill will be sourced from this borrow-pit.
The borrow pits will have a permanent, low level, slight impact on soils, and a temporary low level slight impact hydrology and hydrogeology in the immediate vicinity of the pits. The development of the borrow pits will have a low level permanent but slight impact on geology. The borrow pits will be excavated using rock breakers fitted to mechanical excavators. There is the potential for minor leaks or spills of hydraulic oils or fuel oils from this equipment, which could impact water quality locally in the bedrock aquifer beneath the borrow pits. However, the impact of the development of the borrow pits is not considered to be significant at the local or regional scale. Measures will be required to mitigate potential impacts during construction on soils, surface water and groundwater quality.

4.2.7 New Drains

Drains will be constructed along all of the new access roads similar to those already present on the existing access tracks. The construction of new drains has the potential to have a moderate, temporary impact on surface water quality and flow in drains and streams if not undertaken in accordance with best practice due to increasing silt run-off. Measures will be required to mitigate impacts on hydrology. The construction of new drains will have a permanent, slight impact on soils and geology where material is quarried from borrow pits to construct the roads. However the scale of the impact is not considered to be significant at local or regional scale. No significant impact on hydrogeology is considered likely.

4.2.8 Upgrade of Existing Drains and Stream Crossings

Two stream crossings will require construction over the Carhoonoe Stream on the boundary between the townlands of Tooreengarriv and Barna along the new access track leading to turbine T9, and over the Tooreengarriv Stream in the townland of Ballynahulla along the new access track leading to turbine T10. The upgrade of existing drains and the installation of stream crossings have the potential to have a long term moderate, permanent impact on surface water quality and flow in drains and streams if not undertaken in accordance with best practice due to increasing silt run-off and potential flood risk. Measures will be required to mitigate impacts on hydrology. The upgrade of existing drains will have no impact on soils and geology but will have a long term permanent, impact on hydrology. However the scale of the impact is not considered to be significant at local or regional scale. No significant impact on hydrogeology is considered likely.

4.2.9 Construction of Sub-Stations

Two substation compounds will be constructed, one for each section of the wind farm and to connect the wind farm to the national grid.
The substation compound for the northern section of the wind farm will be located in the Townland of Ballynahulla, on the northern side of the existing unsurfaced L11128 Local Tertiary County Road which passes through the site. The compound will cover 6,705 m² and will contain outdoor switchgear comprising busbars, line bays, grid transformer and a control building for a medium and a high voltage substation.

The substation compound for the southern section of the wind farm will be in the Townland of Knocknageeha, on the north western side of the L3013 Local Primary County Road. The compound will cover 1,565 m² and will contain outdoor switchgear including a house transformer and a control building.

The construction of the substations has the potential to have a slight impact on soils, surface and groundwater, and measures will be required to mitigate the risks. Temporary, slight, impacts on soils and geology will occur through the removal of soils and the use of quarried bedrock from the borrow pits, but are not considered to be significant at the local or regional scale.

4.2.10 Underground Cable Routes and Grid Connection

Subsurface cable routes will be constructed between the turbines and substations. In the northern section a medium voltage underground cable will connect Turbines T8 – T14 to the new substation at Ballynahulla.

Some of the cable routes along public roads will cross watercourses at existing bridges/culverts. Approximately 5.8km of cable trench will be installed alongside the new/upgraded access tracks and public road in the southern section of the wind farm.

In the northern section a 110 kV high voltage cable will connect the grid connection substation at Ballynahulla to Eirgrid’s 110/220 kV substation at Ballynahulla. These works will include a medium voltage underground cable circuit connecting Turbines T1 – T7 to the substation at Toreencahill. Approximately, 5.3km of cable trench will be installed alongside the new/upgraded access tracks and the public road on the northern section of the wind farm.

A medium voltage underground cable circuit of approximately 4km in length will connect the substation at Knocknageeha to the new 110 kV Grid Connection Substation at Ballynahulla. This will be installed along the L-3013 Local Primary County Road as far as its junction with the L-2032 Local Primary County Road, then along the L-2032 until its junction with the L-11128 Local Tertiary County Road, then under the L-11128 as far as the substation.

The construction will have a low, temporary, slight impact on soils during excavation but will cease once the cables have been laid and the trenches backfilled. No in stream works will be required to facilitate cable works. There is the potential for slight impacts on hydrology where a cable route crosses over a drain or stream, and mitigation measures will be required to minimise potential impacts on surface water flow. No significant impact is envisaged on soils or groundwater quality as the cable routes will be shallow and will not extent to bedrock or below the water table.
4.2.11 Construction/Contractor’s Compounds

A temporary contractor’s compound for the northern section will be located in the townland of Ballynahulla between the existing site entrance off the R577 Regional Road and Borrow Pit. The compound for the southern section will be located to the rear of the substation in the townland of Knocknageeha.

The construction of the compounds will have a temporary, slight impact of low significance on soils, geology, and hydrology. No impact is envisaged on hydrogeology, however measures will be required to mitigate potential impacts on soils, surface and groundwater quality.

4.2.12 Summary of the Construction Phase Impacts

Tables 4.1 summarises the Construction Phase Impacts on Soils and Geology. Measures will however be required to mitigate the impacts and these are outlined in Section 5.
Table 4.1 Construction Stage Impacts on Soils and Geology

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
<th>Importance</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Felling</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Construction of new Access Roads</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Widening/Upgrading of Existing Access Tracks</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Construction of Turbine Bases and Hard Standing Areas</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Construction of Meteorological Masts</td>
<td>Temporary</td>
<td>Low</td>
<td>Negligible</td>
<td>Slight</td>
</tr>
<tr>
<td>Borrow Pits and Repositories</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>New Drains</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Upgrading of Existing Drains and Stream Crossings</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Construction of Sub Stations</td>
<td>Temporary</td>
<td>Low</td>
<td>Negligible</td>
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<tr>
<td>Underground Cable Routes and Grid Connection</td>
<td>Temporary</td>
<td>Low</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>Construction Compound</td>
<td>Contractors</td>
<td>Temporary</td>
<td>Low</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
Tables 4.2 summarises the Construction Phase Impacts on Hydrology and Hydrogeology. Measures will be required to mitigate the impacts and these are outlined in Section 5.

**Table 4.2 Construction Stage Impacts on Hydrology and Hydrogeology**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
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<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Felling</td>
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<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
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<tr>
<td>Construction of new Access Roads</td>
<td>Temporary</td>
<td>Moderate</td>
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<td>Temporary</td>
<td>Low</td>
<td>Negligible</td>
<td>Slight</td>
</tr>
</tbody>
</table>
4.3 Operational Stage

Operational activities will comprise visits by company staff to maintain and/or repair equipment in the turbines, support systems in the substation buildings and maintenance of the roads and the surface water drainage system.

The substation buildings will be surrounded by palisade fencing. The Control Building will be unmanned, but will contain toilet facilities (with an enclosed holding tank) for maintenance staff and the transformers in the substations will contain cooling oils.

There is the potential for localised impact on hydrology and hydrogeology in the event that toilet facilities are not maintained, or the transformer oils were to leak to ground causing soil and possibly groundwater contamination. Given the limited volume of wastewater likely to be generated (c1-2m³/year the impact would be temporary, and of negligible significance.

There is the potential for contamination of the soils, surface and groundwater locally in the event of a leak of cooling oils from transformers. Given that the volume of oil is likely to be low c2-3 litres of cooling oils, the impact would be temporary and of slight significance.

Road maintenance work could result in localised generation of silt which could run off to drains and water courses. The impacts are considered to be temporary i.e. over the period of maintenance, slight impact on Soils and hydrology with negligible impacts on Geology and Hydrogeology.

Maintenance work on drains, water courses and stream crossings could result in impacts on surface water quality. The impacts are considered to be temporary i.e. over the period of maintenance, slight impact on hydrology with negligible impacts on soils, geology and hydrogeology.

The cumulative impacts during the operational phase are considered to be temporary, moderate impact on Soils and Hydrology and slight impact on Geology and Hydrogeology.

Measures are required to mitigate the associated impacts and these are described in Section 5.

4.4 Decommissioning Stage

Impacts during decommissioning will be limited to the dismantling and removal of the turbines from the site. It is not proposed to remove the turbine bases or the substations.

By the time decommissioning takes place the borrow pit areas will be fully reinstated, and all previously soil stripped areas will have been revegetated. The surface water drainage will have stabilised, with sediment run-off from the site similar to undeveloped areas. Decommissioning impacts will be limited to the movement of vehicles and equipment to remove the turbines.

The impact of the decommissioning works will be of short duration, and of negligible significance on the Soils, Geology, Hydrology and Hydrogeology.

4.5 Cumulative Impacts

Activities within the catchment of the windfarm are dominated by forestry and peat cutting. Forestry, farming and peat cutting operations in the Blackwater catchment have the potential to have an adverse effect on water quality together with wind farm construction.

Turbines T-1 to T-7 are located in areas associated with past and recent cut away bog with small areas of wet grass land to the north of T-5 and T-6 and to the south of T-7. Turbines T-8, 9 and 13 are also associated with cut away bog. While turbines T-11 and 12 are in wet grass land. There is a portion of improved agricultural lands to the southeast of T-14. Cut away bogs that are being actively cut for turf have the potential to impact on surface water quality if sediment run-off is not controlled.

Forestry may impact on the surface water quality during planting, application of forestry fertilisers and tree felling activities.

Agricultural activities can result in runoff/emissions of silt, nutrients and pesticides to receiving watercourses, which can reduce water quality.

However, the ecological status of the streams associated with the site are classified as Good indicating that forestry, peat cutting and agricultural activities are not having an overly negative effect on water quality within that part of the catchment.

The potential cumulative impacts of the above activities combined with the construction of the wind farm are considered to be of moderate significance.
5 MITIGATION AND CONTROL MEASURES

5.1 Construction Phase Mitigation Measures

As part of the overall construction programme a Construction and Environmental Management Plan (CEMP) will be prepared. A detailed Surface Water Management Plan has been prepared for this project and will be incorporated in the CEMP. The CEMP will include methodologies for each element of the construction programme and will outline the measures to mitigate impacts. It will specify a monitoring regime for peat stability and landslip risk, surface water management and monitoring programme and waste management. Sediment and erosion control measures have been incorporated into the wind farm design which is based on best practice guidance (CIRIA C648) and practical wind farm site won experience ensuring the principle keeping of clean water clean i.e. intercepting and diverting clean water away from excavations and diverting dirty water in works areas for appropriate treatment prior to discharge. The mitigation measures for the various elements of the construction stage are as follows:

5.1.1 Tree Felling

Tree felling will be undertaken in accordance with best practice guidance including:

- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements –Site Assessment and Mitigation Measures.

A 50 m buffer zone will be maintained between the felling area and all watercourses where possible. With the exception of access roads to T9, T10 and existing road upgrades and an existing stream crossing, all the proposed tree felling areas are outside the felling buffer zones, therefore runoff from the tree felling areas will be attenuated prior to reaching surface water courses. Where tree felling is required in the vicinity of streams, the following mitigation measures will be implemented.

- Works will not take place in periods of high rainfall, in order to minimise entrainment of sediment to drains and streams.
- Low ground pressure plant will be utilised to minimise ground disturbance and monitoring and maintenance of roads, drains and culverts.
- The existing forestry drains will be blocked upstream of the confluence with the surface water streams and temporary silt traps will be deployed. No direct discharge from these drains will occur during tree felling activities.
• In steeper areas where there is a potential for soil erosion brash mats will be used along off-road routes. Off-road tracking will be suspended during periods of high rainfall.

• Felled timber will be stacked in dry areas, and outside of the buffer zones. All brash will be removed from the aquatic buffer zones.

• Regular maintenance of access tracks and culverts will be undertaken during the felling works.

• Refuelling or maintenance of machinery will not be permitted within 100m of a watercourse. Spill kits will be provided at the refuelling areas. All of the construction machinery operating in or near these watercourses will be systematically checked in order to avoid leaks of oils, hydraulic fluids and fuels.

• Forestry can only be replanted on suitable lands

• Any replanting of forestry will adhere to Forest Service guidelines on the protection of water quality during forestry operations.

5.1.2 Construction of New Access Tracks and Widening of Existing Tracks

Road construction works will be undertaken in accordance with best practice guidance on the construction of forestry roads as outlined;

- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures.

During construction clean run-off will be diverted around excavation areas keeping clean water clean, and water in excavations will be diverted to settlement ponds (or stilling ponds) prior to controlled diffuse release over vegetated surfaces. There will be no direct discharges to surface water courses.

A buffer zone of 50 m will be maintained between access roads and surface water courses, except at surface water crossing points. Works will not take place during periods of high rainfall, in order to minimise entrainment of sediment to drains and streams.

Low ground pressure plant will be utilised to minimise ground disturbance and monitoring and maintenance of existing roads, drains and culverts. Machinery tracking through watercourses will be avoided as much as possible along internal forestry drains.

The roads will be laid out to follow the existing contours as much as possible avoiding the cutting into slopes.
Some of the peat removed from access roads will be used for landscaping, and any excess will be temporarily stockpiled in peat repositories and ultimately used to restore the three proposed borrow pits. Where possible, the upper (acrotelm) vegetative layers will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored peat within the peat storage areas.

The road construction will incorporate drains along the sides to collect run-off from the road surface, and check dams and silt fences will be located along the drains to reduce sediment load. Run-off in the drains will be diverted to settlement ponds at regular intervals which will over flow to vegetated surfaces at the greenfield run-off rate.

Refuelling or maintenance of machinery will not be permitted within 100 m of a watercourse. Spill kits will be provided at the refuelling areas. All of the construction machinery operating in or near these watercourses will be systematically checked in order to avoid leaks of oils, hydraulic fluids and fuels.

5.1.3 Construction of Turbine Foundations and Hard Stand Areas

Peat removed from turbine locations will be used for landscaping i.e. to reinstate turbine base areas outside the hardstand footprint, with any excess stockpiled temporarily in designated peat storage areas. Temporary Peat Stockpile heights will not exceed 1 m and will be located on level ground. The stock piles will be used to restore the three proposed borrow pits. Where possible, the upper vegetative layer (acrotelm) will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored peat within the peat storage areas.

While it is not envisaged that there will be a need to dewater the excavations as part of the turbine base and hardstands, drainage will be incorporated to accommodate surface water run-off which will be diverted to a settlement pond at each turbine location prior to discharge overland at the greenfield run-off rate.

5.1.4 Borrow Pits

Prior to construction an interception drain will be installed upslope of each borrow-pit to divert clean water around the excavation area with final discharge overland at greenfield run-off rate. Sumps will be excavated in the borrow pit floors to control water inflow. The sumps will be pumped out to settlement ponds and the run-off will be discharged to interceptor drains and settlement/attenuation ponds prior to discharge as overland flow at the greenfield run-off rate. During development of the borrow pits all rock breaking and excavator plant will be regularly inspected in order to avoid leaks of oils, hydraulic fluids and fuels in the borrow areas.

5.1.5 New Drains

Drains will be constructed along all of the new access roads similar to those already present on the existing access tracks. Check dams will be located along the drains to reduce sediment load. Run-off along the drains will be diverted to settlement ponds at regular intervals which will over flow to vegetated surfaces on level ground at the greenfield run-off rate.
Each silt control feature will be given a reference number and a documented on-site quality system of maintenance and monitoring of each trap will be implemented. The implementation of this will be monitored by an independent environmental consultant, unless otherwise agreed with the planning authority. Monitoring reports will be available on-site for inspection by the Planning Authority and other relevant statutory authorities including Inland Fisheries Ireland (IFI) and National Parks and Wildlife Services (NPWS) Rangers.

5.1.6 Upgrade of Existing Drain and Stream Crossings

Two new stream crossings will be provided on the Carhoonoe Stream. The first will be on the boundary between the townlands of Tooreengarriv and Barna along the new access track leading to turbine T9. The second will be over the Tooreengarriv Stream in the townland of Ballynahulla along the new access track leading to turbine T10. The existing stream crossing will be upgraded where the existing unsurfaced tertiary road crosses the Tooreengarriv stream east of the substation. The culverts are likely to comprise precast box culverts with the integrity of the stream bed re-instated through the culvert. Each culvert will be sized to take cater for the appropriate flows in these streams. The design details will be incorporated in the Drawings being prepared for the EIS.

5.1.7 Substations

A speed restriction of 10 km/hr will apply for travel slowly across open ground. Bog mats will be employed to protect tracked areas and prevent soil erosion. All machinery operations shall take place away from the stream and ditch banks, apart from where crossings are required.

All construction materials with the potential to impact on soil or waters (cement, fuel and lubricating oils) will be stored in appropriately bunded areas in the construction compounds.

Re-fuelling will take place at a specific designated re-fuelling area in the construction compounds. This re-fuelling area will be appropriately bunded. Maintenance of construction vehicles or plant will only be permitted at the contractor’s construction compound.

Fuels or chemicals will only be stored at suitably bunded storage areas in the construction compounds. All plant will be regularly inspected for leaks and fitness for use, and spill kits will be available to deal with accidental spillage from plant and equipment.

All construction waste shall be stored in skips, and removed from site following completion of the building works to suitably licensed material recovery facilities.

5.1.8 Construction Compounds

All construction materials with the potential to impact on soil or waters (concrete materials, fuel and lubricating oils) will be stored in appropriately bunded areas in the construction compound.
Re-fuelling will take place at a specific designated re-fuelling area in the construction compound. This re-fuelling area will be appropriately bunded. Maintenance of construction vehicles or plant will only be permitted at the contractor’s construction compound.

Fuels or chemicals will only be stored at suitably bunded storage areas in the construction compound. All plant will be regularly inspected for leaks and fitness for use and spill kits will be available to deal with accidental spillage from plant and equipment.

All construction solid waste will be stored in skips in the construction compound, and removed from site following completion of the building works to suitably licensed material recovery facilities.

Temporary toilet facilities will be provided. The toilets will be regularly inspected, and the wastewater will be removed using a licenced waste disposal contractor for treatment at the closest available municipal wastewater treatment plant.

5.1.9 Subsurface Cable Routes

Where cable routes cross on bridges over drains or streams (no instream works will be required) appropriate water quality controls as specified above will be put in place.

5.1.10 Peat Stability and Land Slip

The following section provides a summary of the peat stability report followed by mitigation measures.

A Peat Slope Stability Assessment was undertaken by MRG following best practice guidance on slope stability and peat landslip risk assessment developed by the Scottish Executive 2006. No corresponding standard is available in Ireland. The assessment involved establishing peat thickness, shear strength and slope angle. Factors of safety (FOS) were applied assuming no loading during construction: This considers the stability of the peat with no additional load applied to the surface of the peat.

Secondly, assuming loaded conditions during construction: This considers the stability of the peat with an additional load of 12kN/m² applied to the surface of the peat. Where the FOS is <1 then slope failure is likely. Where the FOS is >1 Slope failure is unlikely.

The calculated FOS exceeds 1.5 for all elements of the wind farm infrastructure in the unloaded condition and can therefore be considered stable in its current state. The lowest calculated factor of safety (2.2) at a turbine foundation/crane hardstanding area location occurs at Turbine 9, which coincides with the deepest area of peat (3.0m) and slopes of less than 3 degrees. The calculated factor of safety at the other turbine locations range from 4.1 at Turbine T5 to in excess of 20 at Turbines T6 and T8.
All of the proposed development infrastructure also has a calculated factor of safety in excess of 1.5 for the loaded condition, with the lowest calculated factors of safety (1.6) coinciding with Turbine T9 and access tracks AT12 (leading to T9) and AT13 (leading to T10). This would indicate that the peat can be considered to be stable and can gradually be loaded with up to 1m of peat throughout the site.

The Scottish Executive Guidelines recommend that a Peat Stability Risk Assessment (PSRA) comprising a peat landslide hazard zonation plan and accompanying risk register be compiled for a site. The PSRA quantifies the level of risk by assessing the likelihood of a peat instability event at a location (turbine foundations/crane hardstanding areas, access tracks, substations, temporary construction compounds, borrow pits and repositories) by assessing the impact of such an event on neighbouring dwellings/settlements and critical infrastructure such as public roads, overhead lines and communications. The overall risk rating is the product of the likelihood of an event occurring combined with the impact such an event might have.

MRG considers that the level of risk is Low at Turbines T03, T04, T06, T07, T08, T10, T11, T12 and T13 and Medium at Turbines T01, T02, T05 and T14 and that works can safely proceed at all of these locations subject to the appropriate geotechnical investigations and mitigation measures being put in place.

Only Turbine T09 is classified as being at High Risk which is consistent with the results of the Slope Stability Assessment which calculated the lowest factor of safety at this location. However, given that the calculated factor of safety is 2.2 in the unloaded condition and 1.6 for the loaded condition, and that it is considered safe to construct where the factor of safety exceeds 1.5, it is concluded that construction can proceed at Turbine T9 subject to the appropriate mitigation measures being put in place.

The PSRA confirms that the level of risk is classified as Low or Medium for all sections of access track and works can safely proceed at these locations, subject to the appropriate mitigation measures being put in place.

The PSRA confirms that the level of risk is classified as Medium for both substation locations, and works can safely proceed at these locations subject to the appropriate mitigation measures being put in place.

The PRSA confirms that the level of risk at all borrow pit and repository locations is classified as Low, and works can safely proceed at these locations subject to the appropriate mitigation measures being put in place.

A Spoil/Peat and Subsoil Excavation and Management Plan will form part of the CEMP. A method statement will be prepared for each turbine location, access track upgrade and development, the borrow pits and repository areas and substations.

Peat excavation works will be supervised by a geotechnical engineer who will undertake regular site inspections to ensure the mitigation measures are effective. No works will be permitted during periods of, or immediately after heavy prolonged rainfall.
Where peat is stripped around the turbine bases the upper vegetated layer will be separated from the underlying layer of peat, and will be stored with the vegetated layer facing upwards, maintained in a wet condition and reinstated at the earliest opportunity to promote natural recovery of the vegetation around the turbines.

The excavated peat will be stockpiled in repository areas adjacent to the borrow pits on level ground and in areas where the ground is level and undisturbed peat is a maximum of 1 m deep in strict accordance with the PRSA.

In most excavation locations the peat will be removed to repository area or where it is thin along level ground, will be side cast. Where peat is exposed on permanent slopes in cuttings, it will be trimmed back to stables slopes of 1:1.5 or flatter. In deeper peat and or where peat is too soft to trim it back to permanent slopes of c. 1:1.5, a berm of rock fill will be constructed along the edge of the slope, and founded on the underlying subsoil, in order to support the peat.

Side casting of peat will not occur within 50 m of a surface water course and repository areas will all be located at least 100 m from a surface water course.

5.2 Operational Phase Mitigation Measures

The transformers will be located within impermeable concrete bunds with a capacity to retain 110% of the volume of oil in the transformer in the event of a leak. Drainage from the bunds will pass through an oil interceptor.

Wastewater from toilets will be collected in a tank that will be emptied when required using a licenced waste disposal contractor.

5.3 Decommissioning Phase Mitigation Measures

Impacts during decommissioning would be similar to but a reduced level to those that could occur during the construction phase of the project. As part of the decommissioning works the turbines will be dismantled and removed from the site. It is not proposed to remove the turbine bases or the substation as this infrastructure may be of use in the future to the power supply grid. By the time decommissioning takes place the borrow pit areas will be fully reinstated and all previously soil stripped areas will have been revegetated. The surface water drainage will have stabilised with sediment run-off from the site similar to undeveloped areas. Decommissioning impacts will be limited to the movement of vehicles and equipment to remove the wind turbines. The impact of this activity will be of short duration and of low impact.
6 Conclusion

6.1 Conclusions

The proposed development has, in absence of mitigation measures the potential to cause adverse impacts on the geology, hydrology and hydrogeology. However, the proposed design and method of construction and operation as well as the Surface Water Management Plan incorporate measures that effectively mitigate those risks. Provided all mitigation is appropriately implemented, the residual impact of Silverbirch Wind Farm is not considered to be significant.
Appendix 1

Groundwater Body Report
River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at www.wfdireland.ie.
The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.
### Chemical and Quantitative Status Report

**Water Management Unit:** N/A  
**WaterBody Category:** Groundwater Waterbody  
**WaterBody Name:** Rathmore_W  
**WaterBody Code:** IE_SW_G_070  
**Overall Status Result:** Good  
**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Status Element Description</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td>INS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Status associated with saline intrusion into groundwater</td>
<td></td>
</tr>
<tr>
<td>DWS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Status associated with exceedances of water quality above specific standards</td>
<td></td>
</tr>
<tr>
<td>DS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Chemical status of groundwater due to pressure from diffuse sources of pollution</td>
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</tr>
<tr>
<td>CLS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Chemical status of groundwater due to pressure from contaminated soil or land.</td>
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</tr>
<tr>
<td>MS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Chemical status of groundwater due to pressure from mine sites (active or closed).</td>
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</tr>
<tr>
<td>UAS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Chemical status of groundwater due to pressures from urban areas</td>
<td></td>
</tr>
<tr>
<td>GWS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>General groundwater quality status</td>
<td></td>
</tr>
<tr>
<td>RPS</td>
<td>GS-LC</td>
</tr>
<tr>
<td>Status associated with MRP loading to rivers</td>
<td></td>
</tr>
<tr>
<td>TNS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Status associated with nitrate loading to transitional and coastal waters</td>
<td></td>
</tr>
<tr>
<td>SWS</td>
<td>GS-LC</td>
</tr>
<tr>
<td>Overall status associated with nutrient loadings to rivers and transitional and coastal waters</td>
<td></td>
</tr>
<tr>
<td>SQS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Status associated with dependant surface water quantitative status</td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td>GS-HC</td>
</tr>
<tr>
<td>Groundwater dependant terrestrial ecosystems status</td>
<td></td>
</tr>
<tr>
<td>QSO</td>
<td>GS-LC</td>
</tr>
<tr>
<td>Quantitative status overall</td>
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</tr>
<tr>
<td>CSO</td>
<td>GS-LC</td>
</tr>
<tr>
<td>Chemical status overall</td>
<td></td>
</tr>
<tr>
<td>OS</td>
<td>Good</td>
</tr>
<tr>
<td>Overall status</td>
<td></td>
</tr>
</tbody>
</table>

**GS-HC**: Good status High Confidence  
**GS-LC**: Good status Low Confidence  
**n/a**: not assessed

**Status**  
By ‘Status’ we mean the condition of the water in the waterbody. It is defined by its chemical status and quantitative status, whichever is worse. Groundwaters are ranked in one of 2 status classes: Good or Poor.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).
## Risk Report

**Water Management Unit:** N/A  
**WaterBody Category:** Groundwater Waterbody  
**WaterBody Name:** Rathmore_W  
**WaterBody Code:** IE_SW_G_070  
**Overall Risk Result:** 2a - Probably Not At Risk  
**Heavily Modified:** No

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<tr>
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<th>Risk</th>
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</thead>
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<tr>
<td>Groundwater Quality</td>
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</tr>
<tr>
<td>Groundwater Quality (General)</td>
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</tr>
<tr>
<td>TE GWDTE Risk</td>
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</tr>
<tr>
<td>DIF Diffuse Elements (General) Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>DW Drinking Waters Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>INT Intrusions Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>WB Water Balance Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>Groundwater Quality (General)</td>
<td></td>
</tr>
<tr>
<td>GQ General Groundwater Quality Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>Groundwater Quality (Point Risk)</td>
<td></td>
</tr>
<tr>
<td>CL Contaminated Land Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>LF Landfill Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>MI Mine Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>QY Quarry Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>UR Urban Risk</td>
<td>N/A</td>
</tr>
<tr>
<td>UW UWWT Risk</td>
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<tr>
<td>GW Diffuse Risk Sources</td>
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<td>WB3 Mobile Nutrients (NO3)</td>
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<tr>
<td>WB4 Mobile Chemicals</td>
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</tr>
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<td>WB5 Clustered OSWTSs and leaking urban sewerage systems</td>
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</tr>
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<td>GW Hydrology</td>
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</tr>
<tr>
<td>WB1 Water balance - Abstraction</td>
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</tr>
<tr>
<td>WB2 Abstraction - Intrusion</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Date Reported to Europe: July 2010  
Date Report Created: 19/01/2016
** GW Point Risk Sources**

| WB10 | Risk from Point sources of pollution - Contaminated Land | N/A |
| WB11 | Risk from Point sources of pollution - Trade Effluent Discharges | N/A |
| WB12 | Risk from Point sources of pollution - Urban Wastewater Discharges | N/A |
| WB6 | Risk from Point sources of pollution - Mines | N/A |
| WB7 | Risk from Point sources of pollution - Quarries | N/A |
| WB8 | Risk from Point sources of pollution - Landfills | N/A |
| WB9 | Risk from Point sources of pollution - Oil Industry Infrastructure | N/A |

** Overall Risk**

| RA | Groundwater Overall - Worst Case | N/A |

**Risk information**

| CLR | Contaminated land risk | 2b | Not At Risk |
| DR | Risk of groundwater due to pressure from diffuse sources of pollution | 2b | Not At Risk |
| DWR | Risk associated with exceedances of water quality above specific standards | 2b | Not At Risk |
| GDR | Groundwater dependant terrestrial ecosystems risk | 2b | Not At Risk |
| GWR | General groundwater quality risk | 2b | Not At Risk |
| INR | Risk associated with saline intrusion into groundwater | 2b | Not At Risk |
| LR | Risk due to landfills sites/old closed dump sites | 2b | Not At Risk |
| MR | Mines risk | 2b | Not At Risk |
| NULL | Diffuse nitrates from agriculture risk | N/A |
| QR | Risk due to quarries | 2b | Not At Risk |
| RA | Revised risk assessment | 2a | Probably Not At Risk |
| RPR | Risk associated with MRP loading to rivers | 2a | Probably Not At Risk |
| SQR | Risk associated with dependant surface water quantitative status | 2a | Probably Not At Risk |
| SWR | Overall risk associated with nutrient loadings to rivers and transitional and coastal waters | 2a | Probably Not At Risk |
| TNR | Risk associated with nitrate loading to transitional and coastal waters | 2b | Not At Risk |
| UAR | Risk of groundwater due to pressures from urban areas | 2b | Not At Risk |
| UWR | Risk due to direct discharges of urban wastewater | 2b | Not At Risk |

**Risk**

By ‘risk’ we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that ’2008’ after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our ‘WFD Risk Assessment Update’ document in the RBMP document library, and other documents at www.wfdireland.ie (Directory 31 Risk Assessments).

Date Reported to Europe:July 2010
Date Report Created 19/01/2016
Objectives Report

<table>
<thead>
<tr>
<th>Water Management Unit</th>
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</tr>
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<tbody>
<tr>
<td>WaterBody Category</td>
<td>Groundwater Waterbody</td>
</tr>
<tr>
<td>WaterBody Name</td>
<td>Rathmore_W</td>
</tr>
<tr>
<td>WaterBody Code</td>
<td>IE_SW_G_070</td>
</tr>
<tr>
<td>Overall Objective</td>
<td>Protect</td>
</tr>
<tr>
<td>Heavily Modified</td>
<td>No</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Objectives Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extended timescale information</strong></td>
<td></td>
</tr>
<tr>
<td>E1 Extended deadlines due to agricultural P</td>
<td>No Status</td>
</tr>
<tr>
<td>E2 Extended deadlines due to agricultural N</td>
<td>No Status</td>
</tr>
<tr>
<td>E3 Extended deadlines due to mines</td>
<td>No Status</td>
</tr>
<tr>
<td>E4 Extended deadlines due to urban areas</td>
<td>No Status</td>
</tr>
<tr>
<td>E5 Extended deadlines due to contaminated lands</td>
<td>No Status</td>
</tr>
<tr>
<td>EO Extended deadlines - overall</td>
<td>No Status</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OB1 Prevent deterioration objective</td>
<td>Protect</td>
</tr>
<tr>
<td>OB2 Restore at least good status objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB3 Reduce chemical pollution objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB4 Protected areas objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB0 Overall objectives - objective</td>
<td>Protect</td>
</tr>
</tbody>
</table>

Extended timescales

Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives

In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

Date Reported to Europe: July 2010
Date Report Created: 19/01/2016
## Measures Report

**Water Management Unit:** N/A  
**WaterBody Category:** Groundwater Waterbody  
**WaterBody Name:** Rathmore_W  
**WaterBody Code:** IE_SW_G_070  
**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Measures Description</th>
<th>Applicable</th>
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<tr>
<td>BC  Total number of basic measures which apply to this waterbody</td>
<td>27</td>
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<tr>
<td>BW  Directive - Bathing Waters Directive</td>
<td>No</td>
</tr>
<tr>
<td>BIR Directive - Birds Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>HAB Directive - Habitats Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>DW  Directive - Drinking Waters Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>MAE Directive - Major Accidents and Emergencies Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>EIA Directive - Environmental Impact Assessment Directive</td>
<td>Yes</td>
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<tr>
<td>SS  Directive - Sewage Sludge Directive</td>
<td>Yes</td>
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<tr>
<td>UWT Directive - Urban Waste Water Treatment Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>PPP Directive - Plant Protection Products Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>NIT Directive - Nitrates Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>IPC Directive - Integrated Pollution Prevention Control Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>CR Other Stipulated Measure - Cost recovery for water use</td>
<td>Yes</td>
</tr>
<tr>
<td>SUS Other Stipulated Measure - Promotion of efficient and sustainable water use</td>
<td>Yes</td>
</tr>
<tr>
<td>DWS Other Stipulated Measure - Protection of drinking water sources</td>
<td>Yes</td>
</tr>
<tr>
<td>ABS Other Stipulated Measure - Control of abstraction and impoundment</td>
<td>Yes</td>
</tr>
<tr>
<td>POI Other Stipulated Measure - Control of point source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>DIF Other Stipulated Measure - Control of diffuse source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>GW Other Stipulated Measure - Authorisation of discharges to groundwaters</td>
<td>Yes</td>
</tr>
<tr>
<td>PS Other Stipulated Measure - Control of priority substances</td>
<td>Yes</td>
</tr>
<tr>
<td>MOD Other Stipulated Measure - Controls on physical modifications to surface waters</td>
<td>Yes</td>
</tr>
<tr>
<td>OA Other Stipulated Measure - Controls on other activities impacting on water status</td>
<td>Yes</td>
</tr>
<tr>
<td>AP Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents</td>
<td>Yes</td>
</tr>
<tr>
<td>OTS On-site waste water treatment systems</td>
<td>Yes</td>
</tr>
<tr>
<td>FPM Freshwater Pearl Mussel sub-basin plan</td>
<td>Yes</td>
</tr>
<tr>
<td>SHE Shellfish Pollution Reduction Plan</td>
<td>No</td>
</tr>
<tr>
<td>IPR IPPC licences requiring review</td>
<td>Yes</td>
</tr>
<tr>
<td>WPR Water Pollution Act licences requiring review</td>
<td>Yes</td>
</tr>
<tr>
<td>FOR Forestry guidelines and regulations</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Date Reported to Europe: July 2010  
Date Report Created 19/01/2016
Measures
Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in ‘River Basin Planning Guidance’ and in other documents in our RBMP Document Library at www.wfdireland.ie.
Appendix 2

Surface Water Body Report
Full Report for Waterbody Blackwater, Trib of Blackwater

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at www.wfdireland.ie.

Date Reported to Europe: July 2010
Date Report Created 19/01/2016
### Summary Information:

<table>
<thead>
<tr>
<th>Water Management Unit:</th>
<th>IE_SW_Blackwater</th>
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<tbody>
<tr>
<td>WaterBody Category:</td>
<td>River Waterbody</td>
</tr>
<tr>
<td>WaterBody Name:</td>
<td>Blackwater, Trib of Blackwater</td>
</tr>
<tr>
<td>WaterBody Code:</td>
<td>IE_SW_18_450</td>
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<td>Overall Status:</td>
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<td>Overall Objective:</td>
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<td>Overall Risk:</td>
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<td>Heavily Modified:</td>
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The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.
**Status Report**

**Water Management Unit:** IE_SW_Blackwater  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Blackwater, Trib of Blackwater  
**WaterBody Code:** IE_SW_18_450  
**Overall Status Result:** Moderate  
**Heavily Modified:** No

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<th>Status Element Description</th>
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<td>Macroinvertebrate status</td>
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<td>PC</td>
<td>General physico-chemical status</td>
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<td>FPQ</td>
<td>Freshwater Pearl Mussel / Macroinvertebrate status</td>
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<td>DIA</td>
<td>Diatoms status</td>
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<td>HYM</td>
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<td>ES</td>
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<td>CS</td>
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<td>DON</td>
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n/a - not assessed

**Status**

By ‘Status’ we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdirleand.ie (Directory 15 Status).
### Risk Report

**Water Management Unit:** IE_SW_Blackwater  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Blackwater, Trib of Blackwater  
**WaterBody Code:** IE_SW_18_450  
**Overall Risk Result:** Not At Risk

<table>
<thead>
<tr>
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<td>RD1 EPA diffuse model (2008)</td>
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</tr>
<tr>
<td>RD2a Road Wash - Soluble Copper</td>
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</tr>
<tr>
<td>RD2b Road Wash - Total Zinc</td>
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</tr>
<tr>
<td>RD2c Road Wash - Total Hydrocarbons</td>
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</tr>
<tr>
<td>RD3 Railways</td>
<td>2b</td>
</tr>
<tr>
<td>RD4a Forestry - Acidification (2008)</td>
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</tr>
<tr>
<td>RD4b Forestry - Suspended Solids (2008)</td>
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</tr>
<tr>
<td>RD4c Forestry - Eutrophication (2008)</td>
<td>1a</td>
</tr>
<tr>
<td>RD5 Overall Unsewered (2008)</td>
<td>2b</td>
</tr>
<tr>
<td>RD5a Unsewered Areas - Pathogens (2008)</td>
<td>2a</td>
</tr>
<tr>
<td>RD5b Unsewered Phosphorus (2008)</td>
<td>2b</td>
</tr>
<tr>
<td>RD6a Arable</td>
<td>2b</td>
</tr>
<tr>
<td>RD6b Sheep Dip</td>
<td>2b</td>
</tr>
<tr>
<td>RD6c Forestry - Dangerous Substances</td>
<td>2a</td>
</tr>
<tr>
<td>RDO Diffuse Overall -Worst Case (2008)</td>
<td>1a</td>
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</tbody>
</table>

**Hydrology**

<table>
<thead>
<tr>
<th>Risk Test Description</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHY1 Water balance - Abstraction</td>
<td>2b</td>
</tr>
</tbody>
</table>

**Morphological Risk Sources**

<table>
<thead>
<tr>
<th>Risk Test Description</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM1 Channelisation (2008)</td>
<td>2b</td>
</tr>
<tr>
<td>RM2 Embankments (2008)</td>
<td>2b</td>
</tr>
<tr>
<td>RM3 Impoundments</td>
<td>2b</td>
</tr>
<tr>
<td>RM4 Water Regulation</td>
<td>2b</td>
</tr>
<tr>
<td>RM5 Intensive Landuse</td>
<td>N/A</td>
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<tr>
<td>RMO Morphology Overall - Worst Case (2008)</td>
<td>2b</td>
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</table>

**Overall Risk**

<table>
<thead>
<tr>
<th>Risk Test Description</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA Rivers Overall - Worst Case (2008)</td>
<td>2b</td>
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</tbody>
</table>

Date Reported to Europe: July 2010

Date Report Created 19/01/2016
**Point Risk Sources**

<table>
<thead>
<tr>
<th>RP</th>
<th>Source</th>
<th>Risk Category</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1</td>
<td>WWTPs (2008)</td>
<td>1a</td>
<td>At Risk</td>
</tr>
<tr>
<td>RP2</td>
<td>CSOs</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP3</td>
<td>IPPCs (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP4</td>
<td>Section 4s (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP5</td>
<td>WTPs/Mines/Quarries/Landfills</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>RPO</td>
<td>Overall Risk from Point Sources - Worst Case (2008)</td>
<td>1a</td>
<td>At Risk</td>
</tr>
</tbody>
</table>

**Q Value**

<table>
<thead>
<tr>
<th>Q</th>
<th>EPA Q rating and Margaritifera Assessment</th>
<th>N/A</th>
</tr>
</thead>
</table>

**Q/RDI or Point/Diffuse**

| QPD  | Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)   | 2b            | Not At Risk |

**Rivers Direct Impacts**

| RDI1 | Rivers Direct Impacts - Dangerous Substances                           | N/A           |

**Risk**

By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our 'WFD Risk Assessment Update' document in the RBMP document library, and other documents at www.wfdireland.ie (Directory 31 Risk Assessments).
### Objectives Report

<table>
<thead>
<tr>
<th>Water Management Unit:</th>
<th>IE_SW_Blackwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>WaterBody Category:</td>
<td>River Waterbody</td>
</tr>
<tr>
<td>WaterBody Name:</td>
<td>Blackwater, Trib of Blackwater</td>
</tr>
<tr>
<td>WaterBody Code:</td>
<td>IE_SW_18_450</td>
</tr>
<tr>
<td>Overall Objective:</td>
<td><strong>Restore_2021</strong></td>
</tr>
<tr>
<td>Heavily Modified:</td>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Objectives Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extended timescale information</strong></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td>Extended timescales due to time requirements to upgrade WWTP discharges</td>
</tr>
<tr>
<td>E2</td>
<td>Extended timescales due to delayed recovery of chemical pollution and chemical status failures</td>
</tr>
<tr>
<td>E3</td>
<td>Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
</tr>
<tr>
<td>E4</td>
<td>Extended timescales due to delayed recovery from physical modifications and physical damage</td>
</tr>
<tr>
<td>E5</td>
<td>Extended timescales due to delayed recovery following implementing forestry acidification measures</td>
</tr>
<tr>
<td>E6</td>
<td>Extended timescales due to physical recovery timescales at mines and contaminated sites</td>
</tr>
<tr>
<td>E7</td>
<td>Extended timescales due to delayed recovery of highly impacted sites</td>
</tr>
<tr>
<td>E8</td>
<td>Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
</tr>
<tr>
<td>E9</td>
<td>Extended timescales due to delayed recovery from nitrogen losses to estuaries</td>
</tr>
<tr>
<td>E10</td>
<td>Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
</tr>
<tr>
<td>E11</td>
<td>Extended timescales due to delayed recovery from physical modifications and physical damage (overgrazing)</td>
</tr>
<tr>
<td>E12</td>
<td>Extended timescales due to delayed recovery from physical modifications and physical damage (channelisation)</td>
</tr>
<tr>
<td>E13</td>
<td>Extended timescales from Northern Ireland Environment Agency</td>
</tr>
<tr>
<td>EOV</td>
<td>Overall extended timescale - combination of all extended timescales fields</td>
</tr>
<tr>
<td>E14</td>
<td>Extended timescales due to the presence of Freshwater Pearl Mussel populations</td>
</tr>
<tr>
<td>EX15</td>
<td>Extended timescales due to highly impacted sites</td>
</tr>
</tbody>
</table>

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Objectives information

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB1 Prevent deterioration objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB2 Restore at least good status objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB3 Reduce chemical pollution objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OB4 Protected areas objective</td>
<td>Restore_2021</td>
</tr>
<tr>
<td>OB5 Northern Ireland Environment Agency objective</td>
<td>No Status</td>
</tr>
<tr>
<td>OBO Overall objectives</td>
<td>Restore_2021</td>
</tr>
</tbody>
</table>

Extended timescales

Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives

In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter’s likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.
### Measures Report

**Water Management Unit:** IE_SW_Blackwater  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Blackwater, Trib of Blackwater  
**WaterBody Code:** IE_SW_18_450  
**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Measures Description</th>
<th>Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Total number of basic measures which apply to this waterbody</td>
<td>25</td>
</tr>
<tr>
<td>BW Directive - Bathing Waters Directive</td>
<td>No</td>
</tr>
<tr>
<td>BIR Directive - Birds Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>HAB Directive - Habitats Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>DW Directive - Drinking Waters Directive</td>
<td>No</td>
</tr>
<tr>
<td>MAE Directive - Major Accidents and Emergencies Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>EIA Directive - Environmental Impact Assessment Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>SS Directive - Sewage Sludge Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>UWT Directive - Urban Waste Water Treatment Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>PPP Directive - Plant Protection Products Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>NIT Directive - Nitrates Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>IPC Directive - Integrated Pollution Prevention Control Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>CR Other Stipulated Measure - Cost recovery for water use</td>
<td>Yes</td>
</tr>
<tr>
<td>SUS Other Stipulated Measure - Promotion of efficient and sustainable water use</td>
<td>Yes</td>
</tr>
<tr>
<td>DWS Other Stipulated Measure - Protection of drinking water sources</td>
<td>Yes</td>
</tr>
<tr>
<td>ABS Other Stipulated Measure - Control of abstraction and impoundment</td>
<td>Yes</td>
</tr>
<tr>
<td>POI Other Stipulated Measure - Control of point source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>DIF Other Stipulated Measure - Control of diffuse source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>PS Other Stipulated Measure - Control of priority substances</td>
<td>Yes</td>
</tr>
<tr>
<td>MOD Other Stipulated Measure - Controls on physical modifications to surface waters</td>
<td>Yes</td>
</tr>
<tr>
<td>OA Other Stipulated Measure - Controls on other activities impacting on water status</td>
<td>Yes</td>
</tr>
<tr>
<td>AP Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents</td>
<td>Yes</td>
</tr>
<tr>
<td>TP1 WSIP - Agglomerations with treatment plants requiring capital works</td>
<td>Yes</td>
</tr>
<tr>
<td>TP2 WSIP - Agglomerations with treatment plants requiring further investigation prior to capital works</td>
<td>No</td>
</tr>
<tr>
<td>TP3 WSIP - Agglomerations requiring the implementation of actions identified in Shellfish PRPs</td>
<td>No</td>
</tr>
<tr>
<td>TP4 WSIP - Agglomerations with treatment plants requiring improved operational performance</td>
<td>No</td>
</tr>
<tr>
<td>TP5 WSIP - Agglomerations requiring investigation of CSOs</td>
<td>No</td>
</tr>
</tbody>
</table>

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Measures
Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in ‘River Basin Planning Guidance’ and in other documents in our RBMP Document Library at www.wfdireland.ie.
Appendix 3

Preliminary Flood Risk Assessment Maps
No Fluvial Data Available For Area

RATHMORE

Legend:
Flood Extents
- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents

PFRA Outcomes
- Probable Area for Further Assessment
- Possible Area for Further Assessment

Important User Note:
The flood extents shown on these maps are based on broad-scale simple analyses and may not be accurate for a specific location. Information on the purposes, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or ‘Have Your Say’ on www.cfram.ie).

Office of Public Works
Jonathan Swift Street
Trim
Co Meath
Ireland

Project:
PRELIMINARY FLOOD RISK ASSESSMENT (PFRA)

Map:
PFRA Indicative extents and outcomes - Draft for Consultation

Sheet No: 61
Date: July 2011

Revision: 0

Plot Scale: 1:1 @ A3
Drawing Scale: 1:50,000

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