CHURCHTOWN LANDFILL

NATURA IMPACT STATEMENT

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1 INTRODUCTION

This Natura Impact Statement (NIS) has been prepared by RPS on behalf of Donegal County Council, the operator of the decommissioned landfill site at Churchtown, County Donegal.

The EPA have directed Donegal County Council to prepare this Natura Impact Statement, as defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 as amended following their own screening for Appropriate Assessment undertaken on 1st March 2019. This was communicated to Donegal County Council through an Article 12 Compliance Notice issued under Waste Management (Licensing) Regulations in respect of the licence review from Donegal County Council for the Churchtown Landfill.

This NIS has been prepared to assist the EPA in its role as a Competent Authority, fulfilling its duties in accordance with European Communities (Natural Habitats) Regulations (S.I. No. 94 of 1997) under Regulation 31 (Annex 1.2). An appropriate assessment is required under the Habitats Directive for any plan or project likely to have significant effect on a Natura 2000 site.

This NIS documents the evaluation and analysis, undertaken on behalf of Donegal County Council, seeking to establish whether the Churchtown Landfill site, hereafter referred to as the development, is likely to have a significant effect on any European site, and if so whether those Likely Significant Effects (LSEs) will adversely affect the integrity of any European site. As an initial exercise Donegal County Council undertook its own screening assessment of the potential impact of the development.

The exercise considers the proposed site by itself has been undertaken in view of best scientific knowledge and in view of the conservation objectives of the site concerned. Measures intended to avoid or reduce the harmful effects of the proposed development on European sites have not been taken into account at screening stage, in accordance with the judgment of the Court of Justice of the European Union (CJEU) in case C-323/17 (People Over Wind).

2 APPROACH

2.1 Guidance Documents

This NIS supporting the licence review at the Churchtown Landfill has been carried out using the following guidance:

- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on *Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities* March 2010.
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government 2009; http://www.npws.ie/en/media/NPWS/Publications/CodesofPractice/AA%20Guidance.pdf
- Managing Natura 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission 2000; http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provision_of_art6_en.pdf
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf
- Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging. http://ec.europa.eu/environment/nature/natura2000/management/docs/guidance_doc.pdf

2.2 Likely Significant Effect

The threshold for a Likely Significant Effect (LSE) is treated as being above a *de minimis* level. A *de minimis* effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex II species present on a European site necessary to ensure their favourable conservation condition. If low level effects on habitats or individuals of species are judged to be in this order of magnitude and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be likely significant effects.

"…the requirement that the effect in question be 'significant' exists in order to lay down a de minimis threshold. Plans or projects that have no appreciable effect on a European site are thereby excluded. If all plans or projects capable of having any effect whatsoever on the site were to be caught by Article 6(3), activities on or near the site would risk being impossible by reason of legislative overkill".

[Paragraphs 46-50 of the Opinion of the Advocate General in the Court of Justice of the European Union case (CJEU) *C-258/11*]

2.3 Mitigation Measures

In relation to mitigation measures, EC (2001) states that *"project and plan proponents are often encouraged to design mitigation measures into their proposals at the outset"*. However, it is important to recognise that the screening assessment should be carried out in the absence of any consideration of mitigation measures that form part of a project or plan and are designed to avoid or reduce the impact of a project or plan on a

Natura 2000 site". This direction in the European Commission's guidance document is unambiguous in that it does not promote the inclusion of mitigation at screening stage.

In April 2018, the CJEU issued a ruling in case C-323/17 (People Over Wind) that Article 6(3) of Directive 92/43/EEC must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

3 PROPOSED DEVELOPMENT

3.1 Summary of the Proposed Development

Donegal County Council submitted a proposal for the restoration of Churchtown Landfill site on 24th January 2014. This was approved by the EPA as a pilot and included the following:

- Re-grading of waste profiles on site.
- A clay cap to a minimum depth of 0.5m with a permeability of 1x10-8 m/s.
- A 300mm layer of topsoil will then be placed over the clay cap to allow for a suitable soil for the plantation of the willow.
- Management of leachate and surface water.
- The use of short rotation coppice willow (SRC willow) on Churchtown Landfill site and using the plants to biofilter the leachate collected.
- Inclusion of an Integrated Constructed Wetland (ICW).

These works required the discharge of treated leachate to the River Finn via two surface water perimeter drains. The works have been undertaken to ensure any significant impact from the discharge of leachate to the River Finn System are reduced. In response, Donegal County Council have undertaken their own NIS, the results of which are summarised below. A review of the licence is required to establish appropriate Emission Limit Values (ELVs) for the proposed discharge to surface water. The EPA undertook an Appropriate Assessment screening and concluded that a Stage 2 Appropriate Assessment was required and directed Donegal County Council to submit a Natura Impact Statement as part of the licence review process. The ELVs have been suggested based on a mass balance assessment of the discharge and the potential to impact on water quality in the River Finn and any nearby waterbodies with which the river is hydraulically connected. The ELVs have been proposed based on the available assimilative capacity in the River Finn at the point of discharge and the maximum load to be discharged under maximum effluent flow conditions.

3.2 Site Location

Churchtown Landfill site is located in the townland of Churchtown, Lifford, Co. Donegal (see Figure 3.1). The site is bounded by the N15 to the northwest and the River Finn to the southeast.

3.3 Design Principles

A series of design principles have underpinned the design evolution of the project. These include:

- Undertaking development proposals using a willow bed and an Integrated Constructed Wetland (ICW) for the Churchtown site, which discharges to perimeter surface water drains. The system is part of a pilot study for the use of biofiltration systems in the treatment of contaminated water.

3.4 Description of Completed Works

A willow plantation and an Integrated Constructed Wetland (ICW) has been installed on top of the landfill. There are two separate ICW systems; ICW Area A and ICW Area B (see Appendix A). Due to the layout and location of the willow bed the volumes of leachate is split between the two ICW areas. The volume of leachate to be treated through each ICW is relative to the treatment area within each ICW system.

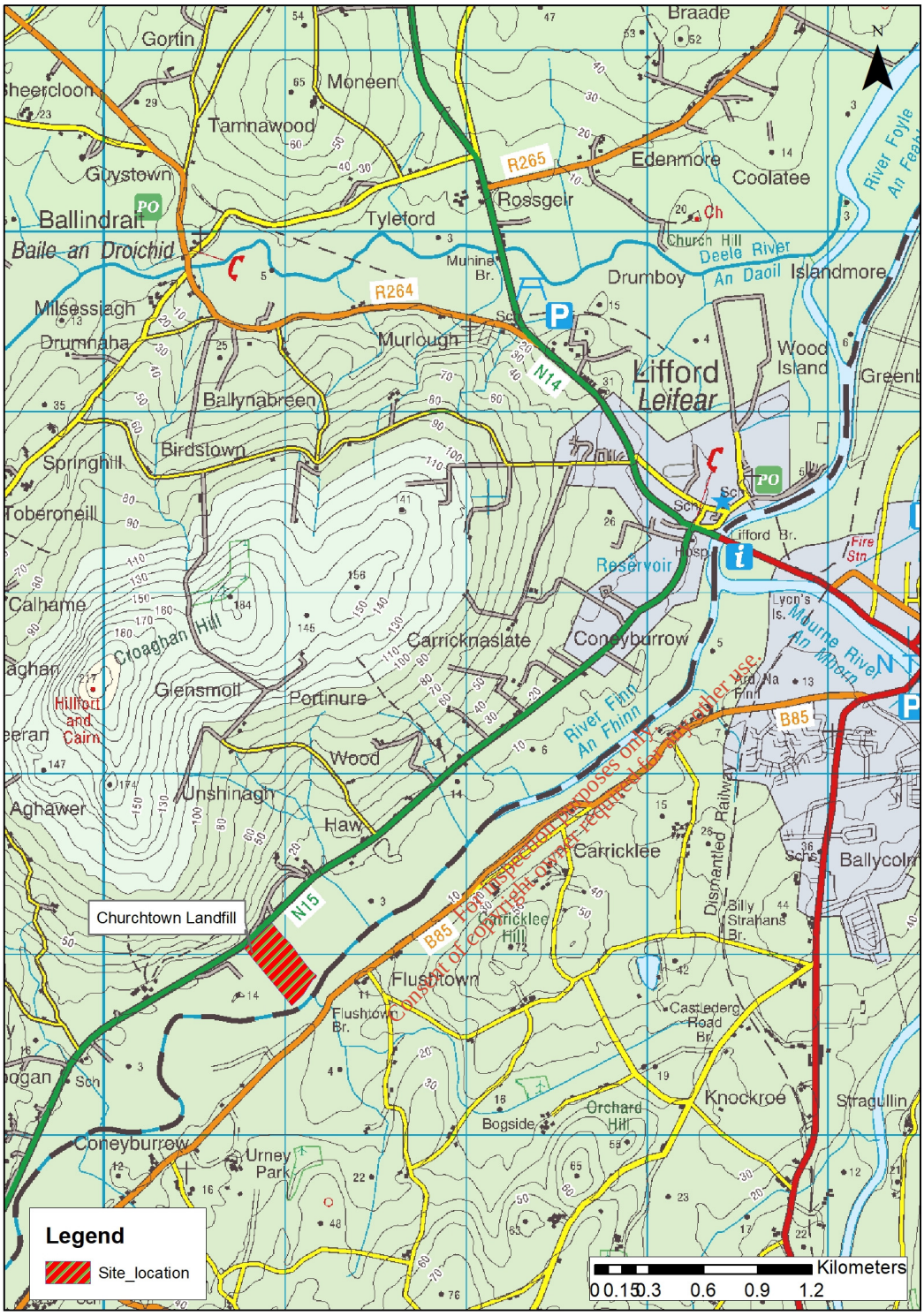

Figure 3-1: Site Location

The use of willow plantation and two separate ICWs, which will discharge to perimeter surface water drains, was deemed most practical for the site, both in terms of cost, construction and maintenance. These wetlands formed part of a pilot study within the ANSWER/WaterPro Project to assess the use of biofiltration systems in the treatment of contaminated water and leachate of which Donegal County Council is a partner.

The WaterPro Project is designed to help meet the aims of this Interreg IVA project in part by using SRC Willow, both on local farms irrigated with wastewater effluent and also to irrigate leachate from Churchtown Landfill Site. This will help provide Biomass for heating/power generation on a cyclical basis.

A Specified Engineering Work (SEW) for these restoration works was submitted and agreed with the Agency in 2014 with works completed in 2016. This waste licence review is to include emission limit values for discharge to surface water.

The outlet from the willow plantation is monitored for ammonia concentrations and flows. If ammonia concentrations these achieve an ELV of 3mg/l theses will discharge to perimeter surface drains. If the levels are greater than this, the effluent is recirculated through the willow and ICW system. It is proposed to discharge flows which have passed through the willow plantation/constructed wetlands to the perimeter surface water drains at two locations (D1 and D2) which ultimately discharge to the River Finn. As per Condition 4.13.1 of the License SW2 and SW5 will be monitored for the following parameters and emission limit values (ELV) as proposed in Table 3.1.

Table 3.1: Proposed Emission Limit Values

Parameter	Limit
pH	6-9
BOD	20 mg/l
Suspended Solids	30 mg/l
Total P (as P)	2 mg/l
Total Ammonia (as N)	3 mg/l

In order to provide an enhanced growth medium for the SRC willow on the site the depth of topsoil in this area above the 0.5m clay cap was increased from 300mm to 450mm. The ICW requires a reduced depth of topsoil of 150mm above the provided 0.5m depth clay cap. All other areas of the cap not being planted with willow (i.e. the perimeter slopes) will also be provided with 150mm topsoil as outlined in the drawings.

Additionally an elevated 1m high bund is to be formed along the eastern, western and southern perimeters of the site to contain the SRC willow. This bund will contain all surface water generated within the SRC willow, direct all discharges to the designated discharge points and prevent runoff from the SRC willow directly entering the River Finn.

3.4.1 Leachate Extraction

Leachate is extracted from 3 pumping stations (Sump 1, 2 and 3) on site. A common 90mm HDPE leachate pumping main has been laid through the full length of the site within an existing site access road as shown on the drawing in Appendix A (See IBR1015/106). Sump 1, 2 and 3 are connected to the 90mm pumping main adjacent to each extraction point.

3.4.2 Treatment System

The Willow Plantation (area is approx. 400m long with widths varying from 50m – 70m) is divided into four zones with two main irrigation feed points each located centrally between Zone 1 and 2 and Zone 3 and 4. The connection to willow plantations is via 80mm leachate pumping main via an isolating valve, a strainer and a Flowmeter. The Willows are planted in double rows.

Each ICW pond is above a 0.5 m clay cap and is bunded using imported subsoil material that provides containment and processing of the influent contaminated waters. Each pond is comprised of a dense vegetation cover and shallow water depth (100-200mm). The base area of each pond is level, with a level difference occurring from one pond to the next. Gravity flow is provided through the system from Pond 1 to the outlet of Pond 5. Each pond is connected by means of 150mm diameter inter-connecting pipes. The pipes are placed at the bottom of the pond floor and water levels can be managed within each pond by adjusting bends on the outlet pipe of each pond.

The irrigation distribution system, flowmeters, flow analyser and motorised valves are contained within 3.0m diameter precast concrete chambers.

3.4.3 Leachate Treatment

The primary treatment option for the extracted leachate is to the willow plantation. Leachate is pumped to the willow plantation before discharge to surface water. If online analysers record concentrations of ammonia in the leachate that are unacceptably elevated, the leachate is pumped into the nearest pumping station chamber (No 1 or 2) to be treated further recirculating via the willow/ICW's before discharging to surface water.

3.4.3.1 Willow Plantation Treatment

The Willow plantation is supplied with leachate on a timed basis (Currently applied 5am and 5pm daily to Zone 1 and 2 and Zone 3 and 4). A number of factors dictate leachate treatment and application rates within Willow Plantation and are as follows:

1. Precipitation
2. Temperature
3. Visual inspection manual intervention.

A rainfall gauge and temperature probe have been installed to enact the controls required of the leachate dosing system to the Willow Plantation zones and ICW's. Temperature, precipitation and trigger levels have been set to allow for activation and deactivation of leachate pumping and dosing to Willow Irrigation zones and ICW's accordingly. The maximum daily flow to date to the willow is 15m^3 to Zone 1 and 2 and 15 m^3 to Zone 3 and 4.

The system mains pressure is maintained to allow for sufficient treatment via the irrigation laterals installation. The two outlets from the Willow plantation are being monitored by Ammonia analysers and flowmeters and recorded on the SCADA system. When any sample reaches a limit of 3 mg/l ammonia, a motorised valve will shut and divert flow via gravity into the nearest pumping station chamber (No1 or 2) for recirculation in the willow/ICWs. This scenario shall continue until the sample has reached acceptable limits. Collected runoff effluent meeting the required parameters is discharged to adjacent surface water drains as shown on the drawings. All values are recorded and trended on the SCADA system. The discharge from the willow plantation is fitted with high level alarms. Flows from each monitoring chamber is recorded and monitored. This includes leachate applied to the treatment zones, treated flows to surface water drains and flows redirected back to the system for re-distribution and additional treatment.

Figure 3-2: View of the willow plantation

3.4.3.2 Integrated Constructed Wetland Treatment (ICWs)

Wetlands, both natural and constructed, have an innate ability to cleanse water through physical, chemical and biological processes. The main treatment processes include:

- Uptake and transformation of contaminants/nutrients by micro-organisms and plants
- Breakdown and transformation of contaminants/pollutants by micro-organisms and plants
- Filtration and chemical precipitation through contact with substrate and plant litter
- Settling of suspended particular matter
- Chemical transformation of pollutants
- Absorption and ion exchange on the surface of plants, sediment, and litter (of particular relevance to the capture and storage of phosphorous)

- Predation and natural die-off of pathogens (e.g. E. coli and Cryptosporidium)

Flow of leachate to ICWs is controlled on the pumping main with an actuated valve within a precast concrete chamber along with flow measurements via flow meter. Flow of leachate to ICWs is via a weir chamber and flow split on a 60/40 percentage basis relative to their areas (60% to the A series ponds and remaining 40% to the B series ponds). The maximum volume of leachate pumped from below the Churchtown landfill to ICW's is c. 50m^3/day.

Where leachate is available over and above the treatment capacity of the willow plantation (either through seasonal increases in leachate generation, wet/frosty weather conditions or manual operator intervention) leachate can be diverted to the ICWs as a secondary alternative. The system also allows the site operator to intervene and permit periodic irrigation of the ICWs when sufficient leachate is available during dry weather which would ordinarily be applied to the willow plantation in order to maintain the ICWs.

The SCADA system monitors all site equipment and runs the entire plant automatically. The leachate pumping main is controlled at different pressures depending on what it is supplying, either ICWs or Willow Plantation irrigation system.

Leachate is monitored at three monitoring wells located within the waste body, designated as L1A, L2A and L3A (see Appendix A, IBR1015/106).

Figure 3-3: View of the ICW system at Pond 1A.

Figure 3-4: ICW Pond 5B in the left centre and the willow plantation Zone 4 in the centre right.

3.4.4 Discharge Rates

Discharge rates from the ICW systems will be variable depending on the volumes to be treated and on climatic conditions. With higher rates of discharge during the winter months and reduced or no discharges during the summer months.

The maximum volume of leachate applied to the willow and ICWs to date is 80 m^3/day. This was monitored by the sampling of the effluent from the system for ammonia to ensure this volume of leachate was treated. Precipitation and potential evapotranspiration (mm) has been taken from Malin Head, Co Donegal. The annual total mean precipitation and potential evapotranspiration averaged per day has been used to calculate the maximum flow (m^3/day) based on the above assumptions. This gives an estimated maximum flow of 136 m^3/day.

This maximum flow rate has been used in the mass balance assessment. As previously stated discharge rates from the willow and ICW systems will be variable depending on the volumes to be treated and on climatic conditions, with higher rates of discharge during the winter months and reduced or no discharges during the summer months. The use of the maximum flow rates in the mass balance assessment will ensure the maximum pollutant loads to the surface water drains are assessed.

4 SCREENING FOR APPROPRIATE ASSESSMENT

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

This screening exercise principally considers European sites (Special Areas of Conservation or SACs and Special Protection Areas or SPAs designated under the Habitats Directive 92/43/EEC.

The proposed development must be screened against those sites for which a pathway of effect can be reasonably established between a receptor and the proposed development.

4.1 Establishing an Impact Pathway

Current guidance (DEHLG, 2010) on the Zone of Influence to be considered during the Screening for AA states the following:

"A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson et al., 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in-combination effects".

As stated above, a buffer of 15km is typically taken as the initial Zone of Influence extending beyond the reach of the footprint of a plan or project, although there may be scientifically appropriate reasons for extending this Zone of Influence further depending on pathways for potential impacts.

The possibility of significant effects is considered in this report using the source-pathway-receptor model. 'Source' is defined as the individual elements of the proposed works that have the potential to affect the identified ecological receptors. 'Pathway' is defined as the means or route by which a source can affect the ecological receptor. 'Ecological receptor' is defined as the qualifying feature of European sites (and for which conservation objectives have been set in the case of SACs or SPAs) being assessed. Each element can exist independently however an effect is created when there is a linkage between the source, pathway and receptor.

This source pathway receptor model has been used to screen the potential for impact on those Natura 2000 sites. Given that the assessment is based on the proposed ELVs for a surface water discharge the 15km distance is considered inadequate to screen all likely significant effects that might impact upon European Sites. This is primarily due to the need to consider the potential for likely significant effects on European Sites with regard to aquatic and water dependent receptors that are hydrologically linked to the reach of the River Finn that receives the discharge from the Churchtown Landfill. Therefore, the Zone of Influence for this project includes all of the hydrologically connected surface water sub catchments which have the potential to impact on a downstream Natura 2000 site.

Figure 6.1 includes illustrates the Natura Network within the Zone of Influence. The relevant sites are:

- River Foyle & Tributaries SAC (UK0030320)
- River Finn SAC (IE 0002301)
- Lough Foyle SPA (IE 004087)
- Lough Foyle SPA (UK9020031)

Table 4.1: Downstream European sites, their qualifying features and relative distances from the proposed development

European Site	Downstream distance	Qualifying features
River Foyle & Tributaries SAC UK0030320	Site situated along the banks of the SAC (See Appendix A)	Qualifying Interests are ranked in the '*Global Status A-C*' category, have conservation objectives set for them and are principally considered within the screening and test of likely significance. (DAERA, 2017). **Annex I habitats that are a primary reason for selection of this site** **3260** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site** **n/a** **Annex II species that are a primary reason for selection of this site** **1106** Atlantic Salmon *Salmo salar*. **Annex II species present as a qualifying feature, but not a primary reason for site selection** **1355** Otter *Lutra* Otter *Lutra* is found throughout the system.
River Finn SAC IE 0002301	Site situated along the banks of the SAC (See Appendix A)	**3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)** Lowland oligotrophic lakes are found at Loughs Finn, Belshade and Derg, as well as in many of the smaller lakes within the site. Lough Derg is a large oligotrophic lake situated north of Pettigo. An extensive area of blanket bogs and conifer plantations make up the lake catchment. Typical species seen at the three lakes include a sparse covering of Shoreweed (*Littorella uniflora*) along the lake shores, Water Lobelia (*Lobelia dortmanna*), the moss *Fontinalis antipyretica,* Bog Pondweed (*Potamogeton polygonifolius*) and Water Horsetail (*Equisetum fluviatile*), with Bulbous Rush (*Juncus bulbosus*) and Broad-leaved Pondweed (*P. natans*) in the margins. On the tidal stretches within the site the main habitats are the river itself, mudflats and the extensive reedbeds that have colonised the former mudflats. The habitats found are typically freshwater in nature. This site comprises almost the entire freshwater element of the River Finn and its tributaries the Corlacky, the Reelan sub-catchment, the Sruhamboy, Elatagh, Cummirk and Glashagh, and also includes Lough Finn, where the river rises. The spawning grounds at the headwaters of the Mourne and Derg Rivers, Loughs Derg and Belshade and the tidal stretch of the Foyle north of Lifford to the border are also part of the site. The Finn and Reelan, rising in the Bluestack Mountains, drain a catchment area of 195 square miles.

European Site	Downstream distance	Qualifying features

4010 Northern Atlantic wet heaths with Erica tetralix

Northern Atlantic wet heaths with Erica tetralix has not been mapped in detail for River Finn SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 187ha, covering 3% of the SAC. Wet heath occurs in association with blanket bog, upland grassland and exposed rock within the SAC. It occupies shallower peats and better drained slopes. It occurs quite widely at Owendoo/Cloghervaddy (Douglas et al., 1990; NPWS internal files).

7130 Blanket bogs

Upland blanket bog occurs throughout much of the upland area of the site along the edges of the river. However, more extensive examples are found at Tullytresna and in the Owendoo/Cloghervaddy bogs. The blanket bog is dominated by Common Cottongrass (*Eriophorum angustifolium*), Deergrass (*Scirpus cespitosus*), Purple Moorgrass (*Molinia caerulea*) and bog mosses (*Sphagnum* spp.). Pool and hummock systems are a feature of the flatter areas, with Heather (*Calluna vulgaris*), mosses (*Racomitrium lanuginosum, Sphagnum capillifolium* and *S. papillosum*), lichens (e.g. *Cladonia portentosa*) and the liverwort *Pleurozia purpurea* occurring abundantly on the hummocks. The scarce bog boss *S. imbricatum* is a component of some hummocks. *Sphagnum magellanicum* is found in wet flats by pools, while *S. cuspidatum* occurs abundantly within the pools themselves.

7140 Transition mires and quaking bogs

Transition mires (or quaking bogs or scraws) occur at several locations, usually at the interface between bog and lake or stream. In Owendoo/Cloghervaddy there are many examples of small lakes south of Belshade. Some of the lakes contain floating scraws of the bog moss *S. recurvum*, Bottle Sedge (*Carex rostrata*), Bog-sedge (*C. limosa*) and Bogbean (*Menyanthes trifoliata*). West of Owendoo River there is an extensive area of scraw with a similar suite of species but in differing abundances. Quaking areas are also associated with blanket bog at Cronamuck and Cronakerny.

At Cronamuck, a small, level flushed area occurs at the base of a slope leading into a flushed stream. Diversity, including diagnostic species, is good.

1106 Salmon Salmo salar

The Finn system is one of Ireland's premier salmon waters. Although the Atlantic Salmon (*Salmo salar*) is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Commercial netting on the Foyle does not begin until June and this gives spring fish a good opportunity to get into the Finn. The Finn is important in an international context in that its populations of spring salmon appear to be stable, while they are declining in many areas of Ireland and Europe.

1355 Otter Lutra

European Site	Downstream distance	Qualifying features
		Is widespread throughout the system.
Lough Foyle SPA (IE 004087) (UK9020031)	Approximately 31.0km from the closest part of the SPA to the site (See Appendix A)	Bar-tailed Godwit *Limosa lapponica*, Bewick's Swan *Cygnus columbianus bewickii*, Cormorant *Phalacrocorax carbo*, Curlew *Numenius arquata*, Dunlin *Calidris alpina*, Eider *Somateria mollissima*, Golden Plover *Pluvialis apricaria*, Great Crested Grebe *Podiceps cristatus*, Greylag Goose *Anser,* Knot *Calidris canutus*, Lapwing *Vanellus*, Light-bellied Brent Goose *Branta bernicla hrota*, Mallard *Anas platyrhynchos*, Oystercatcher *Haematopus ostralegus*, Red-breasted Merganser *Mergus serrator*, Redshank *Tringa totanus*, Shelduck *Tadorna*. Teal *Anas crecca*, Whooper Swan *Cygnus,* Wigeon *Anas penelope*.

4.2 Initial Screening of European Sites within the Zone of Influence

4.2.1.1 River Finn SAC

4.2.1.1.1 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae), qualifying feature is currently deemed at “bad” status. This qualifying features is surface and ground water dependent. It is also moderately sensitive to hydrological change and pollution.

A review of the SSCOs (NPWS, 2017a) for this habitat has found that this habitat is located in the upper catchment at Lough Finn, An Loch Sifneach, Lough Belshade, Loughin Island, Lough Gulladuff and Lough Derg. These locations are significantly upstream of the proposed discharge location and therefore there is no hydrological connectivity to this habitat and therefore there are no likely significant effects and this feature can be screened out of any further assessment.

4.2.1.1.2 Northern Atlantic wet heaths with Erica tetralix

Northern Atlantic wet heaths with Erica tetralix qualifying feature are currently deemed at "bad" status. They are surface and ground water dependent. The feature is moderately sensitive to hydrological change and pollution.

A review of the SSCOs for this habitat show that there will be no likely significant effects as it is upstream and there is no hydrological connection to the discharge point. There are, therefore, no likely significant effects and this feature can be screened out of any further assessment.

4.2.1.1.3 Blanket bogs

The Blanket bogs (priority if active bog) qualifying feature is currently deemed at "bad" status. This feature is surface and groundwater dependent, with medium sensitivity to hydrological change and pollution as well as overgrazing, erosion and accretion.

There is no potential for significant effects to this habitat as the discharge point is downstream of this habitat and not hydrologically connected.

4.2.1.1.4 Transition mires and quaking bogs

Transition mires and quaking bogs qualifying feature are currently deemed at "bad" status. This feature is surface and ground water dependent, with medium sensitivity to hydrological change and pollution.

There are no likely significant effects on this habitat as the discharge is downstream and therefore not hydrologically connected.

4.2.1.1.5 Salmon

Atlantic Salmon are a qualifying feature of the River Finn and River Foyle SACs. They are present throughout the system. The water bodies are salmonid rivers under the Freshwater Fish Directive (FFD) (2006/454/EC).

This species is particularly sensitive to various aquatic pressures, with water quality posing a high threat on the qualifying feature. It is necessary to ensure these waters are achieving a water quality standard that ensures they achieve the conservation objectives for these protected areas. There are numerous threats to the freshwater habitat and vigilance is required to ensure the maintenance of good quality habitat which salmon require to thrive. The salmon population is still low in comparison to previous decades and so, in the absence of a recovery, the Overall Status is assessed as Inadequate.

There is potential for this qualifying feature to be impacted.

4.2.1.1.6 Otter

Otters (*Lutra lutra*) are an Annex II species present as a qualifying feature in the River Finn SAC. It is widespread throughout the system. Otters are a European Protected Species protected under the Habitats Directive. Under the Regulations, it is illegal to deliberately capture, injure or kill a European Protected Species or deliberately disturb a European Protected Species in such a way as is likely to affect its local distribution or abundance; impair its ability to survive, breed, reproduce or care for its young; impair its ability to hibernate or migrate; or deliberately obstruct access to or damage or destroy a resting or breeding site.

The main threats to the otter include habitat destruction (including river drainage and the clearance of bank-side vegetation); pollution, particularly organic pollution resulting in fish kills; and accidental deaths (road traffic and fishing gear).

Although no works are to take place that may impact the physical habitat of the otter, there is a possibility that the water quality may be impacted. This will directly affect the salmon and trout communities, on which the otter primarily depend on as a food supply. Negative affects to these fish communities will thus consequently negatively affect the otter population.

4.2.1.2 River Foyle and Tributaries SAC

4.2.1.2.1 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation is found in waters of relatively unpolluted waters. This qualifying feature is sensitive to changes in water quality/eutrophication and siltation of riverine sediments.

A review of the SSCOs (NIEA, 2017) for this habitat has found that this habitat is located in the lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane. There is no potential for this feature to be impacted as the discharge point is downstream, and therefore has no hydrological link to this habitat.

4.2.1.2.2 Salmon

As above (section 4.2.1.1.5).

4.2.1.2.3 Otter

As above (section 4.2.1.1.6).

4.2.1.3 Lough Foyle SPA

The bird species that are regarded as qualifying interests of the Lough Foyle SPA are listed above (table 4.1). The SPA habitat has the potential to be impacted by deterioration in water quality and pollutants.

There is potential for impact on these qualifying features.

4.3 Habitat Loss

The Churchtown site is located on the banks of a European site (River Finn SAC). The River Finn is a cross border water body and as such the River Foyle and Tributaries SAC is also designated on the Northern Ireland portion of the river channel and therefore transboundary issues are relevant.

There will be no direct impact on the footprint of the SAC and therefore there will be no habitat loss from the River Finn SAC or any of the other European sites listed in Section 4.1 above.

4.4 Water Quality and Habitat Deterioration

The site of the proposed development is located on the banks of the River Finn SAC (IE0002301) and River Foyle and Tributaries SAC (UK0030320). The European sites listed above must be taken into consideration due to their hydrological connection to the development. However only the qualifying features within these European Sites that have the potential to be impacted through a hydrological link to the discharge point will be considered.

A key requirement of the Water Framework Directive is that surface water bodies attain at least good surface water status, requiring both ecological status and chemical status to be at least good, and that there should be no deterioration in existing status. The River Finn and underlying groundwater body are:

- River Finn (UKGBNI1NW010104074)
- Groundwater (IE_NW_G_085)

These water bodies are within the River Finn/ Derg/Foyle Water Management Unit and as illustrated in Table 4.1 the European sites downstream must be taken into consideration in this exercise due to their hydrological connection with the proposed development. Atlantic Salmon are present in both the River Finn and River Foyle.

As noted, the Churchtown site is situated along the banks of the River Finn, a salmonid river.

A hydrogeological risk assessment suggests that the landfill is having a limited impact on the quality of the River Finn in the immediate vicinity of the landfill in its current setup. Based on mid and downstream surface water quality in the River Finn, the extent of the impact is reducing over time with results showing an improvement in trends except for a spike in ammonia and COD concentrations in June.

However the risk cannot be discounted in the absence of more detailed assessment of the impact of the discharge from the SCR Willow plantation and the ICW on water quality and habitat deterioration within the River Finn SAC, River Foyle and Tributaries SAC and Lough Foyle SPA.

4.5 Summary of the Screening Assessment

4.5.1 Habitat Loss

Likely significant effects have been discounted for all European sites.

4.5.2 Water Quality and Habitat Deterioration

The possibility of likely significant Water Quality and Habitat Deterioration effects cannot be discounted for the River Finn SAC and the River Foyle and Tributaries SAC in the absence of mitigation measures and monitoring.

Having regard to the methodology employed and the findings of the screening stage exercise, it is concluded that an appropriate assessment of the implications of the proposed discharge is required.

Likely significant effects can be discounted for a number of significant features of the SACs as they are upstream and not hydrologically connected to the site. These include oligotrophic waters, Northern Atlantic wet heaths, transitional mires and blanket bogs. The screening assessment concluded that the remaining qualifying features which cannot be discounted from the Stage 2 Appropriate Assessment are Atlantic Salmon, Otter and the bird species that represent the qualifying interests within the Lough Foyle SPA, due to potential impact on water quality and aquatic habitat.

The focus of the remainder of this report shall be on the likely significant water quality and aquatic habitat deterioration effects of the proposed development.

5 STAGE 2 APPROPRIATE ASSESSMENT

The possibility of likely significant water quality and habitat deterioration effects cannot be discounted for River Finn and River Foyle and Tributaries SAC in the absence of mitigation measures. Therefore, it is necessary to conduct a Stage 2 Appropriate Assessment.

5.1 River Finn SAC

The conservation objectives for this site are to maintain (or restore where appropriate) each feature in favourable condition. This is achieved by meeting the component objectives (NPWS, 2017a) for each feature:

- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
- Northern Atlantic wet heaths with Erica tetralix
- Blanket bogs
- Transition mires and quaking bogs
- Atlantic Salmon *(Salmo salar)*
- Otter (*Lutra lutra)*

As outlined in Section 4 the key habitats listed above have been screened out of the assessment with only Atlantic Salmon and Otter taken forward to appropriate assessment due to their sensitivity to aquatic pressures and the direct pathway from the source of the pressure to these receptors.

For these qualifying features the main measures featured within the objective requirements relevant to the Churctown Landfill Discharge are to maintain water quality and aquatic habitat at conditions capable of sustaining poor ecological status i.e. an EPA Q Value of 4. In particular, the condition of river channel and substrate and both chemical and biological quality of the water should be maintained or improved to support the composition of communities, existing populations and distribution of populations. It is therefore essential that the discharge from the Churchtown Landfill Site does not compromise water quality and the ability of the Finn River to sustain Atlantic Salmon and Otter at favourable conservation status. The water body is currently rated Q4 good status under the EPA ranking system.

Atlantic Salmon are surface and marine water dependent and are sensitive to hydrological change and pollution, particularly for juveniles and smolts. While the otter population is dependent on fish stocks, primarily salmon and trout, as a food source.

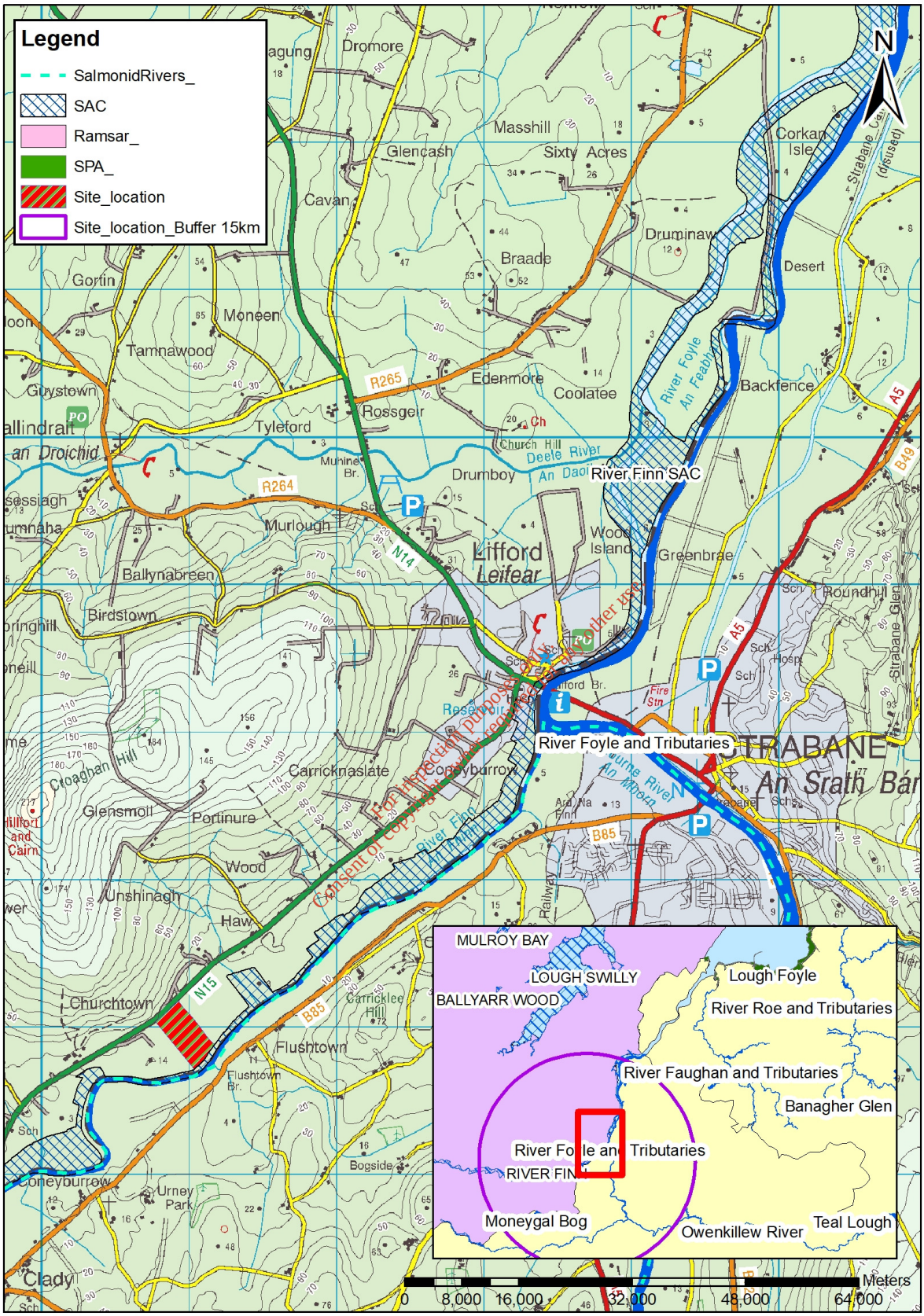

Figure 5-1: SAC location within the vicinity of Churchtown Landfill.

5.2 River Foyle and Tributaries SAC

The conservation objectives for this site are to maintain (or restore where appropriate) each feature in favourable condition. This is achieved by meeting the component objectives (NIEA, 2017) for each feature:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Atlantic Salmon *(Salmo salar)*
- Otter (*Lutra lutra)*

Section 11 of NIEA (2017) lists the main threats, pressures and activities impacting on the site or site features. Water quality is probably the most important single factor for the SAC and ASSI selection features, with both point and diffuse sources of pollution potentially damaging. Achieving these component objectives requires the water quality River Finn and downstream waters not to deteriorate significantly. It is therefore imperative that the discharge from the Churchtown site does not result in a deterioration in the water quality that would represent conditions that were not adequate to sustain good ecological status of the relevant water bodies in the Foyle and Tributaries SAC.

5.3 Lough Foyle SPA

The conservation objectives for this site are to maintain (or restore where appropriate) each feature in favourable condition. This is achieved by meeting the component objectives (NIEA, 2015) for each feature. The included qualifying interests can be seen in Table 4.1.

Section 11 of NIEA (2015) lists the main threats, pressures and activities impacting on the site or site features. Water quality is probably the most important single factor for the SAC and ASSI selection features, with both point and diffuse sources of pollution potentially damaging. Achieving these component objectives requires the water quality River Finn and downstream waters not to deteriorate significantly. It is therefore imperative that the discharge from the Churchtown site does not result in a deterioration in the water quality that would represent conditions that were not adequate to sustain good ecological status of the relevant water bodies in the Foyle and Tributaries SAC and ultimately the Lough Foyle SPA.

5.4 Mass Balance Assessment of the Discharge

5.4.1 Existing Environment

Churchtown Landfill Site is situated on the north bank of the Finn River (EU Water Body Code UKGBNI1NW010104074). Being a cross-border waterbody, this stretch of the Finn is not currently assigned a WFD ecological status by EPA and is subject to further consultation with their NIEA counterparts. NIEA however have assigned a Moderate ecological status to the waterbody as of 2015 based on biological elements of Moderate status for Benthic Invertebrates and Fish. In terms of Priority Substances and Specific Pollutants, only Cypermethrin was not achieving at least Good status conditions.

In addition to its Natura 2000 designations listed above the River Finn is designated as an economically significant salmonid river under the Register of Protected Areas set out in the Water Framework Directive (WFD) (Directive 2000/60/EC).

5.4.2 Assessment of the Impact of the Discharge

As part of the Waste Licence Application to the Environmental Protection Agency (EPA), Leachate Emission Limit Values have been proposed as follows;

Table 5.1 Proposed Emission Limit Values

Parameter	Limit	EQS (95%-ile)
pH	6-9	6-9
BOD	20 mg/l	2.6 mg/l
Suspended Solids	30 mg/l	N/A
Orthophosphate	2 mg/l	0.075 mg/l
Total Ammonia (as N)	3 mg/l	0.14 mg/l

The assimilative capacity is the measure of receiving water's ability to absorb pollutants whilst still maintaining acceptable water quality. In order to determine the assimilative capacity it is necessary to determine the existing water quality status and the acceptable degree to which the existing water quality may be impacted. The assessment of the assimilative capacity provides an indication if a discharge is likely to cause an exceedance of a quality standard, however, it is only indicative and needs to be supported by a mass balance calculation.

Mixing of a discharge with a river is described by the Mass Balance Equation. The mass balance formula calculates the resultant concentration in the receiving water due to a discharge and is the preferred method of determining the impact on the receiving water as it accounts for the volume of flow in the discharge.

The Mass balance formula is shown below:

Mass Balance =T = (FC+fc)/(F+f)

where:

T = resultant concentration of the contaminant of concern downstream of the discharge

F = flow in the receiving water upstream of the discharge (established from existing EPA flow records & hydrometric data were available, or an appropriate hydrological methodology for ungauged catchments)

C = concentration of contaminant of concern in the receiving water upstream of the discharge (calculated from monitoring programme for Churchtown Landfill or existing ambient monitoring from existing WFD monitoring stations and reported on the WFD APP)

f = discharge rate (m^3/s) (taken from the latest AER for each agglomeration)

c = concentration of the contaminant of concern in the discharge (assumed to be the ELV proposed for the discharge as per Table 5.1 or for other parameters the worst case concentration of the parameter from the leachate monitoring)

The impact of a continuous discharge from the leachate treatment system at Churchtown Landfill, at lows flows and average flows are assessed in the context of the receiving water quality and environmental quality standards for orthophosphate as detailed in Schedule 5 of the Surface Water Regulations (S.I. 272 of 2009).

The assimilative capacity was calculated to measure the receiving water body's ability to assimilate the pollutants, based on the above emission limit values, whilst still maintaining an acceptable level of water quality. This measurement is only indicative however and was supported with a Mass Balance calculation to determine the resultant concentration in the receiving water based on the above

emission limit values. The results of these calculations for the receiving waters of the discharge are shown below and an assessment of the impact on the receiving water quality has been made in accordance with the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009), as amended.

Calculations have been applied to those parameters which have been assigned an Environmental Quality Standard (EQS) in the above regulations (S.I. No. 272 of 2009). Whilst Suspended Solids does not have an EQS under the Surface Water Objectives, a limit of 35 mg/l was used, as per the Guidance, "Procedures and Training on the Licensing of Discharges to Surface Waters and to Sewer for Local Authorities (Local Authority Services National Training Group [LASNTG], 2011)".

A calculation for the 'percentage of headroom used', when determining whether or not a licence should be reviewed, is shown below in Tables 5.2 and 5.3. The guidance, "Procedures and Training on the Licensing of Discharges to Surface Waters and to Sewer for Local Authorities" states that if less than 25% of the headroom is used then a review of the licence is not required.

Headroom calculations are as follows:

Headroom = C_{max} – C

Where

Cmax = EQS

C= Background concentration upstream

Percentage headroom utilized (%) = $\frac{(T-C)x100}{Headroom}$

Where **T** is the resultant concentration from the mass balance

The results are summarised in Table 5.2 and Table 5.3 and the percentage of headroom utilized for all Contaminants of potential concern (COPC) is less than 25% therefore supporting the ELVs established under Table 5.1 above and their limited environmental impact.

It should be noted that this assessment of the ELVs are conservative in nature in that the mass balance has been undertaken under the assumption that there is a continuous discharge from the leachate treatment system and this occurs during low flow conditions in the River Finn, i.e. the 95 percentile flow estimates. During low flow conditions it is unlikely that there will be a discharge from the leachate management system and therefore an assessment has also been undertaken using the mean flow in the receiving waters as a more appropriate flow statistic.

The results of these calculations are collated below in **Table 5.2** and **Table 5.3**.

5.4.3 Mass Balance assessment at Low flow (Q95) calculations

The flow estimates upstream of the discharge for the purposes of the mass balance assessment where derived from the OPW Gauging station at Dreenan Bridge on the River Finn. The EPA HydroNet website states that the 95%ile flow at this gauging station is 0.845 m^3/s. This flow has been factor by the additional catchment area between the Dreenan Gauging Station and the Churchtown Landfill site to provide an estimated 95 %ile flow of 1.15 m^3/sec.

Upstream background concentrations were taken from measurements recorded at monitoring point SW6 immediately upstream of the discharge location.

In most cases, where upstream background concentrations were not available or were already in excess of the respective EQS, an adjusted background concentration was used as per the LASNTG guidance. This provides an indication of the likely impact of the discharge based on the assumption that the waterbody is already achieving Good status.

In the case of Ammoniacal Nitrogen, an adjusted background concentration was calculated as a mean of the EPA monitoring results further upstream on the Finn at Castlefin Bridge (Site code - 01F01-1100). In the case of Lead, where the measured background concentration also exceeded the EQS, an adjusted background concentration is derived by halving the Annual Average EQS value.

The proposed ELVs as listed above were used as the maximum allowable discharge concentration in order to provide a conservative assessment. For the metals which are not currently subject to ELVs, the worst-case scenario from the leachate monitoring results was used as the discharge concentration.

Where there is assimilative capacity at the point of discharge in a water course, this does not infer that it is acceptable to allow a discharge to utilise the full amount of this capacity. Other downstream discharges may be relying on the dilution effects of the upstream flows to comply with the water quality standards.

In order to assess this increase in concentration, the headroom (difference in concentration between the background concentration and the EQS Standard) should be calculated and the percentage of this headroom utilized by the increase in concentration is derived. The Guidance states that if the discharge alone will not use >25% of the headroom then the discharge may be permitted.

Based on these calculations it can be seen that none of the parameters will utilise in excess of 25% available headroom, provided that:

- *Upstream concentrations are indicative of good status, and;*
- *Discharge concentrations do not exceed the proposed ELVs*

As such, the discharge will not impact on the environmental quality standards for the various parameters assessed and therefore conditions are considered to be consistent with the achievement of at least good status for the biological elements for the River Finn waterbody, based on the EQS values in the Surface Water Regulations 2009 (as amended). The discharge will therefore not result in a deterioration or prevent the attainment of the required WFD environmental objectives of good ecological status for this water body. This also means that the conservation objectives for the River Finn SAC, the Foyle and Tributaries SAC and Lough Foyle SPA will not be impacted by the discharge given that there will be no impact on the ecological status of the water body and the required conservation objective for Atlantic Salmon is an EPA Q value of 4 which is indicative of good biological conditions and good ecological status.

5.4.4 Mass Balance at Mean flow (Q25) calculations

As mentioned above, the assessment when taking the 95 percentile low flow statistics into consideration is conservative in nature given that during low flow conditions it is unlikely that there will be a discharge from the leachate management system. Therefore the mass balance assessment has also been undertaken using an estimated maximum discharge flow of 136m^3/s (using the rainfall and evapotranspiration data available for Malin Head, as outlined in Section 3.4.4) and an estimate of the mean flows (Q25) in the River Finn derived from the gauging station at Dreenan Bridge as a more appropriate flow statistic. Again the flow duration curve for the Dreenan Gauge was used to derive a 25 percentile flow as an estimate of the mean flows in the River. This was then factored by the additional area to derive an estimated mean flow upstream of Churchtown Landfill of 21.99 m^3/s

When this flow is considered the mass balance assessment indicates that there would be an imperceptible increase in concentrations that would not be detectable, i.e. less than the limit of detection for the parameters considered.

Table 5.2: Assimilative Capacity and Mass Balance calculations for the Finn River receiving waterbody based on 95%ile flows and max. discharge

Contaminant of Potential Concern											
	BOD	Susp. Sols	Ortho-P	Nitrogen - ammoniacal	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
Discharge vol (m3/day)	80	80	80	80	80	80	80	80	80	80	80
Discharge vol. (m3/sec)	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Q95 flow (m3/sec)	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526	1.146211526
U/S Background Conc. (mg/l)	1.433	8.33	0.006	0.028	0.00005	0.0016	0.0024	0.00060	0.00004	0.0007	0.00268
Dilution Factor	1239	1239	1239	1239	1239	1239	1239	1239	1239	1239	1239
EQS - AA (mg/l)	1.5	35	0.035	0.065	0.00008	0.0034	0.005	0.0012	0.00007	0.004	0.008
ELVs (mg/l)	20.000	30	2.000	3.000							
Leachate (worst case)					0.00070	0.0337	0.180	0.0012	0.00127	0.0573	0.017
Assim Capacity	6.635	2641.20	2.872	2.664	0.0030	0.178	0.257	0.059	0.0030	0.327	0.527
Mass Balance assessment											
Resultant Concentration	1.4480	8.3475	0.0076	0.0304	0.0001	0.0016	0.0025	0.0006	0.00004	0.0007	0.0027
% increase	1.05%	0.21%	26.82%	8.57%	1.05%	1.62%	5.97%	0.09%	2.48%	6.53%	0.43%
Headroom calculations											
Headroom available	0.06700	26.67000	0.02900	0.03700	0.00003	0.00180	0.00260	0.00060	0.00003	0.00330	0.00532
% headroom utilised	22.37%	0.07%	5.55%	6.48%	1.75%	1.44%	5.51%	0.09%	3.31%	1.38%	0.22%

**Denotes adjusted background concentration*

Table 5.3: Assimilative Capacity and Mass Balance calculations for the Finn River receiving waterbody based on mean flows and max. discharge

	Contaminant of Potential Concern										
	BOD	Susp. Sols	Ortho-P	Nitrogen (ammoniacal)	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
Discharge vol (m3/day)	80	80	80	80	80	80	80	80	80	80	80
Discharge vol. (m3/sec)	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Q25 flow (m3/sec)	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667	21.99369667
U/S Background Conc. (mg/l)	1.433	8.330	0.006	0.0280	0.00005	0.0016	0.0024	0.0006	0.00004	0.0007	0.00268
Dilution Factor	23754	23754	23754	23754	23754	23754	23754	23754	23754	23754	23754
EQS - AA (mg/l)	1.5	35	0.035	0.065	0.00008	0.0034	0.005	0.0012	0.00007	0.004	0.008
ELVs (mg/l)	20.000	30	2.000	3.000							
Leachate (worst case)					0.00070	0.0337	0.180	0.0012	0.00127	0.0573	0.017
Assim Capacity	127.317	50679.81	55.107	70.309	0.0570	3.420	4.941	1.140	0.0570	6.271	10.109
	Mass Balance assessment										
Resultant Concentration	1.4338	8.3309	0.0061	0.0281	0.0001	0.0016	0.0024	0.0006	0.00004	0.0007	0.0027
% increase	0.05%	0.01%	1.40%	0.45%	0.05%	0.08%	0.31%	0.00%	0.13%	0.34%	0.02%
	Headroom calculations										
Headroom available	0.06700	26.67000	0.02900	0.03700	0.00003	0.00180	0.00260	0.00060	0.00003	0.00330	0.00532
% headroom utilised	1.17%	0.00%	0.29%	0.34%	0.09%	0.07%	0.29%	0.00%	0.17%	0.07%	0.01%

Denotes adjusted background concentration

5.5 Mitigation Measures

The discharge has potential to impact on water quality and hence the conservation objectives for the SAC.

The location of the discharge point is within the River Finn SAC/Foyle and Tributaries SAC. The discharge will include treated leachate and rainfall run-off falling on the site only and will be subject to monitoring to ensure compliance with ELVs as set out in the licence.

The site is bunded to ensure that all surface water generated within the SRC willow will be contained, all discharges will be directed to the designated discharge points and runoff from the SRC willow will be prevented from directly entering the River Finn.

This appropriate assessment relates to the discharge from the landfill site and its potential impact on water quality and the surrounding Natura 2000 sites. As shown by the mass balance assessment, no impact is predicted.

Although the discharge will be to the River Finn SAC/River Foyle and Tributaries SAC, the mass balance assessment shows that no impact will be experienced provided ELVs are met. It should be noted that this assessment is conservative in nature in that the mass balance has been undertaken of the ELVs assuming continuous flow at the maximum discharge rate and low flow conditions in the River Finn, i.e. the 95 percentile flow estimates. During low flow conditions it is unlikely that there will be a discharge from the leachate management system and therefore a more appropriate flow statistic to use in the receiving waters during discharge periods is the mean flows. When this flow is considered the mass balance assessment indicates that there would be an imperceptible increase in concentrations that would not be detectable.

The assessment indicates that there is limited potential for an impact on the integrity of the River Finn SAC/Foyle and Tributaries SAC and therefore the downstream Lough Foyle SPA, to arise as a result of the treated discharge from the Churchtown Landfill site, based on the proposed ELVs. The works have reduced the risk to the SAC from the existing site due to the controlled treatment and discharge of leachate. Furthermore given the extensive additional dilution available in the Foyle System further downstream where the Lough Foyle SPA is located there will be no impact on the downstream Natura 2000 sites.

It is essential that the mitigation in the form of the leachate management system operation and maintenance and the monitoring of the effluent quality and receiving environment are continued to ensure that the system continues to achieve the necessary ELVs.

Therefore, the site represents no risk to the achievement of the conservation objectives of the River Finn SAC/Foyle and Tributaries SAC and the downstream Lough Foyle SPA where hydrological connectivity exists. The works to the site have improved the quality of the discharge to the River Finn at present and will continue to be monitored.

6 CONCLUSION

This NIS has been prepared by RPS on behalf of Donegal County Council in support of the licence review for Churchtown Landfill. The purpose of the report is to document the evaluation and analysis of the potential impact on the conservation objectives of connected Natura 2000 sites and to inform the Appropriate Assessment that the EPA will undertake in reviewing the Licence.

The report was prepared with regards to relevant legislation outlined in Section 1 of this report and methodological guidance outlined in Section 2 of this report.

A screening exercise was completed in Section 4 of this report to determine whether or not Likely Significant Effects on any European site could be discounted as a result of the proposed development.

From the findings of the screening stage exercise, the possibility of likely significant water quality and habitat deterioration effects could not be discounted for River Finn SAC/Foyle and Tributaries SAC and Lough Foyle SPA in the absence of the ongoing leachate management system operation, maintenance and monitoring procedures.

The conservation objectives of the sites concerned were therefore evaluated and analysed as part of the assessment and production of the NIS. Mitigation measures intended to avoid or reduce the harmful effects of the project on the European sites were assessed.

The assessment concludes that no adverse effect upon the integrity of any European site will occur in the presence of the correct monitoring and treatment procedures to ensure the proposed ELVs are achieved.

The likely impacts that will arise from the discharge to the River Finn have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. The main risk is associated with the water quality in the River Finn, which is designated as an SAC (River Finn SAC IE0002301 and the Foyle and Tributaries SAC). Water quality is considered as one of the key indicators of the conservation status of this site. The landfill leachate management system and the proposed ELVs will ensure the water quality in the River Finn will not be compromised and will not prevent the achievement of the conditions required to maintain the key qualifying features of the SACs/SPA at favourable conservation status. The proposed ELVs will also ensure the landfill leachate management system will not prevent the achievement of the assigned WFD objectives for the Finn River waterbody, i.e. good ecological status.

The mass balance assessment indicates that the ELVs proposed for the main contaminants of concern in the discharge under the licence review will not have an impact on the River Finn SAC/Foyle and Tributaries SAC, and as such will not impact other downstream Natura 2000 sites, the Lough Foyle SPA which have a direct hydrological connectivity with the River Finn.

On the basis of these findings, it is concluded that the proposed discharge:

(i) is not directly connected with or necessary to the management of a Natura 2000 site

and

(ii) will not have significant effects on the conservation objectives of the qualifying habitats and species of the River Finn SAC/Foyle and Tributaries SAC provided proposed discharge ELVs are adhered to.

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APPENDIX A

Drawings

Precipitation Discharge Routes

- Precipitation Incident to Zones 1 and 2 flows overland to central Collection drain. Water Quality tested at FMA/C1 and discharged to D1 if quality parameters met. otherwise flow diverted to Sump 1 for re-circulation and re-treatment
- Precipitation Incident to Zones 3 and 4 flows overland to central Collection drain. Water Quality tested at FMB/C2 and discharged to D3 if quality parameters met. otherwise flow diverted to Sump 2 for re-circulation and re-treatment
- Precipitation incident to Ponds 1A-5A flows through ponds to discharge at D4
- Precipitation incident to ponds 1B-5B flows through ponds to discharge at D2

SW1
Pond 1A Receiving Cell
GW3
ICW Break Chamber
L3A
Pond 1A
Pond 1B
Zone 1
Precipitation on side slopes run over ground to perimeter SW drainage channel
Pond 2A
GW4A
Precipitation on side slopes run over ground to perimeter SW drainage channel
LCD 1B
LCD 1A
FMA
Pond 2B
C1
Zone 2
Pond 3A
Discharge to SW Channel from SRC Willow
D1
Sump 1
Pond 3B
Pond 4A
Zone 3
SW7
Discharge to SW Channel from ICW
D4
SW2
Sump 3
L1A
LCD 2A
LCD 2B
Pond 5A
Pond 4B
L2A
Zone 4
SW3
FMB
C2
Pond 5B
Discharge to SW Channel from SRC Willow
Discharge to SW Channel from ICW
D3
D2
GW1
Sump 2
SW4
SW6
SW5

DISCHARGE POINTS			
POINT NUMBER	EASTING	NORTHING	DESCRIPTION
1	230908.077	395942.728	D1
2	231076.621	395754.966	D2
3	231069.698	395759.633	D3
4	231172.265	395896.980	D4

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. Datum: Malin Head Ordnance Datum

- 50mm Ø MDPE Header (Supply) Pipes
- 150mm Ø nb uPVC pipe [between ICW Break chamber and connected to inlets to ICWs]
- 80mm Ø MDPE Header (Supply) Pipes [between 90mm HDPE main and LDC1B/2B]
- 90mm Ø HDPE PE100 Pumping Main
- 50mm Ø MDPE Pumping Main from leachate tower to 90mm HDPE pumping main with 100mm bed and surround
- 150mm Ø HDPE Outfall Pipe [To Drainage Ditch] with 100mm bedding and surround
- Existing 63mm Ø HDPE Outfall Pipe [To Collection Sump]
- Existing Lined French Drain (Runoff Drainage)
- Existing Leachate Toe Drain - Collecting Leachate from beneath landfill cap and discharging to Collection Sump
- Pond Flows
- GW4A — Ground Water Monitoring Boreholes
- Leachate Monitoring Boreholes
- SW2 — Surface Water Monitoring Points
- Sump
- D2 — Discharge Points

rev	amendments	drawn	date

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Project
CHURCHTOWN LICENCE REVIEW
-

Title
LEACHATE SYSTEM FLOW DIRECTION

Drawing Status	Sheet Size	Drawing Scale
PRELIMINARY	A1	1:1000

Drawing Number	Rev
IBR1015/106	-

Project Leader	Drawn By	Date	Initial Review
DD	AMB	Jul-2019	JD