MONAGHAN COUNTY COUNCIL

WASTE WATER DISCHARGE LICENCE REGISTER NUMBER: D0062 AGGLOMERATION: Carrickmacross Town ANNUAL ENVIRONMENTAL REPORT 1st JANUARY 2011 - 31st DECEMBER 2011

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Carrickmacross Waste Water Treatment Plant – Annual Environmental Report 2011

Document Amendment Record

Client: Monaghan County Council
Plant: Carrickmacross Waste Water Treatment Plant
Title: Annual Environmental Report 2011

Ref No. : D0062

DATE	Issue Purpose:	originated	Checked:	Authorised:
January 2012	A Document for Submission:	S. Mallon A.E.	M. Johnston S.E.E.	M. Murray S.E./D. Fallon D.O.S.
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Monaghan County Council Water Services Section
Annual Environmental Report 2011

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Section 1. Introduction & background to 2011 AER

1.1 Introduction.

This is the first Annual Environmental Report (AER) for Carrickmacross Town WasteWater Treatment Plant.

The Environmental Protection Agency granted a Waste Water Discharge Licence (Register No. D0062) in respect of the agglomeration named, to Monaghan County Council on the 8th November 2011.

The purpose of this Annual Environmental Report (AER) is to provide a summary of activities relevant to the discharges from 1st January 2011 to the 31st December 2011 as required by Condition 6.8. The Annual Environmental Report (AER) for Carrickmacross Agglomeration includes the information specified in Schedule D of the Wastewater Discharge Licence D0062.

The AER content and has been prepared in accordance with the Environmental Protection Agency (EPA) publications: -
"Guidance on the Preparation & Submission of the Annual Environmental Report (AER) for Waste Water Discharge Licences for 2011"
And ……..
'A Step-by-Step Guide to reporting by EPA licensed facilities of AER/PRTR Emissions Data and the Annual Environmental Report'.

1.2 Description of Wastewater Treatment Works

Carrickmacross town is a medium sized town located in the south of County Monaghan. The Waste Water treatment plant is located at a site adjacent to the Ardee Road in Carrickmacross town. The Waste Water Works comprises of a gravity collection system with a high dependency on pumping stations due to the topography of the catchment area and a Waste Water Treatment Works with a design capacity of 12,150 P.E. The current load is approximately 12,144 P.E. (based on current flow and BOD loading). The Carrickmacross treatment plant's load has greatly decreased over the last few years, the plant was treating P.E. loads up to 23,000 in 2008, with some loads in excess of this figure on occasion, due to industrial input. The main reason for the reduced loading into the plant over the past few years is that an industrial food company has installed their own treatment facilities on site in the town, which greatly decreased the BOD loading into the Carrickmacross plant. Also, the current economic downturn with business closures and unemployment affecting the town, would also explain the decrease in loading into the plant. The plant provides secondary and tertiary treatment with nutrient removal (phosphorus reduction) for the effluent. The Waste Water Treatment Plant (WWTP) which provides treatment for a design load of 12,150 population equivalent comprises aeration by mechanical aerators, phosphorus removal (Ferric dosing) followed by secondary settlement and clarification and rapid

gravity sand filters. Sludge dewatering is provided by thickening the sludge in a picket fence thickener followed by dewatering on a sludge belt presses. Final effluent was treated to standards in accordance with the Urban Waste Water Regulations (UWWTR) 2001 in 2011. From 2012, final effluent will be treated to standards in accordance with schedule B of the granted discharge licence, granted in November 2011.

1.3 Brief summary of monitoring results

For the year 2011, the treated effluent had an average BOD concentration of 3.5mg/l and average suspended solids concentration of 5.5mg/l. Average concentrations of nutrients are as follows; Total Phosphorus 1.3mg/l (P) and Total Nitrogen 9.8mg/l (N), (refer table 2, appendix 1) the plant is therefore operating efficiently treating effluent in accordance with the UWWTR's 2001 ELV's as required. There were no exceedances of emission limit values (ELV's)/incidents throughout the year as outlined in table 2, appendix 1 attached.

The outfall from the Carrickmacross Waste Water Plant discharges to the River Proules at National Grid Reference 284624E 302833N in the Town land of Magheross, Carrickmacross, Co Monaghan. The associated Waste Water Treatment Plant is located at 284555E 302802N also in the town land Magheross, Carrickmacross, Co Monaghan.
The River Proules flows from the primary discharge of the WWTP downstream approximately 600m and into Lough Naglack, and flows out as a river for approximately 600m and into Monalty Lough. The River Proules is identified as sensitive water in terms of the Urban Waste Water Treatment Regulations 2001 from downstream of the Carrickmacross sewage outfall, to confluence with River Glyde, Monalty Lough is also designated as sensitive under these Regulations. It is not a designated Salmonid water (under the European Communities (Quality of Salmonid Waters) Regulations, 1988) nor designated as an SPA, SAC or NHA.
The river Proules is in the Neagh Bann river basin district with overall status classified as 'Poor'and at risk of not meeting good status by 2015, with overall objective to restore it's status by 2021. The 'point risk source' and potential for impact from the Carrickmacross WWTP discharge on the river is categorised as '2b – not at risk' and the combined storm overflows (CSOs) categorised as '1b – probably at risk' therefore the CSOs are impacting on the poor river quality status, (ref: WFD Ireland maps/website & reports.). This data for the CSOs and WWTP discharge relates to the years pre 2008, the WWTP would have been operating over the design P.E. of the plant at that time and the CSOs would have been in operation more frequently due to the overload on the plant at that time. Since then, as stated in section 1.2, the loading into the plant has been greatly reduced and it is operating within it's design P.E.. Also there are no exceedances of the ELV's in 2011. Major upgrading on the entire collection network for the WWTP commenced in 2008 and was completed for Carrickmacross in 2011, this contract consisted of the upgrading and remediation of sewers within the existing network area resulting in separation

of flows (combined to separate systems) in the town centre area. Ten no. CSOs have been decommissioned on the network, with one remaining (SW2) at the treatment plant site from the storm holding tank. Six new pumping stations were provided on the network.
All of the upgrading works have greatly reduced the discharges to the River Proules as there is now only one storm water overflow remaining from a storm holding tank at the WWTP site, this, combined with the primary discharge to the river being within the emission limit standards should greatly reduce the impact of the Carrickmacross WWTP on the status of the River Proules.

Monaghan County Council's upstream monitoring results for 2011 (refer table 4, appendix 1) indicate relatively good quality water in the river with average BOD levels at 3.3mg/l, average total Phosphorus levels at 1.0mg/l and average ammonia level at 0.94mg/l. The downstream monitoring results (refer table 5, appendix 1) indicate that the discharge is being assimilated into the river without deteriorating the existing water quality significantly, with similar results of average BOD levels at 3.2mg/l, average total Phosphorus levels at 1.0mg/l and average ammonia level at 1.28mg/l.

1.4 Specified Improvement works

Under Schedule A3 of the licence, *'Discharges to be discontinued',* Storm water overflows SW3-SW12 discharging into River Proules and Lisanisk Lake should have ceased by 31 December 2011. As outlined previously in section 1.4, these ten CSOs have been decommissioned as part of the major upgrade contract completed in 2011.
Under Schedule C of the licence, *'Specified Improvement Programme',* there are major advance works outlined for the WWTP. The completion date specified for these works is 1st January 2015. These works are with the DOEHLG for approval and funding under Contract 3 for Carrickmacross, 'Treatment Plant Upgrade and Outfall' which provides for the construction of the following infrastructure at the existing wastewater treatment plant:

- Inlet Pumping Station
- Stormwater Holding Facility
- Inlet Works
- Final Effluent Pumping Station
- 400mm diameter final effluent outfall

The estimated cost of Contract No. 3 is € 5.5M. Approval of the Contract Documents was deferred by the Department of the Environment, Community and Local Government in May 2011 subject to further clarification and amendment of Monaghan County Council's Contract Documents and associated Water Pricing Report.

Section 2. Monitoring Reports Summary

2.1 Summary report on monthly influent monitoring

Monaghan County Council's summary on influent monitoring for Carrickmacross WWTP is tabulated in table 2.1 attached in appendix 1. As required under condition 4.15 of the licence, monthly monitoring of the influent stream to the WWTP for BOD, COD, Suspended Solids, Total Nitrogen and Total Phosphorus measuring mass loadings and removal efficiencies has been calculated and tabulated in the aforementioned table. The removal efficiencies for BOD, COD and SS within the treatment plant are adequate achieving averages over 95% for the parameters. There are 2 results considered erroneous for Total Nitrogen influent to the plant for the dates 16/02/2011 & 28/04/2011 respectively as the values are too low for influent wastewater. The removal efficiencies for Total Nitrogen and Total Phosphorus are generally adequate achieving up to 95% removal within the treatment plant, there are a two low percentage reduction results for both Total Phosphorus and Total Nitrogen, one in July, which can be attributed to the replacement of sand media in the rapid gravity filters at that time and one in October which can be attributed to a severe storm that occurred that week, this was due to the extreme inclement weather at that time, with a storm return period of 1 in 125 years reported by the Met Office for that period of rainfall.

2.2 Discharges from the agglomeration

A summary presentation of monitoring results for the primary discharge (National Grid Reference 284624E 302833N) is tabulated in table 2 attached in appendix 1. The ELV's where applicable are included in the heading columns in accordance with the Urban Waste Water Regulations (UWWTR) 2001 for 2011. From 2012, final effluent will be treated to standards in accordance with schedule B of the granted discharge licence, granted in November 2011.
There were 12 sample analysis carried out in 2011 for the effluent.
There was one exceedance for Total Nitrogen at 16.38mg/l on 31/03/11 and one exceedance for Total Phosphorus on 28/04/11 at 2.4mg/l which under the fifth schedule, part 4 (c) of the UWWR's 2001 are not incidents, as the annual mean of the samples conforms. From analysis of the effluent, the Carrickmacross WWTP is operating efficiently with no reportable incidents for 2011.

2.3 Ambient monitoring summary

A summary presentation of the ambient monitoring results for the upstream (National grid reference 284561E 302882N) and downstream (National grid reference 284719E 302758N) receiving waters is tabulated in tables 4 and 5 attached in appendix 1. There were 12 sample analyses carried out in 2011 for the ambient monitoring. The river Proules is identified as sensitive water in terms of the Urban Waste Water Treatment Regulations 2001 from

downstream of the Carrickmacross sewage outfall, to confluence with River Glyde. It is not a designated Salmonid water (under the European Communities (Quality of Salmonid Waters) Regulations, 1988), nor designated as an SPA, SAC or NHA. The impact of the discharge from the agglomeration on the river Proules is assessed with regard to the Environmental Quality Standards (EQS), (Surface Water Regulations 2009) for BOD and total Ammonia in the following calculations:

Assimilative Capacity of Receiving Water:
There are no active OPW monitoring stations near the Proules River in Carrickmacross, hence the OPW 'estimation of Flow Duration Curve for ungauged catchment' figures are used for this section of river. The reference name given to this section of river by the EPA for estimation purposes is the Longfield River (284759E 302748N). The 95-percentile flow is estimated at a figure of 0.037m3/s by the EPA and is used in these calculations. The river Proules's overall status is classified as poor and at risk of not meeting good status by 2015, with overall objective to restore it to good status by 2021.
The assessment has been undertaken on the basis of an average discharge flow to the receiving water from the Wastewater Treatment Plant and the measured average upstream BOD and Total Ammonia concentrations from Monaghan County Council 2011 results.

BOD Assimilative Capacity

95-percentile Flow Conditions

The BOD assimilative capacity of the river under 95-percentile flow conditions is calculated by:

AC = $(C_{max} - C_{back}) \times 86.4 \times F$

where,

AC = Assimilative capacity
$\mathbf{C_{max}}$ = maximum permissible concentration (EQS) in the river (mg/l) (in this case taken as a maximum of 2.6mg/l) (SW Reg's 2009 – good status (use good status as river is poor status))
$\mathbf{C_{back}}$ = background upstream concentration (mg/l) (3.3mg/l – M.C.C. Upstream 2011 data)
Use adjusted background concentration as measured background conc. Exceeds EQS: ((2.6-2.2)/2)+2.2=**2.4mg/l**
86.4 = constant to correct units to kg/day
F = flow in the river (m^3/s) 95%ile flow (0.037m^3/s or 3,196,800l/d)

Therefore,

AC = (2.6-2.4) x 86.4 x 0.037

AC = 0.64kg/day

Total Amount Discharge to River:

With an average effluent discharge volume of 1850m³/day, and average BOD 3.5mg/l (refer table 2, appendix 1), the total amount of BOD discharged to the Proules River:

(1850,000l/day x 3.5mg/l)/1,000,000 (mg to Kg) = **6.47kg/day**

The Mass balance formula is used to calculate the **resulting BOD concentration in the river** resulting from the effluent discharge:

$$T = \frac{FC + fc}{F + f}$$

Where;
T = resultant concentration due to the discharge (mg/l)
F = 95%ile flow of receiving water (m^3/s) (95% flow of 0.037m³/s or 3,196,800l/d)
c = average concentration in discharge (3.5mg/l)

C = mean background concentration in receiving water u/s of discharge (3.3mg/l – M.C.C. Upstream 2011 data)
Use adjusted background concentration as measured background conc. Exceeds EQS: (((2.6-2.2)/2)+2.2=**2.4mg/l**

f = discharge volume 1850,000l/d

$1m^3/s$ = 86,400,000 l/d
Therefore:

T = [(3,196,800 x 2.4) + (1850,000 x 3.5)] / [3,196,800 + 1850,000]

T = 2.8mg/l

Summary Result - BOD

BOD	95-Percentile Flow
Assimilative Capacity of River	0.64kg/day
Total Amount Discharged	6.47kg/day
% of Assimilative Capacity Absorbed	>100%
Existing Average Background Upstream	(3.3mg/l – M.C.C. Upstream 2011 data) **Use adjusted background concentration as measured background conc. Exceeds EQS: ((**(2.6-2.2)/2)+2.2=**2.4mg/l**
Resultants Conc in River	**2.8mg/l**
Standard EQS – S.W. Regs 2009	**2.6mg/l (Good Status)**

There is no headroom available, as the current upstream concentration exceeds the EQS of 2.6mg/l already.

The resultant concentration is slightly above the EQS of 2.6mg/l for 95%ile flow conditions (Surface water regs 2009), at a figure of 2.8mg/l. This can be attributed to the receiving river Proules being a small river approximately 1.5m wide with low flows and it's existing status is poor, therefore the existing background upstream BOD concentration is already higher (3.3mg/l - 2011 results) than the Surface Water Regs 2009 EQS of 2.6mg/l therefore adjusted figures for the background upstream concentration has to be used (assuming 'good' status), leaving the assimilative capacity of the Proules river very low for BOD. However, this small section of river is only 600m in length after the primary discharge of Carrickmacross WWTP as it then flows into Lough Naglack, which is a large expanse of water whereby the assimilative capacities are much greater. Also, as specified in schedule C1 of the granted licence for Carrickmacross WWTP, there are improvement plans to extend/relocate the effluent pipeline approximately 3.2km further downstream from it's existing location, to discharge into the Longfield River, pending funding from the DOEHLG, which has a significantly larger catchment area than the Proules River, thus dilution levels and assimilative capacities would be significantly greater than the existing Proules receiving river.

Total Ammonia Assimilative Capacity

95-percentile Flow Conditions

The Total Ammonia assimilative capacity of the river under 95-percentile flow conditions is calculated by:

AC = $(C_{max} - C_{back}) \times 86.4 \times F$

where,

AC = Assimilative capacity
$\mathbf{C_{max}}$ = maximum permissible concentration (EQS) in the river (mg/l) (in this case taken as a maximum of 0.14mg/l) (SW Reg's 2009 – good status (use good status as river is poor status))
$\mathbf{C_{back}}$ = background upstream concentration (mg/l) (0.94mg/l – M.C.C. Upstream 2011 data)
Use adjusted background concentration as measured background conc. Exceeds EQS: ((0.14-0.09)/2)+.09=**0.115mg/l**
86.4 = constant to correct units to kg/day
F = flow in the river (m^3/s) 95%ile flow (0.037m^3/s or 3,196,800l/d)

Therefore,

AC = (0.14-0.115) x 86.4 x 0.037

AC = 0.08kg/day

Total Amount Discharge to River:

With an average effluent discharge volume of 1850m³/day, and average total ammonia of 1.0mg/l (refer table 2, appendix 1), the total amount of ammonia discharged to the Proules River:

(1850,000l/day x 1.0mg/l)/1,000,000 (mg to Kg) = **1.85kg/day**

The Mass balance formula is used to calculate the **resulting total Ammonia concentration in the river** resulting from the effluent discharge:

$$T = \frac{FC + fc}{F + f}$$

Where;
T = resultant concentration due to the discharge (mg/l)
F = 95%ile flow of receiving water (m^3/s) (0.037m³/s or 3,196,800l/d)
c = average concentration in discharge (1.0mg/l)

C = mean background concentration in receiving water u/s of discharge (0.94mg/l – M.C.C. Upstream 2011 data)
Use adjusted background concentration as measured background conc. Exceeds EQS: ((0.14-0.09)/2)+.09=**0.115mg/l**

f = discharge volume 1850,000l/d

$1m^3/s$ = 86,400,000 l/d
Therefore:

T = [(3,196,800 x 0.115) + (1850,000 x 1.0)] / [3,196,800 + 1850,000]

T = 0.44mg/l

Summary Result – Total Ammonia

Total Ammonia	95-Percentile Flow
Assimilative Capacity of River	0.08kg/day
Total Amount Discharged	1.85kg/day
% of Assimilative Capacity Absorbed	>100%
Existing Average Background Upstream	0.115mg/l – Use adjusted method as existing status poor
Resultants Conc in River	**0.44mg/l**
Standard EQS – S.W. Regs 2009	**0.14mg/l (Good Status)**

There is no headroom available, as the current upstream concentration exceeds the EQS of 0.14mg/l already.

The resultant concentration is above the EQS of 0.14mg/l for 95%ile flow conditions (Surface water regs 2009), at a figure of 0.44mg/l. As previously stated for total Ammonia assimilative capacities, this can be attributed to the receiving river Proules being a small river approximately 1.5m wide with low flows and it's existing status is poor, therefore the existing background upstream total Ammonia concentration is already higher (0.94mg/l - 2011 results) than the Surface Water Regs 2009 EQS of 0.14mg/l therefore adjusted figures for the background upstream concentration has to be used (assuming 'good' status), leaving the assimilative capacity of the Proules river very low for Total Ammonia. However, this small section of river is only 600m in length after the primary discharge of Carrickmacross WWTP as it then flows into Lough Naglack, which is a large expanse of water whereby the assimilative capacities are much greater. Also, as specified in schedule C1 of the granted licence for Carrickmacross WWTP, there are improvement plans to extend/relocate the effluent pipeline approximately 3.2km further downstream from it's existing location, to discharge into the Longfield River, pending funding from the DOEHLG, which has a significantly larger catchment area than the Proules River, thus dilution levels and assimilative capacities would be significantly greater than the existing Proules receiving river.

2.4 Data Collection and reporting requirements under the UWWT Directive.

This information will be submitted separately to the EPA.

2.5 Pollutant Release and Transfer Register (PRTR) – report for 2011.

The PRTR report for Carrickmacross is not required for 2011 as the licence was granted in Quarter four of 2011 for the agglomeration.

Section 3. Operational Reports Summary

3.1 Complaints Summary

There were no complaints of an environmental nature related to the discharge from Carrickmacross WWTP in 2011.

3.2 Reported Incidents Summary

As stated in section 2.2, there were 9 no. exceedances/incidents throughout the year as highlighted in table 2.1 (appendix 1) in red text.

Section 4. Infrastructural Assessment & Programme of Improvements

4.1 Treatment Capacity

As per condition 1.7 of the licence, an annual assessment of the remaining hydraulic and organic treatment capacities of the waste water works is required. This assessment is tabulated in table 2.3, (appendix 1) attached, as stated in the table there is hydraulic remaining capacity of 22% and no Organic remaining capacity at the treatment works based on the current loading. The Waste Water Treatment Plant has a design capacity of 12,150 P.E. The current load is approximately 12,141 P.E. (based on current flow and BOD loading). From these calculations, it is evident that the Carrickmacross WWTP is running at almost full capacity from an organic loading point, however, the effluent is being treated to standards required as outlined in section 2.2, with no reportable incidents in 2011. Also, in the past few years, the Carrickmacross treatment plant's load was a lot higher, the plant was treating P.E. loads up to 23,000 in 2008, with some loads in excess of this figure on occasion, due to industrial input. The main reason for the reduced loading into the plant over the past few years is that an industrial food company has installed their own treatment facilities on site in the town, which greatly decreased the BOD loading into the Carrickmacross plant. Also, the current economic downturn with business closures and unemployment affecting the town, would also explain the decrease in loading into the plant. In the past, when the plant was subject to these loadings, in some cases 100% and over than the design P.E. of the plant, the plant operators still continued to treat the wastewater to the required standards by availing of a certain amount of redundancy in the original plant design, some temporary improvement works and that most of the additional loading was from industrial origin. It is therefore concluded, should the loading increase into the plant, as from previous experiences and running capacities, that the operators and plant can treat it to required standards. In the long term, expansion works are planned for the Carrickmacross Sewerage Scheme and are with the DOEHLG for approval and funding under Contract 3 for Carrickmacross, 'Treatment Plant Upgrade and Outfall' which provides for the construction of the following infrastructure at the existing wastewater treatment plant:

- Inlet Pumping Station
- Stormwater Holding Facility
- Inlet Works
- Final Effluent Pumping Station
- 400mm diameter final effluent outfall

The estimated cost of Contract No. 3 is € 5.5M. Approval of the Contract Documents was deferred by the Department of the Environment, Community and Local Government in May 2011 subject to further clarification and amendment of Monaghan County Council's Contract Documents and associated Water Pricing Report.

4.2 Storm water overflow identification and inspection report
As per condition 4.12.1 of the licence, a report on the investigation and assessment of storm water overflows is required as part of the second AER, which will be submitted then.

4.3 Report on progress made and proposals being developed to meet the improvement programme requirements.
As per condition 5 of the licence, a programme of infrastructural improvements to maximise the efficiency and effectiveness of the licence is required as part of the second AER, which will be submitted then.

Section 5. Environmental liability and Financial Provisions

5.1 Statement of measures
Appendix 2 details this item.

5.2 Environmental Liabilities Risk Assessment
Appendix 2 details this item.

Section 6. Licence Specific Reports

There are two licence specific reports required under the Carrickmacross licence:

Priority Substance Assessment
Under Schedule B of the licence (monitoring requirements), relevant Priority substances shall be identified by undertaking a risk based assessment in accordance with 'Guidance on the Screening for Priority Substances for Waste Water Discharge licences' issued by the Agency. It is recommended by the Agency that a 'risk based approach should be undertaken when addressing this screening requirement'. The Carrickmacross WWTP catchment area serves a medium sized town and it's environs. A desktop overview of all industrial inputs to the WWTP network concludes that there are a number of licensed food manufacturing companies, which are discharging in compliance with granted licences to the network. There are also some small businesses such as petrol stations, garages, hairdressers, dry cleaners and electrical companies discharging to the network. The remaining loading is primarily from domestic dwellings, along with schools, community centres, churches, a chapel and clothing shops, supermarkets and confectionary stores. In 2007 when the initial discharge licence application for Carrickmacross was being compiled, monitoring of the effluent discharge and downstream locations in the receiving river Proules was undertaken and analysed for organic compounds and heavy metals, the results of which are attached in appendix 1. There were no elevated levels of the compounds analysed in the discharge or receiving water as reported. However, this list would not have analysed all of the parameters as required in appendix of the

guidance note for priority substances, also, it is difficult to ascertain components of discharges from small businesses that are not licensed discharging into the sewer network, Monaghan County Council therefore undertakes to screen a representative sample from the primary discharge of the Carrickmacross WWTP for the presence of the organic compounds and metals listed in appendix 1 of the guidance document in 2012, and review/report on these results when completed.

Drinking Water Abstraction Point Risk Assessment
Under condition 4.18 of the licence *'a risk assessment for the protection of the downstream drinking water abstraction point'* is required. This risk assessment is assessing the impact of the Carrickmacross waste water treatment plant and it's discharges on the receiving water, the River Proules, Lough Naglack and Monalty lake, as there is a drinking water abstraction point (Killanny/Reaghstown Group Water Supply Scheme (GWSS)) from Monalty lake approximately 2.5km downstream of the primary discharge supplying a substantial rural area in Monaghan and part of County Louth.
Killanny/Reaghstown GWSS abstracts water from the Monalty lake at Annacroff town land and treats the water at a treatment plant located approximately 300m from the intake. Killanny/Reaghstown GWSS are part of a Design, Build and Operate bundle in County Monaghan, whereby a private contractor operates the treatment plant for the group scheme. The water treatment plant is a modern treatment plant using rapid gravity filtration that was commissioned in 2006. The group scheme are presently producing an average of 1,600m3/day treated water for it's consumers.

Carrickmacross WWTP discharge has the potential to impact on the downstream water abstraction point at Monalty Lake in relation to pollutant loading into the River Proules which flows to Monalty Lake. The risk from the Carrickmacross WWTP will be assessed under four separate headings with an overall risk ranking applied in a conclusion:

(1) Level of treatment and capacity of WWTP.
(2) Discharge compliance.
(3) River Fane quality and monitoring data.
(4) Discharges impact during periods of normal and abnormal operation and control measures.

(1) Level of treatment and capacity of WWTP:
Carrickmacross WWTP provides secondary treatment with nutrient removal (phosphorus reduction). The plant is operated and maintained to a good standard with a caretaker 8 hours per day Monday to Friday and 2 hours Saturdays and Sundays. The plant runs automatically with monitors and meters linked to a SCADA system on site. The design P.E. of the plant is 12,150 with it currently treating 12,144 P.E. An assessment of the remaining capacities at the plant is outlined in section 4.1 of this AER, (tabulated in table

2.3, appendix 1). From these calculations, it is evident that the Carrickmacross WWTP is running at almost full capacity from an organic loading point, however, the effluent is being treated to standards required as outlined in section 2.2, with no reportable incidents in 2011. Also, as outlined in section 4.1, in the past few years, the Carrickmacross treatment plant's load was a lot higher, the plant was treating P.E. loads up to 23,000 in 2008, with some loads in excess of this figure on occasion, due to industrial input. In the past, when the plant was subject to these loadings, in some cases 100% and over than the design P.E. of the plant, the plant operators still continued to treat the wastewater to the required standards by availing of a certain amount of redundancy in the original plant design, some temporary improvement works and that most of the additional loading was from industrial origin. It is therefore concluded, should the loading increase into the plant, as from previous experiences and running capacities, that the operators and plant can treat it to required standards. In the long term, expansion works are planned for the Carrickmacross Sewerage Scheme and are with the DOEHLG for approval and funding under Contract 3 for Carrickmacross, 'Treatment Plant Upgrade and Outfall' which provides for the construction of the following infrastructure at the existing wastewater treatment plant:

Inlet Pumping Station
Storm water Holding Facility
Inlet Works
Final Effluent Pumping Station
400mm diameter final effluent outfall

The estimated cost of Contract No. 3 is € 5.5M. Approval of the Contract Documents was deferred by the Department of the Environment, Community and Local Government in May 2011 subject to further clarification and amendment of Monaghan County Council's Contract Documents and associated Water Pricing Report.
The level of treatment at the plant is adequate producing effluent with no ELV's in 2011 and from past experience and loading to the plant it is evident that the WWTP can cope with increased loading to the plant, should it occur. However, there is very little remaining capacity at the treatment works with infrastructural capital works pending approval and funding from the DOEHLG. The risk ranking for this element of the discharge from the WWTP is therefore applied as '***medium risk***".

(2) Discharge Compliance:
Under Schedule B and condition 2 of the licence (ref. table 2, appendix 1 and section 2.2 of this AER report) the Carrickmacross WWTP discharge is compliant with no reportable incidents for 2011. A regular monthly monitoring and sampling program is in place for analysis of the discharge at the Carrickmacross WWTP thus minimising the risk of pollution to the River Proules. The River Proules is identified as sensitive water in terms of the Urban Waste Water Treatment Regulations 2001 from downstream of the Carrickmacross sewage outfall, to confluence with River Glyde, Monalty Lough is also designated as sensitive under these Regulations. The river

Proules is in the Neagh Bann river basin district with overall status classified as 'Poor'and at risk of not meeting good status by 2015, with overall objective to restore it's status by 2021. The 'point risk source' and potential for impact from the Carrickmacross WWTP discharge on the river is categorised as '2b – not at risk' and the combined storm overflows (CSOs) categorised as '1b – probably at risk' but this element of impact on the river Proules has been removed with the decommissioning of 10 CSOs as part of major upgrading on the entire collection network for the WWTP in 2011. Monalty lake is in the Neagh Bann river basin district with overall status classified as 'Moderate'and at risk of not meeting good status by 2015, with overall objective to restore it's status by 2021, however, the WWTP is not identified as impacting on the lake quality. In the past when the Carrickmacross WWTP was operating under severe constraints and at times over 100% of the design P.E. of the plant, combined with the 10 CSOs that were in operation, it would have been contributing to the pollution of the Proules river and downstream waters, however, since the plant is now operating within it's design capacity and with only one remaining storm water overflow (activates rarely) from a storm holding tank at the treatment plant and with no incidents in 2011, the pollutant impact from the discharge has been minimised and greatly reduced.
The risk ranking for this element of the discharge from the WWTP is therefore applied as '***low risk***".

(3)Proules river quality and monitoring data.
The Proules river and downstream Monalty lake existing status has been discussed under item (2) above. Assimilative capacity calculations for BOD and total Ammonia from the plant to the receiving River Proules (ref. section 2.3 of this AER report) conclude that they are over the EQS applicable for each parameter in the river and are therefore impacting upon the existing river Fane quality. This can be attributed to the receiving river Proules being a small river approximately 1.5m wide with low flows and it's existing status is poor, therefore the existing background upstream BOD and total Ammonia concentrations are already higher (3.3mg/l and 0.94mg/l respectively- 2011 results) than the Surface Water Regs 2009 EQS of 2.6mg/l and 0.14mg/l respectively, therefore adjusted figures for the background upstream concentration has to be used (assuming 'good' status), leaving the assimilative capacity of the Proules river very low for the discharge. However, this small section of river is only 600m in length after the primary discharge of Carrickmacross WWTP as it then flows into Lough Naglack, which is a large expanse of water whereby the assimilative capacities are much greater. Also, as specified in schedule C1 of the granted licence for Carrickmacross WWTP, there are improvement plans to extend/relocate the effluent pipeline approximately 3.2km further downstream from it's existing location, to discharge into the Longfield River, pending funding from the DOEHLG, which has a significantly larger catchment area than the Proules River, thus dilution levels and assimilative capacities would be significantly greater than the existing Proules receiving river.

The risk ranking for this element of the discharge from the WWTP at it's present location is therefore applied as '***medium risk***'.

(4) Discharges impact during periods of normal and abnormal operation and control measures.

The impact of the Carrickmacross discharge to the drinking water abstraction point at Monalty Lake is considered low to medium risk as discussed in points 1 to 3 above. Periods of abnormal operation at the plant would be considered to occur due to extreme storm conditions, equipment malfunction or breakdown, Power cut, or dumping of toxic waste e.g. diesel wash into the network. The impact to the treatment plant and discharge to the River Proules from these events occurring is minimised by having a plant operator on site every day at the plant, therefore identifying any abnormal events that occur and implementing control measures as necessary to alleviate them. There is a storm tank on site, which has a storage capacity of 450m3, this means that the storm water overflow rarely activates, once per year or less which minimises the risk of any untreated effluent entering the River Proules. The controls and monitors at the treatment works are linked to a SCADA system on site, which is continually monitored by the plant operator, which would highlight any problem with the treatment plant equipment or treatment process. The risk of a chemical spill or overdose into the treatment system at the plant is minimised as the storage tanks for all chemicals are bunded and regular maintenance and calibration of the dosing pumps is undertaken. The dosing pumps setting are reviewed by the plant operators and technician over the plant in conjunction with assessment of the effluent parameters. Regular monitoring of the effluent also ensures that any deviations in the effluent parameters resulting from problems with the treatment process are addressed. In the event of a power cut, the electricity supply company will be contacted and a diesel generator will be connected at the WWTP enabling the treatment plant to continue to operate. From past experience a power cut occurs twice per year and usually lasts 2 to 3 hours. There has been no incidents of illegal waste being dumped into the sewer network in Carrickmacross, however given the proximity of the plant to the border of Northern Ireland and that the dumping of illegal diesel wash is prevalent in the Monaghan/Louth border area, consideration is given to this event occurring. If this event occurred, it may lead to a worst case scenario of the Carrickmacross WWTP being effectively 'shut down' while a clean up of the treatment plant is undertaken and removal of the toxic material and effected plant media to a licensed disposal facility in Germany. While the WWTP is unable to operate and treat the influent from the agglomeration, the influent would be tankered by a licensed haulier to a WWTP elsewhere in Monaghan with available capacity to treat it, until the WWTP is up and running again. If there is an event at the plant that leads to a pollution incident in the River Proules, Monaghan County Council will immediately notify the downstream drinking water source, Killanny/Reaghstown GWSS who are responsible for the downstream water abstraction water supply scheme, the EPA and the

Inland Fisheries Board and implement any control measures and necessary works to address the incident.
From the occurrence of these periods of abnormal operation and the control measures in place to deal with them should they occur, the risk ranking for this element of the discharge from the WWTP is applied as '***low risk***'.

Conclusion:
From the risk ranking applied to the impacts of the Carrickmacross WWTP discharge on the downstream drinking water abstraction point at Monalty Lake in the four situations addressed previously in this section, it is concluded that the **overall risk is low to medium**.

Appendix 1

Table 1 Monitoring Results for Carrickmacross WWTP 2011

Location	Inflow/Outflow Rate m3 per day	Influent Or Effluent	Date of Sampling	Sample Type (C or G)	BOD mg/l	COD mg/l	TSS mg/l	Total P mg/l P	Ortho P mg/l P	Total N mg/l N	Ammonia NH4	BOD Loading kg
Carrickmacross	1711	Influent	27/01/11	C	432.0	690	378	7.65		34.68	18.65	739.16
Carrickmacross	1727	Effluent	27/01/11	C	4.0	22	8	0.98		10.45	0.45	6.91
Carrickmacross		Up Stream Of Works	27/01/11	G	2.0	21	7	1.00		8.76	0.32	
Carrickmacross		Down Stream of Works	27/01/11	G	2.0	21	8	1.00		8.87	0.34	
Carrickmacross	1261	Influent	16/02/11	C	135.0	404	176	3.85		0.12	17.40	170.24
Carrickmacross	1269	Effluent	16/02/11	C	2.0	17	11	0.34		9.38	0.07	2.54
Carrickmacross		Up Stream Of Works	16/02/11	G	2.0	16	7	0.11		4.03	0.12	
Carrickmacross		Down Stream of Works	16/02/11	G	2.0	15	4	0.13		3.90	0.09	
Carrickmacross	3487	Influent	31/03/2011	C	220.0	762	208	5.62		47.80	33.82	767.74
Carrickmacross	3411	Effluent	31/03/2011	C	2.0	36	2	0.69		16.38	0.23	6.82
Carrickmacross		Up Stream Of Works	31/03/2011	G	2.0	16	5	0.36		1.26	0.33	
Carrickmacross		Down Stream of Works	31/03/2011	G	2.0	18	3	0.35		5.47	0.33	
Carrickmacross	1875	Influent	28/04/11	C	450.0	989	288	10.56		4.80	48.60	842.85
Carrickmacross	1810	Effluent	28/04/11	C	2.0	33	10	1.05		14.82	<1.29	3.63
Carrickmacross		Up Stream Of Works	28/04/11	G	2.0	16	12	1.00		7.47	<1.29	
Carrickmacross		Down Stream of Works	28/04/11	G	2.0	17	4	1.00		7.16	<1.29	
Carrickmacross	1427	Influent	16/05/2001	C	632.0	1032	431	9.76		45.68	23.67	901.86
Carrickmacross	1424	Effluent	16/05/2001	C	5.0	25	4	1.32		<7	<1.29	7.12
Carrickmacross		Up Stream Of Works	16/05/2001	G	6.0	25	5	1.00		<7	<1.29	
Carrickmacross		Down Stream of Works	16/05/2001	G	6.0	26	6	1.00		<7	<1.29	
Carrickmacross	1662	Influent	09/08/2011	C	490.0	714	240	8.00		58.58	24.48	814.38
Carrickmacross	1645	Effluent	09/08/2011	C	4.0	28	6	1.44		14.47	1.00	6.58
Carrickmacross		Up Stream Of Works	09/08/2011	G	4.0	22	10	1.48		10.17	<1	
Carrickmacross		Down Stream of Works	09/08/2011	G	4.0	22	7	1.62		9.76	5.14	
Carrickmacross	2174	Influent	14/07/11	C	473.0	589	435	1.00		<7	60.00	1028.30
Carrickmacross	1845	Effluent	14/07/11	C	4.0	20	4	1.00		<7	<1.29	7.38
Carrickmacross		Up Stream Of Works	14/07/11	G	4.0	33	4	1.00		<7	<1.29	
Carrickmacross		Down Stream of Works	14/07/11	G	3.0	17	2	1.00		<7	<1.29	
Carrickmacross	1480	Influent	18/08/11	C	357.0	520	284	7.05		47.90	32.20	624.43
Carrickmacross	1537	Effluent	18/08/11	C	2.0	24	3	1.00		<7	<1	3.07
Carrickmacross		Up Stream Of Works	18/08/11	G	2.0	24	4	1.00		<7	<1	
Carrickmacross		Down Stream of Works	18/08/11	G	2.0	24	6	1.00		<7	<1	
Carrickmacross	1570	Influent	01/09/2011	C	804.0	1215	228	14.44		47.66	33.32	1262.28
Carrickmacross	1558	Effluent	01/09/2011	C	3.0	20	4	1.63		<7	<1	4.67
Carrickmacross		Up Stream Of Works	01/09/2011	G	3.0	20	6	1.41		<7	<1	
Carrickmacross		Down Stream of Works	01/09/2011	G	3.0	28	5	1.79		8.90	<1	
Carrickmacross	1818	Influent	30/09/2011	C	238.0	1280	356	10.62		45.30	28.48	456.48
Carrickmacross	1608	Effluent	30/09/2011	C	3.0	25	6	1.06		7.16	<1.29	5.72
Carrickmacross		Up Stream Of Works	30/09/2011	G	2.0	25	3	1.06		<7	<1.29	
Carrickmacross		Down Stream of Works	30/09/2011	G	2.0	28	4	1.00		<7	<1	
Carrickmacross	1903	Influent	28/10/11	C	292.0	398	138	2.88		18.11	13.78	555.68
Carrickmacross	1899	Effluent	28/10/11	C	6.0	18	2	2.46		10.16	<1.29	11.39
Carrickmacross		Up Stream Of Works	28/10/11	G	6.0	27	10	1.14		<7	<1.29	
Carrickmacross		Down Stream of Works	28/10/11	G	6.0	24	14	1.41		<7	<1.29	
Carrickmacross	1905	Influent	25/11/11	C	595.0	1371	408	21.86		51.67	33.23	1133.48
Carrickmacross	1974	Effluent	25/11/11	C	5.0	28	4	1.00		<7	<1.29	9.87
Carrickmacross		Up Stream Of Works	25/11/11	G	4.0	26	3	1.00		<7	<1	
Carrickmacross		Down Stream of Works	25/11/11	G	4.0	25	5	1.69		<7	<1.29	

Carrickmacross Monitoring results 2011

Table 2
Effluent monitoring results: Note ELV's in red text

Location	Outflow Rate m3 per day	Effluent	Date of Sampling	Sample Type (C or G)	BOD mg/l 25mg/l	COD mg/l 125mg/l	TSS mg/l 35mg/l	Total P mg/l P 2mg/l	Ortho P mg/l P	Total N mg/l N 15mg/l	Ammonia NH4	BOD Loading kg
Carrickmacross	1727	Effluent	27/01/11	C	4.0	22	5	0.98		10.45	0.45	6.91
Carrickmacross	1269	Effluent	16/02/11	C	2.0	17	11	0.34		9.36	0.07	2.54
Carrickmacross	3411	Effluent	31/03/2011	C	2.0	36	2	0.89		16.38	0.23	6.82
Carrickmacross	1816	Effluent	28/04/11	C	2.0	33	10	1.98		14.92	<1.29	3.63
Carrickmacross	1424	Effluent	16/05/2001	C	5.0	23	4	1.32		<7	<1.29	7.12
Carrickmacross	1645	Effluent	09/06/2011	C	4.0	28	9	1.44		14.47	1.00	6.58
Carrickmacross	1844	Effluent	14/07/11	C	4.0	20	4	1.00		<7	<1.29	7.38
Carrickmacross	1537	Effluent	18/08/11	C	2.0	24	3	1.00		<7	<1	3.07
Carrickmacross	1556	Effluent	01/09/2011	C	3.0	20	4	1.93		<7	<1	4.67
Carrickmacross	1908	Effluent	30/09/2011	C	3.0	25	8	1.08		7.16	<1.29	5.72
Carrickmacross	1899	Effluent	28/10/11	C	6.0	18	2	2.40		10.19	<1.29	11.39
Carrickmacross	1974	Effluent	25/11/11	C	5.0	28	4	1.00		<7	<1.29	9.87
Average					3.5	24.5	5.5	1.3		9.8	1.0	6.3
Compliance analysis -12 samples taken - max. UWWT Reg's S.I. 254/2001:							Compliant.	Compliant.	Compliant.	Compliant - Fifth schedule, Part 4. © the annual mean of the samples conforms.	Ortho P will be analysed from 2012 as per licence.	Compliant - Fifth schedule, Part 4. © the annual mean of the samples conforms.
Total Incidents: 0 no.												

Table 3
Influent monitoring results:

Location	Inflow Rate m3 per day	Influent	Date of Sampling	Sample Type (C or G)	BOD mg/l	COD mg/l	TSS mg/l	Total P mg/l P	Ortho P mg/l P	Total N mg/l N	Ammonia NH4	BOD Loading kg
Carrickmacross	1711	Influent	27/01/11	C	432.0	695	376	7.65		34.98	16.98	739.16
Carrickmacross	1261	Influent	16/02/11	C	135.0	404	176	3.84		0.12	17.46	170.24
Carrickmacross	3467	Influent	31/03/2011	C	220.0	752	296	5.85		47.60	33.82	762.74
Carrickmacross	1873	Influent	28/04/11	C	450.0	989	288	10.56		4.80	46.50	842.85
Carrickmacross	1427	Influent	16/05/2001	C	632.0	1032	431	9.76		45.98	23.87	901.86
Carrickmacross	1662	Influent	09/06/2011	C	490.0	714	240	8.00		56.58	24.48	814.38
Carrickmacross	2174	Influent	14/07/11	C	473.0	589	435	1.00		7.00	66.00	1028.30
Carrickmacross	1469	Influent	18/08/11	C	357.0	528	284	7.65		47.90	32.20	524.43
Carrickmacross	1570	Influent	01/09/2011	C	804.0	1215	226	14.44		47.96	33.32	1262.28
Carrickmacross	1916	Influent	30/09/2011	C	238.0	1280	396	10.62		45.39	26.48	456.48
Carrickmacross	1903	Influent	28/10/11	C	292.0	398	138	2.88		18.11	13.78	555.68
Carrickmacross	1903	Influent	25/11/11	C	595.0	1371	498	21.66		51.57	33.23	1133.48
Average					426.5	830.7	315.2	8.7		34.0	30.7	

Table 2.1

Influent monthly monitoring - as per condition 4.15 of licence.

Location	Daily Flow M3	Influent/ Effluent	Date of Sampling	Sample Type (C or G)	BOD mg/l	BOD Loading (Kg/day)	BOD Removal Efficiency %	COD mg/l	COD Loading (Kg/day)	COD Removal Efficiency %	SS mg/l	SS Loading (Kg/day)	SS Removal Efficiency %	Total P mg/l P	Total P Loading (Kg/day)	Total P Removal Efficiency %	Total N mg/l N	Total N Loading (Kg/day)	Total N Removal Efficiency %
Carrickmacro	1711	Influent	27/01/11	C	432.0	739.15		695	1189.15		376	643.34		7.65	13.09		34.98	59.85	
Carrickmacro	1727	Effluent	27/01/11	C	4.0	6.91	99.07	22	37.99	96.80	5	8.64	98.66	0.98	1.69	87.07	10.45	18.05	69.85
Carrickmacro	1261	Influent	16/02/11	C	135.0	170.24		404	509.44		176	221.94		3.84	4.84		0.12	Eroneous result	
Carrickmacro	1269	Effluent	16/02/11	C	2.0	2.54	98.51	17	21.57	95.77	11	13.96	93.71	0.34	0.43	91.03	9.36	11.88	
Carrickmacro	3467	Influent	31/03/2011	C	220.0	762.74		752	2607.18		296	1026.23		5.85	20.27		47.60	165.03	
Carrickmacro	3411	Effluent	31/03/2011	C	2.0	6.82	99.11	36	122.80	95.29	2	6.82	99.34	0.89	3.03	85.07	16.38	55.87	66.14
Carrickmacro	1873	Influent	28/04/11	C	450.0	842.85		988	1852.40		288	539.42		10.56	19.78		4.80	Eroneous result	
Carrickmacro	1816	Effluent	28/04/11	C	2.0	3.63	99.57	33	59.93	96.76	10	18.16	96.63	1.98	3.60	81.82	14.92	27.09	
Carrickmacro	1427	Influent	16/05/2001	C	632.0	901.86		1032	1472.66		431	615.04		9.76	13.93		45.98	65.61	
Carrickmacro	1424	Effluent	16/05/2001	C	5.0	7.12	99.21	23	32.75	97.78	4	5.70	99.07	1.32	1.88	86.50	7.00	9.97	84.81
Carrickmacro	1662	Influent	09/06/2011	C	490.0	814.38		714	1186.67		240	398.88		8.00	13.30		58.58	94.04	
Carrickmacro	1645	Effluent	09/06/2011	C	4.0	6.58	99.19	28	46.06	96.12	9	14.81	96.29	1.44	2.37	82.18	14.47	23.80	74.69
Carrickmacro	2174	Influent	14/07/11	C	473.0	1028.30		589	1280.49		435	945.69		1.00	2.17		7.00	15.22	
Carrickmacro	1844	Effluent	14/07/11	C	4.0	7.38	99.28	20	36.88	97.12	4	7.38	99.22	1.00	1.84	15.18	7.00	12.91	15.18
Carrickmacro	1469	Influent	18/08/11	C	357.0	524.43		529	777.10		284	417.20		7.95	11.68		47.90	70.37	
Carrickmacro	1537	Effluent	18/08/11	C	2.0	3.07	99.41	24	36.89	95.25	3	4.61	98.89	1.00	1.54	86.84	7.00	10.76	84.71
Carrickmacro	1570	Influent	01/09/2011	C	804.0	1262.28		1215	1907.55		226	354.82		14.44	22.67		47.96	75.30	
Carrickmacro	1556	Effluent	01/09/2011	C	3.0	4.67	99.63	20	31.12	98.37	4	6.22	98.25	1.93	3.00	86.75	7.00	10.89	85.53
Carrickmacro	1918	Influent	30/09/2011	C	238.0	456.48		1280	2455.04		396	759.53		10.62	20.37		45.39	87.06	
Carrickmacro	1908	Effluent	30/09/2011	C	3.0	5.72	98.75	25	47.70	98.06	8	15.26	97.99	1.06	2.02	90.07	7.16	13.66	84.31
Carrickmacro	1903	Influent	28/10/11	C	292.0	555.68		398	757.38		138	262.61		2.88	5.48		18.11	34.46	
Carrickmacro	1899	Effluent	28/10/11	C	6.0	11.39	97.95	18	34.18	95.49	2	3.80	98.55	2.40	4.56	16.84	10.19	19.35	43.85
Carrickmacro	1905	Influent	25/11/11	C	595.0	1133.48		1371	2611.76		496	944.88		21.86	41.64		51.57	98.24	
Carrickmacro	1974	Effluent	25/11/11	C	5.0	9.87	99.13	28	55.27	97.88	4	7.90	99.16	1.00	1.97	95.26	7.00	13.82	85.93

Table 2.2

Influent monitoring summary table

	BOD mg/l	COD mg/l	Total P mg/l P	Total N mg/l N	Volumetric Loading m3/day	Loading PE/day
Number of samples	12.00	12	12	12	n/a	n/a
Maximum result	804.00	1371.00	21.86	56.58	3467.00	19261.11
Annual Mean	426.50	830.67	8.70	34.00	1708.00	9488.89

Table 2.3

Remaining Hydraulic & Organic treatment capacities - as per condition 1.7.1 of licence.

Design PE	12150				833	917
Hydraulic loading M3/day	2187.00	1708.00	9489	PE equiv.	479.00	21.90
Organic loading BOD kg/day	729.00	728.46	12141	PE equiv.	0.54	0.07

Carrickmacross Monitoring results 2011

Table 4
Upstream monitoring results

Location	Inflow/Outflow Rate m3 per day	Location	Date of Sampling	Sample Type (G or C)	BOD mg/l	COD mg/l	TSS mg/l	Total P mg/l P	Ortho P mg/l P	Total N mg/l N	Ammonia NH4	BOD Loading kg
Carrickmacross		Up Stream Of Works	27/01/11	G	2.0	21	7	1.00		6.76	0.32	
Carrickmacross		Up Stream Of Works	16/02/11	G	2.0	16	7	0.11		4.03	0.12	
Carrickmacross		Up Stream Of Works	31/03/2011	G	2.0	18	5	0.36		1.26	0.33	
Carrickmacross		Up Stream Of Works	28/04/11	G	2.0	16	12	1.00		7.47	<1.29	
Carrickmacross		Up Stream Of Works	16/05/2001	G	6.0	25	5	1.00		<7	<1.29	
Carrickmacross		Up Stream Of Works	09/06/2011	G	4.0	22	10	1.48		10.17	<1	
Carrickmacross		Up Stream Of Works	14/07/11	G	4.0	33	4	1.00		<7	<1.29	
Carrickmacross		Up Stream Of Works	18/08/11	G	2.0	24	4	1.00		<7	<1	
Carrickmacross		Up Stream Of Works	01/09/2011	G	3.0	26	6	1.41		<7	<1	
Carrickmacross		Up Stream Of Works	30/09/2011	G	2.0	25	5	1.00		<7	<1.29	
Carrickmacross		Up Stream Of Works	28/10/11	G	6.0	27	16	1.14		<7	<1.29	
Carrickmacross		Up Stream Of Works	25/11/11	G	4.0	26	3	1.00		<7	<1	
Average					3.3	23.3	6.8	1.0		6.6	0.94	

Table 5
Downstream monitoring results

Location	Inflow/Outflow Rate m3 per day	Location	Date of Sampling	Sample Type (G or C)	BOD mg/l	COD mg/l	TSS mg/l	Total P mg/l P	Ortho P mg/l P	Total N mg/l N	Ammonia NH4	BOD Loading kg
Carrickmacross		Down Stream of Works	27/01/11	G	2.0	21	8	1.00		6.87	0.34	
Carrickmacross		Down Stream of Works	16/02/11	G	2.0	15	4	0.13		3.90	0.09	
Carrickmacross		Down Stream of Works	31/03/2011	G	2.0	18	3	0.35		5.47	0.33	
Carrickmacross		Down Stream of Works	28/04/11	G	2.0	17	4	1.00		7.16	<1.29	
Carrickmacross		Down Stream of Works	16/05/2001	G	6.0	25	6	1.00		<7	<1.29	
Carrickmacross		Down Stream of Works	09/06/2011	G	4.0	22	7	1.62		9.76	5.14	
Carrickmacross		Down Stream of Works	14/07/11	G	3.0	17	2	1.00		<7	<1.29	
Carrickmacross		Down Stream of Works	18/08/11	G	2.0	24	6	1.00		<7	<1	
Carrickmacross		Down Stream of Works	01/09/2011	G	3.0	28	5	1.78		8.96	<1	
Carrickmacross		Down Stream of Works	30/09/2011	G	2.0	28	4	1.00		<7	<1	
Carrickmacross		Down Stream of Works	28/10/11	G	6.0	24	14	1.41		<7	<1.29	
Carrickmacross		Down Stream of Works	25/11/11	G	4.0	25	5	1.69		<7	<1.29	
Average					3.2	22	6	1		7	1.28	

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Customer	Gearoid McCarthy Monaghan Co Co County Offices The Glen Co Monaghan	*Lab Report Ref. No.*	0810/019/02
		Date of Receipt	19/11/2007
		Date Testing Commenced	19/11/2007
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO	400084842	*Date of Report*	10/12/2007
Customer Ref	River Pooles Discharge pipe	*Sample Type*	Water

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	7.24	mg/L as N	INAB
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	<0.01	ug/L	
Barium	177	ICPMS	20	ug/L	
BOD	113	Electrometry	<2	mg/L	
Boron	177	ICPMS	246	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	1	ug/L	
COD	107	Colorimetry	46	mg/L	INAB
Conductivity	112	Electrometry	1444	uscm -1@25C	INAB
Copper	177	ICPMS	16	ug/L	
Cyanide	145	Colorimetry	27	ug/L	
Dichloromethane	154	GC-MS 1	<1	ug/L	
Fluoride	116	Colorimetry	<0.09	mg/L	
Lead	177	ICPMS	1	ug/L	
Mercury	178	ICPMS	2.3	ug/L	
Nickel	177	ICPMS	3	ug/L	
Nitrate	103	Colorimetry	0.65	mg/L as N	
Nitrite	118	Colorimetry	0.025	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ T	10.64	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	0.68	mg/L as N	
Nitrogen (Total)	0	Calculation	5.72	mg/L as N	
pH	110	Electrometry	7.6	pH Units	INAB
Phenols (Total)	204	GC-MS 2	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	0.071	mg/L as P	

Web Certificate ***Date : 10/12/2007***

Acc. : Accredited Parameters by ISO 17025:2005

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Customer PO	400084842	*Date of Report*	10/12/2007
Customer Ref	River Pooles Discharge pipe	*Sample Type*	Water

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	0.278	mg/L as P	INAB
Selenium	177	ICPMS	2	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104	19	mg/L	
Sulphate	119	Colorimetry	66	mg/L as SO4	
Temperature	715	DO Meter	11.3	degrees C	
Toluene	165	GC-MS 1	<1	ug/L	
Tributyltin	0	GC-MS 1	<0.06	ug/L as Sn	
Xylene	179	GC-MS 1	<1	ug/L	
Zinc	177	ICPMS	35.8	ug/L	

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Customer	Gearoid McCarthy Monaghan Co Co County Offices The Glen Co Monaghan	*Lab Report Ref. No.*	0910/019/03
		Date of Receipt	19/11/2007
		Date Testing Commenced	19/11/2007
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO	400084842	*Date of Report*	07/12/2007
Customer Ref	River Pooles Downstream	*Sample Type*	Water

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	1.95	mg/L as N	INAB
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	<0.01	ug/L	
Barium	177	ICPMS	53	ug/L	
BOD	113	Electrometry	3	mg/L	INAB
Boron	177	ICPMS	193	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	2	ug/L	
COD	107	Colorimetry	7	mg/L	INAB
Conductivity	112	Electrometry	697	uscm -1@25C	INAB
Copper	177	ICPMS	7	ug/L	
Cyanide	145	Colorimetry	8	ug/L	
Dichloromethane	164	GC-MS 1	<1	ug/L	
Fluoride	115	Colorimetry	<0.09	mg/L	
Lead	177	ICPMS	3	ug/L	
Mercury	178	ICPMS	3.2	ug/L	
Nickel	177	ICPMS	2	ug/L	
Nitrate	103	Colorimetry	2.26	mg/L as N	
Nitrite	118	Colorimetry	0.018	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ T	4.48	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	2.27	mg/L as N	INAB
Nitrogen (Total)	0	Calculation	6.76	mg/L as N	
pH	110	Electrometry	7.6	pH Units	INAB
Phenols (Total)	204	GC-MS 2	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	0.089	mg/L as P	

Web Certificate

Katherine McQuillan - Deputy Technical Manager

Date : 07/12/2007

Acc. : Accredited Parameters by ISO 17025:2005

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Customer PO	400084842	*Date of Report*	07/12/2007
Customer Ref	River Pooles Downstream	*Sample Type*	Water

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	0.190	mg/L as P	INAB
Selenium	177	ICPMS	1	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104	11	mg/L	
Sulphate	119	Colorimetry	42	mg/L as SO4	
Temperature	715	DO Meter	11.3	degrees C	
Toluene	165	GC-MS 1	<1	ug/L	
Tributyltin	0	GC-MS 1	<0.05	ug/L as Sn	
Xylene	179	GC-MS 1	<1	ug/L	
Zinc	177	ICPMS	18.2	ug/L	

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Katherine McQuillan - Deputy Technical Manager

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Monaghan County Council

Environmental Liability Risk Assessment & Statement of Measures for Carrickmacross & Environs

2011

Urban Waste Water Discharge
Licence D0062-01

Document Amendment Record
Client: Monaghan County Council
Plant: Carrickmacross Waste Water Treatment Plant
Title: ERLA Report 2011

Ref No. : D0348

DATE	Issue Purpose:	originated	Checked:	Authorised:
Feb 2012	A Document for Submission:	S. Mallon A.E.	M. Johnston S.E.E.	M. Murray S.E./D. Fallon D.O.S.
				David Fallon

Table of Contents

1 Introduction

This Environmental Liability Risk Assessment relates to the agglomeration of Carrickmacross and Environs. This report has been prepared in compliance with Condition 7.2 of Licence No. DO348 which requires the submission of:

- An annual statement as to the measures taken or adopted in relation to the prevention of environmental damage,

- The financial provisions in place in relation to the underwriting of costs for remedial actions following anticipated events (including closure) or accident/incidents, as may be associated with discharges or overflows from the waste water works.

- Environmental Liabilities Risk Assessment (ELRA) to address the liabilities from present or planned discharges. within twelve months of the date of grant of this licence.

1.1 Background

Carrickmacross town is a medium sized town located in the south of County Monaghan. The Waste Water treatment plant is located at a site adjacent to the Ardee Road in Carrickmacross town. The Waste Water Works comprises of a gravity collection system with a high dependency on pumping stations due to the topography of the catchment area and a Waste Water Treatment Works with a design capacity of 12,150 P.E. The current load is approximately 12,144 P.E. (based on current flow and BOD loading). The Carrickmacross treatment plant's load has greatly decreased over the last few years, the plant was treating P.E. loads up to 23,000 in 2008, with some loads in excess of this figure on occasion, due to industrial input. The main reason for the reduced loading into the plant over the past few years is that an industrial food company has installed their own treatment facilities on site in the town, which greatly decreased the BOD loading into the Carrickmacross plant. Also, the current economic downturn with business closures and unemployment affecting the town, would also explain the decrease in loading into the plant.

The plant provides secondary and tertiary treatment with nutrient removal (phosphorus reduction) for the effluent. The Waste Water Treatment Plant (WWTP) which provides treatment for a design load of 12,150 population equivalent comprises aeration by mechanical aerators, phosphorus removal (Ferric dosing) followed by secondary settlement and clarification and rapid gravity sand filters. Sludge dewatering is provided by thickening the sludge in a picket fence thickener followed by dewatering on a sludge belt presses. Final effluent was treated to standards in accordance with the Urban Waste Water Regulations (UWWTR) 2001 in 2011. From 2012, final effluent will be treated to standards in accordance with schedule B of the granted discharge licence, granted in November 2011.

2 Environmental Sensitivity and Risk Assessment

The main considerations in relation to the receiving waters for the primary discharge have been identified and given a designated score through the risk enforcement methodology developed by the EPA.

The Dynamic Risk Enforcement Assessment Methodology (DREAM) uses a decision making framework and toolset to assess the risk posed by the primary

discharge from waste water agglomerations.

DREAM allocated an enforcement category to waste water agglomerations based on five environmental attributes:

- Level of treatment,
- Discharge compliance,
- Observed impact,
- Possible impact, and
- Enforcement record.

The DREAM map and pivot application may be accessed through the following link: https://www.edenireland.ie

Inniskeen Waste Water Treatment Plant agglomeration has been assigned an enforcement category of B1-Medium . The DREAM enforcement categories have been assigned the following site specific risk categories:

DREAM Risk Category	Site Specific Risk Categories
A1	Category 3
A2	Category 2
B1	
C1	Category 1

Table 3 Risk Matrix:

V.High	5					
High	4		IV			VI
Medium	3					I,V
Low	2					II, III
V Low	1					
		Trivial	Minor	Moderate	Major	Massive
		1	2	3	4	5

	These are considered to be high level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.
	These are medium level risks requiring action, but are not as critical as a rede coded risk.
	Green (light and dark green) – These are lowest level risks and indicate need for continuing awareness and monitoring on a regular basis. Whils they are currently low or minor risks, some have the potential to increase to medium or even high level risks and must therefor be monitored and if costs effective mitigation can be carried out to reduce the risk even further this should be pursued,

3 Risk Prevention / Mitigation

The risk matrix above indicates that there are no high levels of risk classification for the site. The overflow of the oxidation ditch and the overcapacity of the storm tank could engender untreated effluent in a relatively small stream; for this reason the programme of works should address these two issues by 2015. the item IV is potentially a severe risk since the abstraction point at risk. The outfall has been highlighted to be piped 3.5km (effectively downstream of abstraction point)

4 Statement of Measures

The measures to be taken by Monaghan County Council are outlined in Table 4 below. Measures are in place within Carrickmacross Waste Water Plant are adequate to maintain the discharge at a quality that complies with the licence conditions and does not significantly impact on the conservation objectives of the Proules River.

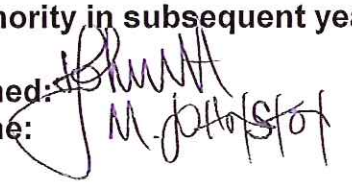
Table 2: Risk Assessment Form

Risk ID	Process*	Potential Hazards	Environmental effect	Severity Weighting	Basis of severity	Occurrence Rating	Basis of Occurenec	Risk Score (Severity * Occurrence)
I	Flooding of oxidation ditch 1	Untreated effluent reaches Proules receiving stream	High BOD; S/S ammonia into river	5	Potential for fish kill; down stream 10km abstraction point	3	Heavy rainfall 1or2 times yearly, engendering flows that the current storm tank cannot cater for having only 5 hours storage DWF	15
II	Ferric dosing tank	Overdose of ferric	High iron/ toxicity content in discharge	5	Potential for fish kill; down stream 10km abstraction point	2	Dose pump mal functions	10
III	aeration	Power failure	High BOD; ammonia into river	5	Would be quickly noticed	2	No standby generator on site	10
IV	Tertiary treatment fails	High P or BOD leaving WWTP	High BOD; ammonia into river	2	Potential for mild pollution levels or ELV breach	4	Sand wash out	8
V	Storm tank overflow	Inundation and overflow of untreated effluent to Proules river	High BOD; S/S ammonia into river	5	Potential for fish kill; down stream 10km abstraction point	3	Heavy rainfall 1or2 times yearly, engendering flows that the current storm tank cannot cater for having only 5 hours storage DWF	15
VI	Overall plant	The ELVs are exceeded and could pollute water at potable water abstraction point.	Polluted water	5	Abstraction point for potable water	4	Failure of plant to effectively treat water to SW Regulations 2009 standards	20

Table 4: Statement of Measures

Risk I.D.	Risk Score	Mitigation Measure to be taken	Outcome	Action	Date for Competition	Owner/ Contact Person
I	15	Increase the heights of walls in u/g tank	safe	Construct higher walls	March 2013	M Johnston
II	10	Close monitoring of dose pumps	More control	SOP for dosing pumps to ensure effective operation	July 2012	MJohnston
III	10	Provide standby generator	Plnat continues to operate in Mains power outage.	Recommend purchase of generator	May 2013	M Johnston
IV	8	Monitoring of sand levels in filter	Clean discharge	SOP for sand filter - Weekly check list	May 2012	I Jackson
V	15	Increase volume of storm overflow tank to 24hours DWF	Containment of raw effluent during high rainfall period	DOE funding WSIP awaited	Jan 2015	M Johnston
VI	8	New outfall down stream of abstraction point for potable water	Cleaner safer potable source	DOE funding WSIP awaited	Jan 2015	M Johnston

I confirm the above are the measures which will be taken in the local Authority in subsequent years.

Signed: 
Name: M. Johnston

Job Title: SEE
Date: 27 Feb 2012

5 FINANCIAL PROVISIONS

5.1 Estimation of remediation costs

Table 5 below outlines the estimated costs of remediation for different categories of events

Table 5: Risk Classification Table

Rating	Severity		
	Category	Description	Cost of Remediation
1	Trivial		€1500
2	Minor		
3	Moderate		€15000
4	Major		
5	Extreme		€100,000

5.2 Details of Financial Provision / Insurance

In order to off set the risk to the environment the Council has enquiry form proposal form for an Environmental Insurance Policy with IPB Insurers, Policy Nos. TBC To the value of €5,000,000.