



Clare County Council

Application for waste water discharge licence for Clonroadmore treatment plant

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In accordance with Waste Water Discharge (Authorisation) Regulations,
S.I. 684 of 2007

Section A: Non- technical summary

1. Introduction

Clare County Council is required to make an application to the Environmental Protection Agency (E.P.A) for a licence to discharge treated wastewater from the wastewater treatment plant at Clonroadmore, serving the Ennis town agglomeration, in accordance with Article 5 of the *Wastewater Discharge (Authorisation) Regulations 2007, (S.I No 684 of 2007)*, on or before 14th December 2007. The E. P. A. prepared a standard application form and guidance notes for the completion of this form. The contents of this application follow the format provided by the E.P.A. with the necessary attachments to indicate the quantity and quality of wastewater discharges from the Ennis town agglomeration, and to provide details of the impacts associated with the town's discharges on the receiving waters of the River Fergus. The application was prepared for Clare County Council by Burke Environmental Services.

2. Description of Clonroadmore WWTP catchment

Ennis is the county town of Clare, located on the N18, some 24 miles north of Limerick City and 40 miles south of Galway City. The town is mainly concentrated in an area of low ground, generally below 10mOD, in the lower catchment of the River Fergus, within the tidally affected reaches of the river. Ennis town has experienced steady growth during recent years, with the level of housing development in line with national trends, and due to its proximity to Shannon, Limerick and Galway. The Claureen/Inch River is tributary of the Fergus and joins the Fergus on the Western side of the town. Upstream of this confluence, the Fergus River branches into two parts. The major branch flows through the town centre. The minor branch flows in an easterly direction, rejoining the main river just downstream of the Clonroad bridge.

The topography of the town has shaped the development of the sewerage system into four sub-catchments, namely Tulla Road, Francis Street, Clareabbey and Clarecastle, with each sub-catchment draining to a main pumping station. (See Map 1, Attachment A1). Foul flows from the Tulla Road and Francis Street pumping stations are directed to the Clonroadmore WWTP, via rising mains. Clare Marts discharge approximately 14m³/day of effluent on two/three days per week.

The total existing resident population of the town is approximately 23,500, but it should be noted that numerous older houses in the town are not connected to the foul sewer network. The town is well served by schools, commercial premises, retail outlets, hospitals and small and medium sized industrial enterprises.

3. Description of wastewater treatment works

Clonroadmore wastewater treatment plant (WWTP) provides treatment for the bulk of foul effluent arising in Ennis town. The WWTP is located between the railway line and the River Fergus, with the access road to the plant off the Quin Road and sharing this access with Clare Marts. The original plant on the site was constructed in the early 1970s and expanded over the years to the present treatment capacity of 17,000-population equivalent. (See aerial photograph of the location of the plant, and associated outfall locations, Attachments A2 and A3)

The Clonroadmore plant receives wastewater from two pumping stations, namely the Francis Street pumping station and the Tulla Road pumping station. These stations service two large sub-catchment, which will be referred to hereafter as the Francis Street sub-catchment and Tulla Road sub-catchment (see Attachment B1, for map indicating total area served). Both

pumping stations were fitted with grit/rag removal at their inception, but the equipment is currently being upgraded with conditioning screening units- details of this upgrade will be provided under proposed upgrades in Section 6 of this report.

The WWTP uses an extended aeration activated sludge treatment process. The inlet pipes from Francis Street and Tulla Road pumping stations and Clare Marts feed to a single distribution chamber. Two treatment channels carry wastewater from this area to the aeration stage in the treatment. Each channel is fitted with two adjustable penstocks to control the flow through the treatment works, and the surplus flow to the storm overflow tanks. A venturi flow measurement flume is located on each inflowing treatment channel.

The aeration tanks, each of 2530m³ volume, are fitted with surface aerators, centrally located in each tank. Effluent from the aeration tanks feeds to the final settlement tanks. The settlement tanks constructed on the site in the 1970s consist of rectangular concrete tanks (each 6.1m side length), with sludge collection hoppers. There are no scrapers in these tanks. The settlement tank provided in the 1980s is a circular tank, of 18m internal diameter. The side wall has a graded slope, with a central sludge collection hopper. This tank is fitted with a scraper for sludge removal.

The effluent from the final settlement tanks is directed by gravity outfall to the River Fergus, which is located due East of the treatment works. A site layout map is provided as Attachment B2 and a map indicating the main discharge points to surface water is provided as Attachment B3. The treated wastewater discharge is the primary discharge, and is designated SW1 on the maps accompanying the application.

The distribution channel at the inlet to the WWTP is also connected to two flat-bottomed, storm tanks, with internal diameter of 22.8m x 11.45m. The

tanks provide primary settlement treatment only. Overflow from these units is directed to the River Fergus, with the outfall pipe located approximately 80 metres upstream of the treated wastewater outfall pipe. Given the nature of a combined sewer system, the inflow volumes vary significantly with weather. The overflow pipe discharge is designated as SW2 in the maps accompanying this application. As the treated wastewater discharge pipe from the WWTP is located within 80 metres of the storm tank overflow pipe, the impact of the discharge from the treatment plant is assessed on the basis of the combined loading to waters at this location.

Waste sludge is directed from the central hopper in the settlement tanks to the sludge holding tank. The sludge de-watering building houses a single belt thickener for sludge dewatering and polyelectrolyte tanks. This thickener achieves 18% dry solids in the final product. Sludge is removed off site to Cremins Farm Compost Ltd., Coolaleen, Broadford, Charleville, Co Limerick (Waste Permit Number WPLK 23A). A temporary thermal drying plant was operated on the site in the past, but this unit is no longer in use.

Control of the extended aeration treatment process is important to maintain dissolved oxygen levels in the aeration tanks, regulate the amount of activated sludge in the process (by controlling the amount of return activated sludge), and controlling the amount of activated sludge wasted from the process. In-process monitoring and final effluent monitoring is undertaken on twice monthly basis at the plant, to provide appropriate control of the facility performance. The WWTP is manned by two full time operatives and an environmental technician on a full time basis (Monday to Friday) and a part-time basis at the weekends.

4. Wastewater sources

The domestic, commercial and industrial sources of wastewater were surveyed in 1997, during a water audit survey. The details of this survey are provided as Attachment A4. However, there has been significant additional residential development in the town since this survey. Flow rates and wastewater characteristics vary on a day to day basis (based on varying activities e.g. Clare Marts on Tuesday and Thursday) and on a seasonal basis due to the combined nature of the sewer in the older areas of the collection system. The 1997 survey was cross checked to identify any facility liable to generate substances listed in Annex X of the Water Framework Directive (2000/60/EC) or relevant pollutants listed in Annex VIII of the Water Framework Directive. Monitoring for these substances was undertaken on November 28th 2007, and results on this monitoring will be submitted on their receipt.

The total hydraulic load arriving at the Clonroadmore WWTP was calculated by measurement of dry weather flow on a number of days in November 2007, and this measurement was used to estimate the final population equivalent, based on the average influent BOD values for the period January - October 2007. The estimated flow value arriving at the treatment works is 11,232 litres per day, with an average BOD of 134.5mg O₂/litre. The population equivalent for this loading is 25,189. This approach to estimation of population equivalent is in accordance with the definition provided in the Waste Water Discharge (Authorisation) Regulations, 2007 ("population equivalent" is a measurement of organic biodegradable load and a population equivalent of 1 (1 p.e.) means the organic biodegradable load having a five-day biochemical oxygen demand (BOD₅) of 60g of oxygen per day; the load being calculated on the basis of the maximum average weekly load entering the waste water works during the year, excluding unusual situations such as those due to heavy rain).

Combined storm overflows

The two main pumping stations serving the Francis Street and Tulla Road sub-catchments appear to be designed to provide for 3DWF, with no storm water storage capacity. Surveys on the flow volumes in both sub-catchments were undertaken for the Ennis Main Drainage and Flooding Study in 2002. An additional study of live planning applications was also undertaken to provide projected loadings. This projected loading study is used for this application to indicate the likely dry weather flow volumes handled by both pumping stations. Copies of this study is appended in Attachment C2, indicating the dry weather flow and projected development dry weather flow for both pumping stations. A revised study of the catchments has not been undertaken for this application.

On the basis of the studies undertaken the estimated dry weather flow at Francis Street station is likely to be of the order of 60.6 litres per second. With a 3DWF design of 182 litres per second, this suggests that the station is operating at the design capacity. Significant rainfall events will give rise to storm overflows.

On the basis of studies undertaken the estimated dry weather flow at Tulla Road station is likely to be of the order of 31.5 litres per second. There is no storm water storage capacity at the pumping station and significant rainfall events will give rise to storm overflows. The design capacity of this station appears to be based on 180 litres/sec, which appears to indicate that the system is currently operating within the 6DWF capacity (even though the design was probably based on 3DWF). On this basis the storm overflow for the Tulla Road station is indicated as a storm overflow, rather than a secondary discharge point in the application.

5. Impact of emissions from the Clonroadmore WWTP on River Fergus

The impact of discharges from the Clonroadmore WWTP on the receiving waters of the River Fergus is considered under a number of headings:

- 5.1 Description of receiving waters
- 5.2 Estimation of dilution/assimilative capacity of the receiving waters
- 5.3 Total maximum nutrient load discharging to receiving waters
- 5.4 Monitoring undertaken on receiving waters
- 5.5 Statutory designations of receiving waters
- 5.6 Impact of combined storm overflows to River Fergus

5.1 *Description of receiving waters*

The Fergus is one of the main tributaries of the River Shannon, and is included in the catchment of the Shannon River Basin. The Fergus River rises to the northwest of Corofin village. The river is 59 kilometres long and has a catchment area of 1043 km². The upper reaches of the catchment are primarily well draining agricultural lands. The Clonroadmore WWTP discharge takes place approximately 500 metres upstream of Doora Bridge. Flow in the lower catchment of the Fergus River, in the vicinity of the WWTP discharge is controlled by a tidal barrage, located just upstream of Clarecastle Bridge. The barrage was installed in 1954 to control flooding above Clarecastle. The barrage consists of a number of sluice gates, which open and close with outgoing and incoming tides.

5.2 *Assimilative capacity of receiving waters*

An Foras Forbartha between 1972 and 1977 undertook flow monitoring of the River Fergus in the Ennis town catchment (see Attachment A5. Mean flow values for each month, in m³/sec, is provided in Table 1.

Table 1: River Fergus Flow Data (An Foras Forbartha 1972-77) in m³/sec

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
12.02	19.06	24.81	25.83	23.12	11.83	7.58	5.62	1.42	2.07	3.88	10.93

Estimates of total effluent discharge volumes and associated nutrient loads are used to assess the likely impact of the discharge from the Clonroadmore WWTP on the river water quality in the Fergus.

Based on the low flow rates provided in Table 1 above (June 1.42 m³/day) and the maximum discharge volume recorded (to date) at the waste water treatment plant, (11,232 m³/day), a 10 fold dilution of the discharge is likely to be provided in the receiving waters at lowest flow volumes.

5.3 *Total maximum nutrient load discharging to River Fergus*

Analytical data for the wastewater discharge from the Clonroadmore WWTP is available on a bi-monthly basis for several years, up to and including August 2007. The influent and effluent streams are monitored in the laboratory on the site of the treatment plant for biochemical oxygen demand (BOD), chemical oxygen demand (COD), and suspended solids (SS). Monitoring for total nitrogen (TN) and total phosphorus (TP) is undertaken on a once per month basis, with analysis undertaken at an external laboratory (City Analysts, Limerick). Results up to August 2007 are used for this application.

The volume of *treated* wastewater discharged from the WWTP is recorded daily at the WWTP. No flow monitoring is routinely undertaken on the influent volumes, so that the volume of wastewater discharged from the primary settlement tanks (storm tanks) was estimated. This was undertaken by directing all the influent flow through the treatment channels for 30-minute periods over a number of consecutive dry days. The daily flow records for treated flow at the plant do not indicate significant diurnal variation in flow volumes. The *estimated* total flow, based on the dry weather influent volumes recorded on a number of dates in November 2007 is 11,232

m³/day. As the outfall of treated wastewater from the Clonroadmore plant is located approximately 80 metres downstream of the storm overflow from the plant, the combined loadings of the treated and overflow waste streams is used to assess the impact of the discharge on the receiving waters for biochemical oxygen demand (BOD) chemical oxygen demand (COD), suspended solids (SS) total nitrogen (TN) and total phosphorus (TP), to waters. The nutrient discharge load is synopsised in Table 2, based on estimated flow readings and mean analytical values for the dates presented.

Table 2: Estimated nutrient load from Clonroadmore WWTP to Fergus River

Date	Treated flow (m ³ /day)	Storm overflow (m ³ /day)	BOD Kgs/day	COD Kgs/day	SS Kgs/day	TN Kgs/day	TP Kgs/day
22/02/07	3485	7747	682.3	1351.1	792.5	169.6	22.5
18/04/07	4045	7187	1168.7	2744.3	1920.9	298.7	24.7
14/08/07	2898	8334	599.4	2382.2	1031.2	329.5	54.4

5.4 Monitoring undertaken on receiving waters

Clare County Council undertakes monitoring of the River Fergus under a number of statutory codes, as set out hereunder:

- a) Monitoring in accordance with the *European Communities (Quality of Salmonid Waters) Regulations, S.I. 293 of 1988*- as the Fergus River is designated water under this statute. Results of monitoring at Clonroad Bridge (upstream of the WWTP discharge) and Doora Bridge (downstream of the WWTP discharge) for 2007 are set out in Table 3. All results are expressed in milligrams per litre, unless otherwise indicated. Abbreviations used refer to biochemical oxygen demand (BOD), dissolved oxygen (DO), nitrate (NO₃-N), nitrite (NO₂-N) d molybdate reactive phosphate (MRP) and ammonium (NH₄-N).

Table 3: River Fergus Monitoring (Salmonid Water Regulations)

Date	Station	BOD	DO % sat	NO ₃ -N	NO ₂ -N	MRP	NH ₄ -N
17/01/07	Clonroad	<3	109	1.33	<0.013	0.026	<0.007
	Doora	<3	100	1.19	0.015	0.033	<0.007
14/02/07	Clonroad	<2	121	0.93	<0.013	0.013	0.015
	Doora	<2	118	1.02	0.02	<0.01	0.549
14/03/07	Clonroad	No result	127	0.83	<0.013	<0.009	0.054
	Doora	No result	130	0.88	<0.013	<0.009	0.117
11/04/07	Clonroad	<2	128	0.58	<0.013	<0.019	0.036
	Doora	2	108	0.9	0.014	<0.019	0.166
16/05/07	Clonroad	<2	115	0.35	0.015	0.068	0.024
	Doora	2	100	0.53	0.022	0.066	0.301
12/06/07	Clonroad	1.2	131	0.186	0.006	0.006	0.012
	Doora	2.4	57	0.231	0.023	0.078	0.35
10/07/07	Clonroad	No result	99	0.251	0.006	0.012	0.006
	Doora	No result	89	0.318	0.008	0.03	0.131
Limit values	S.I 293 of 1988	<5	50% > 9 mg/litre	Not defined	<0.05	Not defined	<0.82

The results indicate no breach in the standards prescribed under the Salmonid Regulations in 2007. There is a slight increase in the concentration of ammonium (NH₄-N) and molybdate reactive phosphate (MRP) in the waters, at Doora Bridge, downstream of the discharge from the Clonroadmore WWTP. This bridge is also downstream of the site of the dis-used (unlined) landfill at Doora. The potential contribution from the dis-used landfill is discussed in Section 5.4 (b) hereunder. Ammonium in water can be associated with the breakdown of discharges from sewage treatment works, stormwater overflows, agricultural run off or landfill discharges. Taking account of the high volume of wastewater discharges from the stormwater tanks at the treatment plant, and the volumes of agricultural effluent arriving at the plant on (at least) three days per week, some elevation in ammonium levels in the receiving waters is to be expected. While the increase is evident

in the receiving waters, there is no breach in a standard set under the European Communities (Quality of Salmonid Waters) Regulations. Quality standards for surface waters are likely to be updated in the near future, to provide for compliance with the Water Framework Directive, (2000/60/EC, implemented in Ireland by the Water Policy Regulations, S.I. 722 of 2003). This will provide an integrated approach to the protection and improvement of the ecological status, ecological potential and chemical status of surface waters.

- b) Monitoring in compliance with a waste licence, (WL 031-1) granted to the now dis-used landfill facility at Doora (downstream of the WWTP). The monitoring stations are located at Clonroad Bridge, upstream of WWTP discharge, approximately 50 metres downstream of WWTP discharge, but upstream of potential landfill discharge and at Doora Bridge, downstream of both the WWTP and landfill. Results of this monitoring are set out in Table 4. All results are expressed in milligrams per litre, unless otherwise stated.

The increase in the concentration of ammonium in the river water, downstream of the treatment plant discharge can be identified in these results. A low dissolved oxygen level was recorded on 6th July 2006, during warm weather. The sampling point downstream of the WWTP is located on the riverbank, with mud flats and vegetation, and the mid-river channel is unlikely to experience the low level of dissolved oxygen indicated in this sample. Concentrations of dissolved oxygen in water decrease as the temperature increases. During warm dry weather, the risk of pollution of waters is greatest, with oxygen depletion taking place when a pollutant load enters the waters. Care must be taken during warm weather to reduce the discharge volume from the storm water tanks at the treatment plant, during low tide

Table 4: River Fergus Monitoring (Waste Licence WL031-1)

Date	Station	BO D	DO ppm	NH ₄ - N
04/07/07	Clonroad Bridge, upstream of WWTP	4.8	6.2	0.019
	River bank, downstream of WWTP, upstream of landfill	<2	6.2	<0.013
	Doora Bridge, downstream of WWTP + landfill	2.6	5.2	<0.013
07/02/07	Clonroad Bridge, upstream of WWTP	<2	8.1	0.015
	River bank, downstream of WWTP, upstream of landfill	2	7.4	0.52
06/09/06	Clonroad Bridge, upstream of WWTP	2.4	9.2	0.11
	River bank, downstream of WWTP, upstream of landfill	4	9.4	0.69
	Doora Bridge, downstream of WWTP landfill	4.1	6.7	0.97
06/07/06	Clonroad Bridge, upstream of WWTP	<2	8.0	0.049
	River bank, downstream of WWTP, upstream of landfill (Water temperature during sampling 20.5°C)	<2	3.2	0.824
12/04/06	Clonroad Bridge, upstream of WWTP	<2	9.2	0.03
	River bank, downstream of WWTP, upstream of landfill	<2	8.2	0.19

- c) Biological quality monitoring in accordance with the *Local Government (Water Pollution) Act 1977 Water Quality Standards for Phosphorous Regulations 1998* is undertaken on a national basis by the E.P.A. Clare County Council also commission Conservation Services to undertake more frequent biological monitoring of surface waters in the vicinity of the dis-used landfill, in accordance with WL 031-1. Results of all monitoring between 1988 and 2006 are set out in Table 5. The results are expressed as Q values or biotic indices for the quoted sites, with Q5 representing a pristine, unpolluted watercourse,

and Q1 representing a grossly polluted watercourse. The sampling method is based on kick sampling for macro-invertebrates. Biological sampling of the sites downstream of the Clonroadmore WWTP and at Doora Bridge were sampled by boat. The ratings assigned to these sites are described as “tentative”, due to the sampling methodology, the occasional (twice-daily) saline nature of the waters and the mud substrate.

The quality ratings assigned to the River Fergus show no discernible difference in water quality at the monitoring stations upstream and downstream of the discharge from the treatment plant. There is evidence of deterioration in water quality in the River Fergus upstream of the Ennis town catchment in recent years (see Drehidnagower results in Table 5), and this trend (if not reversed) will limit the assimilative capacity of these waters.

Table 5: Biological monitoring on Fergus river stations.

Site name	Sampling undertaken in Summer of year indicated					
	1988	1991	1996	1998	2001	2006
Clonroad Bridge	4	4	3-4	3-4	3-4	3
Drehidnagower	4	4	4	4	4	3-4
Corrovorrin Bridge		3	3	2-3	3	3
Claureen Bridge	4	4	4	4	4	3
	Sampling undertaken in Summer of year indicated					
Year of testing	2002	2003	2004	2005	2006	2007
SW5 ¹	3	3	3	3	3	3
Doora Bridge	3	3	3	3	3	3

Note 1: Site downstream of WWTP, upstream of landfill

- d) The E.P.A has published monitoring data for the Shannon and Fergus estuaries, in the “Water Quality in Ireland 2001-2003” publication. Extracts referring to the Fergus estuary from this publication are provided in Attachment A6. Salinity values determine the acceptable levels of dissolved

inorganic nitrogen (sum of nitrate, nitrite and ammonium) and molybdate reactive phosphate (MRP) to prevent nutrient enrichment in partially saline waters. Using these limit values (calculation of limit values is provided in the EPA report), the lower Fergus River is compliant with limits for dissolved inorganic nitrogen and MRP, and is deemed unpolluted. Using these limit values for dissolved inorganic nitrogen and MRP, the Fergus Estuary is deemed intermediate status .

The monitoring programs described provide a good overview of the water quality status in the River Fergus, both upstream and downstream of the WWTP discharge. In conclusion, there is no indication of deterioration in biological quality status of the Fergus River downstream of the discharge from the treatment plant. There are already signs of enrichment in the river waters at Drehidnagower (Fergus River) and Claureen (Claureen/Inch River) –both upstream of the town, which reduces the assimilative capacity of the river for any discharges from the urban area. There is a discernible increase in ammoniacal nitrogen in the river water downstream of the town catchment, which may be exacerbated during low flow periods. The impact of tidal flows reduces the overall impact of low flows in the river, in the vicinity of the wastewater treatment plant outfall.

5.5 Statutory designations of River Fergus

There is no downstream abstraction of water for potable supplies or for agricultural purposes. The river waters are brackish and unsuitable for abstraction at any point downstream of the discharge from the wastewater treatment plant. There are three other discharges downstream of the Clonroadmore WWTP discharge- Clareabbey and Clarecastle (both will be subject to separate applications for licensing under the *Wastewater Discharge (Authorisation) Regulations 2007, (S.I No 684 of 2007)* and Roche Ireland Ltd discharge. The discharge from the Roche plant is licensed by the

Environmental Protection Agency, Integrated Pollution Control Licence (Revised in 2001) - Licence Register No 547

The Fergus Estuary, downstream of the Clarecastle barrage forms part of the estuarine complex named "River Shannon and River Fergus Estuaries Special Protection Area, Site Code 004077", designated under *The European Communities (Conservation of Wild Birds) (Amendment) Regulations 1997*. The site is an important coastal wetland site for wintering waterfowl, with several significant populations of wild birds over wintering at the site (See Attachment A7).

The main channel of the River Fergus is designated "salmonid" water, under the *European Communities (Quality of Salmonid Waters) Regulations, S.I. 293 of 1988*. Breaches in limit values set in these regulations have not been identified in 2007. Details of previous breaches in limit values for nitrite (NO₂) are provided in the extract from the EPA publication "Water Quality in Ireland 2001-2003" (Attachment A6)

5.6 Impact of combined storm overflows to River Fergus

Two combined storm overflows are located in the Ennis town catchment, associated with the main pumping stations serving the Francis Street and Tulla Road sub-catchments. During prolonged wet weather, the configuration at these pumping stations is such that there is surcharging in the upstream sewer, resulting in the overflow of untreated combined storm and wastewater to the river. The discharges from the Francis Street Pumping Station have been the subject of complaint from adjacent residents. Details of these complaints are included in Attachment B11 of this application, together with hours of operation of the storm overflow pumps for the period January-August 2007. No overflow was observed between November 9th-28th 2007, during the preparation of this application.

Discharges from the Tulla Road pumping station also take place, but these discharges take place adjacent to the railway bridge and are not visible. No complaints have been recorded in relation to these discharges.

Monitoring of the Fergus River, downstream of the Francis Street pumping station, takes place at Clonroad Bridge. Details of physico-chemical and biological monitoring of this station, and comments on the results are included in Section 5.4 (b) above.

6. Proposed technology for preventing or reducing emissions from WWTP

The proposals for upgrading of the wastewater treatment facilities for the Ennis town catchment and the associated pumping stations, to cater for the existing and projected loading arising in the agglomeration are set out under the following headings:

- 6.1 Short-medium term measures to address infrastructural deficiencies
- 6.2 Long term measures to address infrastructural deficiencies
- 6.3 Short and long term measures to address pumping facilities
- 6.4 Consolidation of wastewater treatment works for Ennis and environs at new wastewater treatment facility

6.1 *Short-medium term measures to address infrastructural deficiencies*

The original wastewater treatment plant on the Clonroadmore site was constructed in the early 1970s and expanded over the years to the present treatment capacity of 17,000-population equivalent. The flow measurements presenting during the monitoring period (mid-November 2007) show daily discharge values of the order of 12,000 cubic metres, with an associated mean B.O.D loading of 134.5 mg/litre (based on 2007 influent load monitoring). Incidental monitoring of the receiving waters shows that the impact of the discharge is likely to be most significant during low flow periods in these waters, and at low tide levels. The discharge location is impacted by tidal

events, which limits the risk of significant pollution events. Taking account of the projected re-location of the treatment facility- (described under Section 6.2) - it is not considered that the existing facility would merit major investment. Short term, low cost measures could be taken to reduce the impact of the discharge and provide for reduction in the level of ammoniacal nitrogen and phosphate in the final discharge. These measures include

- Reduction of storm overflow volumes, by directing an increased loading through the secondary treatment unit. This requires careful management, to prevent sludge overflow. It is estimated that approximately 5000 cubic metres per day could be treated via the aeration system on the site, without detrimental impact arising in the system.
- Direction of flow through the secondary treatment system during hours of low flow levels in the river, coincident with low tides. This would reduce the risk period for the receiving waters, associated with the storm overflow discharge at these times. This would probably require the full flow through the WWTP for a period of 2 hours, at least once per day.
- Improved inlet flow control and screening

These short term measures will be required to meet the needs of the Ennis town development over a period of 5 years, pending the construction of a new treatment works.

6.2 *Long term measures to address existing infrastructural deficiencies*

Section 5 of this report dealt with the existing flows from the Clonroadmore WWTP, and the associated nutrient loading. The impact on the receiving waters was discussed in Section 5. The existing discharge volumes and associated nutrient loads present a limited risk of pollution to water quality in the Fergus River. Taking account of the projected increase in the population of the agglomeration, the typical cost of nutrient reduction in wastewater treatment plants, and the land footprint available for expansion of the

Clonroadmore plant- the proposal is to provide a new 50,000 capacity treatment works at the site of the existing Clareabbey waste water treatment plant. The site for the proposed treatment works has already been acquired by the Council. A brief to facilitate the appointment of consultants- proceeding to the full design stage- is currently being considered by the Department of Environment, Heritage and Local Government (DoEHLG). A preliminary report on the scheme was already approved by the DoEHLG. The time frame for full completion of the design is likely to be towards the end of 2008. This will require the approval of the Do EHLG and a further tendering process for appointment of contractors . A completion date for the upgraded works is likely to be in 2012.

The Fergus River upstream of the Clarecastle barrage will not provide adequate assimilative capacity for the treated effluent from a 50,000 capacity treatment plant. Studies have been undertaken on the Upper Fergus Estuary , downstream of the Clarecastle barrage. A 2D hydrodynamic model was constructed for the Hydro Environmental Ltd study "Fergus Estuary Water Quality Model Study- Outfall Site Selection" was assembled in 2002. This predictive model was used to assess a range of options for discharge of treated wastewater from the Ennis agglomeration. The model considered a B.O.D load from 50,000 population equivalent, (@ 25mg/litre) providing 281 kgs/day to the Fergus estuary, discharged via a diffuser arrangement. This load combined with the Roche Ireland Ltd load of 200 kgs/day would be within the assimilative capacity of the estuary, which is thought to be circa 500 kgs/day. It was further considered that the Fergus estuary would be able to assimilate the total nitrogen load from the 50,000-population equivalent (circa 115 kgs/day). Phosphorus loading was not considered in this exercise due to the tidal nature of the estuary.

6.2 *Short and long term measures to address pumping facilities*

The existing combined foul sewer network comprises four separate sub-catchments in the Ennis catchment, namely Francis Street, Tulla Road, Clareabbey and Clarecastle. Of these only Francis Street and Tulla Road are the subject of this application. Tulla Road and Francis Street pumping stations deliver wastewater to the Clonroadmore plant by rising main. These pumping stations were constructed in the early 1970s.

Francis Street Pumping Station: The pumping station accommodates foul and storm water from the Francis Street sub-catchment (see Attachment A1). A total of 7 pumps are installed in the station. Three pumps (two duty and one standby) deal with foul flows and four pumps (three duty and one standby) deal with storm flows. The foul pumps transfer wastewater to the Clonroadmore WWTP. The storm pumps only operate when the combined foul and storm loads entering the pumping station cannot be fully catered for by the foul pumps. Storm overflow is directed to the Fergus River. A mechanically raked screen protects the pumps at Francis Street pumping station. The grit trap originally installed is no longer functional. There is a high level emergency overflow located immediately upstream of the screen, and this overflows by gravity to the River Fergus. There is also a pumped overflow from the overflow chamber to the River Fergus. Flow monitoring was installed in late 2006 at the pumping station to monitor flows to the Clonroadmore WWTP. The pumping station is subject to daily inspection, recording of pump flows, and, general maintenance.

Records of hours of operation of storm overflow pumps for the period January –August 2007 are included in Attachment B11 to this application. Records of pumping hours for storm water pumps present a reasonable indication of the flow volumes discharged to the river during heavy storm flows. The storm pumping facility is only used to deal with significant storm

flow volumes, or during power outages to prevent flooding of the pumping station.

In the short term (early 2008), the pumping station will be equipped with new control panels and a conditioning screening unit. This screening removes and shreds rags in the system. The shredded rags will be pressed and landfilled, with eluate being returned to the wastewater collection system.

In the long term (together with the provision of the new treatment facility) Francis Street pumping station will be re-equipped and re-designed with the full upgrading of the sewer network. The sewer collection infrastructure will be upgraded to provide for increased sewer pipe sizes and separation of foul and storm flow in a number of areas. This will reduce surcharging on the pumping station and very significantly reduce the frequency of storm overflows at the station. The storm pumps will be of sufficient size to cater for a sufficiently large flood return period event without causing excess surcharging of the upstream system.

Tulla Road Pumping Station: This pumping station is located to the east of the town centre behind the Fergus Lawn Housing Estate. It was constructed in the mid 1970s and serves the northern area of Ennis receiving both combined and foul flows. A new conditioning screening unit is installed at the site. This removes and shreds rags in the system. The shredded rags are be pressed and landfilled, with eluate being returned to the wastewater collection system. The station is subject to daily inspection, record keeping and maintenance.

Stormwater storage is not provided at the pumping station and there are periodic overflows to the river. The storm overflow is located adjacent to the railway bridge, just downstream of Clonroad Bridge. The Fergus Minor joins the river below this point. Access to the river downstream of the discharge is

difficult, and no observation was made of discharges from this location during the preparation of the licence application.

The sewer network, the operation of the treatment plant and the assimilative capacity of the Fergus River were reviewed in 2000 during the *Ennis Main Drainage & Flooding Study*. The design flows for the upgraded sewer network are set out in the Ennis/Clarecastle Main Drainage Preliminary Report.

7. Measures planned to monitor emissions into the environment

Provisions for monitoring emissions from the wastewater treatment plant are in place at the Clonroadmore WWTP. A full time laboratory technician is employed at the treatment plant. Monitoring of influent and effluent waste water streams, and receiving waters is undertaken on a bi-monthly basis for the parameters biochemical oxygen demand (BOD), chemical oxygen demand (COD) and suspended solids (SS). Total nitrogen (TN) and total phosphorus (TP) measurements are undertaken on the influent and effluent streams on a monthly basis. Methods of analysis and sampling procedures are provided in Attachment E 2 of this application.

Sampling is currently undertaken as grab samples, but it is anticipated that composite samplers will be used on all influent and effluent streams in the near future.

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