

## Mallow – Attachment 5

### Assimilative Capacity Calculations

a) **Mass Balance Equation for Orthophosphate:**

Gauge number 18055, upstream location of discharge.

Median flow of River (station n. 18055) = 20.627 m<sup>3</sup>/sec  
Median oPO<sub>4</sub>-P in River (upstream) = 0.028 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec  
Median value for oPO<sub>4</sub>-P in discharge = 2.72 mg/L

$$C_{\text{final}} = \frac{(20.627 \times 0.028) + (0.043 \times 2.72)}{20.627 + 0.043}$$

$$C_{\text{final}} = 0.0336 \text{ mg/L oPO}_4\text{-P}$$

The increase in Orthophosphate due to the discharge of Mallow WWTP is 5.6 µg/L.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

b) **Mass Balance Equation for BOD:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Average BOD in River (upstream) = 1.33 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average BOD in discharge = 3.929 mg/L

$$C_{\text{final}} = \frac{(3.84 \times 1.33) + (0.043 \times 3.929)}{3.84 + 0.043}$$

$$C_{\text{final}} = 1.359 \text{ mg/L BOD}$$

The increase in BOD due to the discharge of Mallow WWTP is 0.03 mg/L.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

c) **Mass Balance Equation for Suspended Solids:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Average Suspended Solids in River (upstream) = 6.66 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average Suspended Solids in discharge = 16.7 mg/L

$$C_{\text{final}} = \frac{(3.84 \times 6.66) + (0.043 \times 16.7)}{3.84 + 0.043}$$

$$C_{\text{final}} = 6.77 \text{ mg/L Suspended Solids}$$

The increase in Suspended Solids due to the discharge of Mallow WWTP is 0.11 mg/L.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

d) **Mass Balance Equation for Total Phosphate:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Median flow of River (station n. 18055) = 20.627 m<sup>3</sup>/sec

Median TPO<sub>4</sub>-P in River (upstream) = 0.1 mg/L \*

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Median TPO<sub>4</sub>-P in discharge = 2.075 mg/L

$$C_{\text{final}} = \frac{(20.627 \times 0.1) + (0.043 \times 2.075)}{20.627 + 0.043}$$

$$C_{\text{final}} = 0.1041 \text{ mg/L TPO}_4\text{-P}$$

The increase in Total Phosphate due to the discharge of Mallow WWTP is 4.1 µg/L.

Note: \* Results for river (upstream) analysis below Limit Of Detection for Total Phosphate test.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

e) **Mass Balance Equation for Total Nitrogen:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Average Total Nitrogen in River (upstream) = 5.54 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average Total Nitrogen in discharge = 17.02 mg/L

$$C_{\text{final}} = \frac{(3.84 \times 5.54) + (0.043 \times 17.02)}{3.84 + 0.043}$$

$$C_{\text{final}} = 5.666 \text{ mg/L Total Nitrogen}$$

The increase in Total Nitrogen due to the discharge of Mallow WWTP is 0.12 mg/L.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

f) **Mass Balance Equation for Sulphate:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Average Sulphate in River (upstream) = 15 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average Sulphate of discharge = 38.52 mg/L

$$C_{\text{final}} = \frac{(3.84 \times 15) + (0.043 \times 38.52)}{3.84 + 0.043}$$

$$C_{\text{final}} = 15.26 \text{ mg/L Sulphate}$$

The increase in Sulphate due to the discharge of Mallow WWTP is 0.26 mg/L.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

g) **Mass Balance Equation for Ammonia-N:**

Gauge number 18055, upstream location of discharge.

Flow of River (95%) = 3.84 m<sup>3</sup>/sec

Average Ammonia-N in River (upstream) = 0.05 mg/L \*

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average Ammonia-N in discharge = 0.075 mg/L

$$C_{\text{final}} = \frac{(3.84 \times 0.05) + (0.043 \times 0.075)}{3.84 + 0.043}$$

$$C_{\text{final}} = 0.0502 \text{ mg/L Ammonia-N}$$

The increase in Ammonia-N due to the discharge of Mallow WWTP is 0.2 µg/L.

Note: \* Results for river (upstream) analysis below Limit Of Detection for Ammonia-N test.

## Mallow – Attachment 5

### Assimilative Capacity Calculations

#### h) Mass Balance Equation for Zinc:

Gauge number 18055, upstream location of discharge.

DWF for River @ station n. 18055 = 1.86 m<sup>3</sup>/sec

(Note: As Zinc is classified in the Dangerous Substances Category, Dry Weather Flow (DWF) is used for calculations.)

Average Zinc in River (upstream) = 0.01 mg/L

Average volume of discharge = 0.043 m<sup>3</sup>/sec

Average Zinc in discharge = 0.0385 mg/L

$$C_{\text{final}} = \frac{(1.86 \times 0.01) + (0.043 \times 0.0385)}{1.86 + 0.043}$$

$$C_{\text{final}} = 0.0106 \text{ mg/L Zinc}$$

The increase in Zinc due to the discharge of Mallow WWTP is 0.64 µg/L.



## Mallow – Attachment 5

### Assimilative Capacity Calculations

Assimilative Capacity Calculations were not performed for the following parameters, as the substances were below the limit of detection in the upstream samples, in the discharge samples and in the downstream samples:

- (a) Chromium
- (b) Copper
- (c) Lead
- (d) Nickel
- (e) Cadmium
- (f) Barium
- (g) Boron

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# Comhairle Contae Chorcaí Cork County Council

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E.P.A.

27<sup>th</sup> June, 2008.

**Re : E.P.A. Discharge Licence Application for Mallow Town and Environs.**

## **SECTION G : PROGRAMME OF IMPROVEMENTS**

**Ref : G1 Compliance with Council Directives - Revised**

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I wish to state that the Upgrading of Mallow WWTP has been recently completed, the plant being fully commissioned in April 2005.

Included in the DOEHLG's Water Services Investment Programme (2007 – 2009) for Cork County is a Proposed Mallow Sewerage Scheme. This scheme's current status is that the Preliminary Report was submitted to the DOEHLG by Cork Co. Council in February 2008 and Approval sought to prepare Contract Documents.

Along with an Upgrading of the Pipe Network, the Preliminary Report recommends the elimination of the existing Storm Water Overflows and the provision of a Storm Water Holding Tank at the Bearforest Pumping Station (SW 2).

The WWTP at Mallow is fully compliant with the UWWD for BOD, COD and SS in 2007. However, the discharge breached the compliance limits for Total Phosphate and Total Nitrogen in 2007 as the discharge is to Sensitive Waters under the UWWD>

**Frank Cronin,  
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# Laboratory Test Report

## Cork County Council

### Waste Water Laboratory

#### Inniscarra, Co. Cork

June 25, 2008

Industry Name: Mallow Sewage Works  
 Address: Mallow, Co. Cork

Industry Code No. 312  
 Report Ref No. S25-06-08-158  
 Issued to F. Cronin  
SE Water Services  
Wt. Co. Cork

Licence No. Type S

Licence	Volume	pH	B.O.D.	C.O.D.	Sus Solids	TP-P	TN-N\$	Code	Comments
Limit	m3	12.99	mg/l	mg/l	mg/l	mg/l	mg/l		
999999		3.99	25	125	35	2.0	15		
Date									
17/01/07		7.4	2.4	<21	23	1.88	7.2	GR032	C
01/02/07		7.3	3.2	<21	9	* 2.27	* 22.3	GR101	C
08/03/07		7.6	3.9	21	16	1.07	10.4	GR208	C
~ 12/04/07		7.3	6	28	13	* 3.95	* 31	GR309	G THM\$=<1.0mg/L
03/05/07		7.4	5.5	25	11	1.23	14.8	GR351	C THM\$=<1mg/L
28/06/07		7.2	2.1	25	14	0.71	14	GR554	G THM\$=<1.0mg/L
13/09/07	2746	7.3	2.09	<21	8	1.46	8.3	GR858	G SO4=31mg/l NH3=<0.1mg/l
27/09/07	2946	7.7	2.12	33	33	3.3	* 23.4	GR905	C SO4=41.7mg/l NH3=0.1mg/l
03/10/07		7.6	4.88	36	12	3.18	* 23.8	GR947	C OP04=2.86mg/l NH3=<0.1m
24/10/07		7.3	7.08	34	28	* 2.39	* 18	GR1044	G OPO4-P=2.25mg/l
22/11/07		7.7	4.16	<21	9	* 2.50	* 20.4	GR1149	C NH3-N= <0.1mg/l
06/12/07			4.07	23	16	1.87	13.7	GR1176	C SO4= 35.9mg/l
% Compl.	100	100	100	100	100	50	50	***	
Average	2846.00	7.44	3.96	18.75	16.00	2.17	17.03	****. **	

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The samples are received at the Laboratory on the day of sampling. The above test methods are based on Standard Methods for the examination of Water and Waste Water, 21st Edition 2005, APHA, AWWA, WEF. C = Composite Sample, G = Grab Sample.

The compliance value may be varied on items marked with an \* by the application of uncertainty of measurement values on reverse Page Chemical Procedure Numbers(CP No.) for INAB accredited tests are as follows:

- CP NO. 1 = B.O.D.
- CP NO. 3 = S.S.
- CP NO. 20 = TP-P
- CP NO. 5 = pH
- CP NO. 6 = C.O.D.
- CP NO. 7 = Cl
- CP NO. 22 = Ammonia(KONELAB)
- CP NO. 23 = OPO4-P(KONELAB)
- CP NO. 24 = Chloride (KONELAB)
- CP NO. 25 = Sulphate(KONELAB)

This report relates only to the samples listed above. This report shall not be reproduced except in full and only with the approval of the testing laboratory. Cork County Council is not accredited by INAB for tests marked with \$. Kg loadings based on flows as supplied by the company. ~ indicates results that have been edited.

Reported by: V. Hannon Date: 25/06/08

Ms. V. Hannon  Technical Manager  
 Deputy Technical Manager

## **Wastewater Laboratory Cork County Council- Test Report Addendum**

- a. Sample date reported in column 1 on this report is the date of collection of the sample from the industry name and address as outlined at the top of the report.
- b. Cork County Council wastewater laboratory are not accredited for sample collection.
- c. Data reported in (d) below is defined in section 5.10.3 (c ) in wastewater laboratory quality manual.
- d. Table of Uncertainty Of Measurement – Estimate Of Values For Accredited Tests

Chemical Procedure No.	range	Test Name	Estimated Uncertainty	Units
CP No. 1	1 - 8 mg/l	Biochemical Oxygen Demand (BOD)	± 0.30	mg/l
CP No. 1	9 –70 mg/l	Biochemical Oxygen Demand (BOD)	± 3.2	mg/l
CP No. 1	71 - 700 mg/l	Biochemical Oxygen Demand (BOD)	± 40	mg/l
CP No. 3	35 mg/l	Suspended Solids (SS)	± 6.4	mg/l
CP No. 3	200 - 400mg/l	Suspended Solids (SS)	± 41.6	mg/l
CP No. 3	700 – 1000mg/l	Suspended Solids (SS)	± 80.0	mg/l
CP No. 5	2 - 12	pH	± 0.12	pH Units
CP No. 6	< 6 mg/l	Chemical Oxygen Demand (COD LR)	± 5.6	mg/l
CP No. 6	15 – 75 mg/l	Chemical Oxygen Demand (COD LR)	± 10.6	mg/l
CP No. 6	100 –135 mg/l	Chemical Oxygen Demand (COD LR)	± 17.4	mg/l
CP No. 6	120 – 1500mg/l	Chemical Oxygen Demand (COD High Range)	± 26.8	mg/l
CP No. 7	5.0 – 125 mg/l	Chloride (Cl.)	± 0.85	mg/l
CP No. 20	0.2 – 2.5 mg/l	Total Phosphorus (TP-P)	± 0.22	mg/l
CP No. 22	0.1 – 0.9 mg/l	Ammonia (Konelab)	± 0.04	mg/l
CP No. 22	1.0 – 2.0 mg/l	Ammonia (Konelab)	± 0.10	mg/l
CP No. 22	2 – 10 mg/l	Ammonia (Konelab)	± 0.32	mg/l
CP No. 22	11 – 19 mg/l	Ammonia (Konelab)	± 0.72	mg/l
CP No. 22	20 – 25 mg/l	Ammonia (Konelab)	± 1.56	mg/l
CP No. 23	0.05 – 1.00 mg/l	Orthophosphate as P (Konelab)	± 0.04	mg/l
CP No. 24	25.00 – 99.00 mg/l	Chloride (Konelab)	± 3.04	mg/l
CP No. 24	100.00 – 200.00 mg/l	Chloride (Konelab)	± 11.16	mg/l
CP No. 25	30.00 – 199.00 mg/l	Sulphate (Konelab)	± 3.42	mg/l
CP No. 25	200.00 – 250.00 mg/l	Sulphate (Konelab)	± 8.70	mg/l

**November 2007**

The raw data used to evaluate the above estimations is stored in the Wastewater Laboratory, Cork County Council.

The method followed is located in the Uncertainty of Measurement file and in the Eurachem Guidelines for Quantifying Uncertainty in Analytical Measurement.



# Cork County

## Water Services Investment Programme 2007 - 2009

Schemes at Construction	W/S	Est. Cost		W/S	Est. Cost
<b>Cork North</b>			<b>Cork South</b>		
Mitchelstown Sewerage Scheme (Nutrient Removal)	S	221,000	Ballincollig Sewerage Scheme (Upgrade) (G)	S	22,248,000
<b>Cork South</b>			Cork Lower Harbour Sewerage Scheme (excl. Crosshaven SS)	S	73,542,000
Ballyvourney/ Ballymakeery Sewerage Scheme	S	3,049,000	Shannagary/ Garyvoe/ Ballycotton Sewerage Scheme	S	3,780,000
Cobh/ Midleton/ Carrigtwohill Water Supply Scheme	W	10,135,000	Youghal Sewerage Scheme	S	14,420,000
Cork Lower Harbour Sewerage Scheme (Crosshaven SS) (G)	S	4,850,000	<b>Cork West</b>		
Cork Water Strategy Study (G)	W	941,000	Ballydehob Sewerage Scheme	S	683,000
Kinsale Sewerage Scheme	S	20,000,000	Bantry Water Supply Scheme	W	14,935,000
Midleton Sewerage Scheme (Infiltration Reduction) (G)	S	2,078,000	Clonakilty Sewerage Scheme (Plant Capacity Increase)	S	3,677,000
		<b>41,274,000</b>	Courtmacsherry/ Timoleague Sewerage Scheme	S	2,472,000
<b>Schemes to start 2007</b>			Dunmanway Regional Water Supply Scheme Stage 1	W	12,669,000
<b>Cork North</b>					<b>164,629,000</b>
North Cork Grouped DBO Wastewater Treatment Plant (Buttevant, Doneraile & Kilbrin)	S	5,150,000	<b>Serviced Land Initiative</b>		
<b>Cork West</b>			<b>Cork North</b>		
Skibbereen Sewerage Scheme	S	20,000,000	Ballyclough Water Supply Scheme	W	139,000
		<b>25,150,000</b>	Ballyhooley Improvement Scheme	W/S	139,000
<b>Schemes to start 2008</b>			Broghill-Rathgoggin Sewerage Scheme	S	406,000
<b>Cork North</b>			Bweeny Water Supply Scheme	W	115,000
Mallow/ Ballyvinter Regional Water Supply Scheme (H) W		8,652,000	Churchtown Sewerage Scheme (incl. Water)	W/S	543,000
Mallow Sewerage Scheme (H)	S	5,408,000	Glodulane Sewage Treatment Plant	S	417,000
<b>Cork South</b>			Freemount Sewerage Scheme	S	150,000
Ballincollig Sewerage Scheme (Nutrient Removal) (G)	S	948,000	Pike Road Sewerage Scheme (incl. Water)	W/S	2,080,000
Ballingeary Sewerage Scheme	S	1,296,000	Rathcomac Sewerage Scheme (incl. Water)	W/S	555,000
Bandon Sewerage Scheme Stage 2	S	14,729,000	Spa Glen Sewerage Scheme	S	736,000
City Environs (CASP) Strategic Study (G)	S	153,000	Uplands Fermoy Sewerage Scheme (incl. Water)	W/S	1,174,000
Cloghroe Sewerage Scheme (Upgrade)	S	683,000	Watergrasshill Water Supply Scheme (incl. Sewerage) (G)	W/S	4,151,000
Creechford Water Supply Scheme	W	1,318,000	<b>Cork South</b>		
Curtstown Sewerage Scheme	S	2,153,000	Ballincollig Sewerage Scheme (Bary's Rd Foul and Storm Drainage) (G)	S	1,164,000
Inniscarra Water Treatment Plant Extension Phase 1	W	2,678,000	Belgooley, Water Supply Scheme (incl. Sewerage)	W/S	2,913,000
Little Island Sewerage Scheme (G)	S	2,200,000	Blamey Water Supply Scheme (Ext. to Station Rd) (G)	W	416,000
<b>Cork West</b>			Carrigtwohill Sewerage Scheme (Treatment and Storm Drain) (G)	S	7,632,000
Bantry Sewerage Scheme	S	7,148,000	Castlematyr Wastewater Treatment Plant Extension	S	1,200,000
Dunmanway Sewerage Scheme	S	2,153,000	Crookstown Sewerage Scheme (incl. Water)	W/S	1,200,000
Leap/ Baltimore Water Supply Scheme	W	6,365,000	Dripsey Water Supply Scheme (incl. Sewerage)	W/S	1,112,000
Schull Water Supply Scheme	W	5,253,000	Glounthane Sewerage Scheme (G)	S	1,576,000
		<b>61,137,000</b>	Innishannon Sewerage Scheme	S	277,000
<b>Schemes to start 2009</b>			Innishannon Wastewater Treatment Plant	S	694,000
<b>Cork North</b>			Kerypikie Sewerage Scheme	S	832,000
Banteer/Dromahane Regional Water Supply Scheme	W	1,576,000	Kerypikie Water Supply Scheme	W	416,000
Conna Regional Water Supply Scheme Extension	W	2,627,000	Killeagh Wastewater Treatment Plant Extension	S	1,200,000
Cork NE Water Supply Scheme	W	4,326,000	Killeagh Water Supply Scheme (includes Sewerage)	W/S	485,000
Cork NW Regional Water Supply Scheme	W	6,046,000	Killeens Sewerage Scheme	S	420,000
Millstreet Wastewater Treatment Plant (Upgrade)	S	1,628,000	Kilnagleary Sewerage Scheme	S	694,000
			Midleton Wastewater Treatment Plant Extension	S	4,050,000



# Cork County contd.

## Water Services Investment Programme 2007 - 2009

	W/S	Est. Cost		W/S	Est. Cost
Mogeely, Castlemartyr & Ladysbridge Water Supply Scheme	W	2,566,000	<b>Cork South</b>		
North Cobh Sewerage Scheme (G)	S	3,193,000	Carrigtwohill Sewerage Scheme (G)	S	20,000,000
Riverstick Water Supply Scheme (incl. Sewerage)	W/S	525,000	Cork Sludge Management (G)	S	14,420,000
Rochestown Water Supply Scheme	W	2,700,000	Cork Water Supply Scheme (Storage - Mount Emla, Ballincollig & Chetwind) (G)	W	8,500,000
Saleen Sewerage Scheme	S	1,051,000	Inniscarra Water Treatment Plant (Sludge Treatment)(G)W		5,356,000
Youghal Water Supply Scheme	W	2,300,000	Macroom Sewerage Scheme	S	5,150,000
<b>Cork West</b>			Minane Bridge Water Supply Scheme	W	1,421,000
Castletownshend Sewerage Scheme	S	1,576,000			
		<b>50,797,000</b>	<b>Cork West</b>		
<b>Rural Towns &amp; Villages Initiative</b>			Bantry Regional Water Supply Scheme (Distribution)	W	9,455,000
<b>Cork North</b>			Cape Clear Water Supply Scheme	W	1,679,000
Buttevant Sewerage Scheme (Collection System)	S	2,446,000	Castletownbere Regional Water Supply Scheme	W	8,405,000
Doneraile Sewerage Scheme (Collection System)	S	1,738,000	Glengarriff Sewerage Scheme	S	2,500,000
<b>Cork South</b>			Roscarberry/Owenahincha Sewerage Scheme	S	1,576,000
Innishannon (Ballinadee/ Ballinspittle/ Garrettstown) Water Supply Scheme	W	6,726,000	Skibbereen Regional Water Supply Scheme Stage 4	W	7,880,000
<b>Cork West</b>					<b>95,646,000</b>
Ballylicky Sewerage Scheme	S	2,153,000	<b>Water Conservation Allocation</b>		<b>12,206,000</b>
Baltimore Sewerage Scheme	S	3,162,000	<b>Asset Management Study</b>		<b>300,000</b>
Castletownbere Sewerage Scheme	S	6,202,000	<b>South Western River Basin District (WFD) Project<sup>1</sup></b>		<b>9,400,000</b>
Schull Sewerage Scheme	S	3,523,000			
		<b>24,950,000</b>	<b>Programme Total</b>		<b>485,489,000</b>
<b>Schemes to Advance through Planning</b>					
<b>Cork North</b>					
Mitchelstown North Galtees Water Supply Scheme	W	3,152,000			
Mitchelstown Sewerage Scheme	S	3,000,000			
Newmarket Sewerage Scheme	S	3,152,000			

<sup>1</sup> This project is being led by Cork County Council on behalf of other authorities in the River Basin District

(H) Refers to a Hub as designated in the National Spatial Strategy

(G) Refers to a Gateway as designated in the National Spatial Strategy



## Section A Non Technical Summary -Mallow D0052-01 Revised

### A Description of the Waste Water Works and the Activities Carried Out Therein

The wastewater in Mallow is collected in a partially combined foul and separated foul sewage drainage network. The wastewater drains from the town on both sides of the Blackwater River. The wastewater drains to a pumping station at Mallow Bridge, which is then pumped to the WWTW.

The Mallow WWTP is designed for a Population Equivalent (PE) of 18,000PE and BOD loading of 1,080 Kg/day. The maximum hydraulic capacity of the Mallow WWTP is 556m<sup>3</sup>/h which is 2.5 Dry Weather Flow (2.5DWF).

The treatment plant treats all flows that arrive at the works to secondary standards in accordance with the Urban Waste Water Directive 1994 as shown in the following table:

Parameter	Effluent Limit
BOD	25 mg/l
COD	125 mg/l
Suspended Solids	35 mg/l
Phosphate	2 mg/l
Ammonia	3 mg/l
Total Nitrogen	25 mg/l
Sludge	18% or greater

Table 1 – Effluent Limits discharge

The existing WWTW was upgraded with an additional stream. The flow is split after the wastewater passes through the new inlet works. 50% of the flow is diverted to the existing wastewater treatment stream. The remaining 50% is directed to a new treatment system. The existing stream has an aeration phase, a secondary settlement phase and return activated sludge phase. The new stream has an anaerobic, anoxic and aeration phase, a secondary settlement phase and return activated sludge phase.

Sludge is wasted separately from each stream to a common storage sludge blend tank, common Picket Fence Thickener and common dewatering plant.

A summary of the treatment process is presented below:

<b>Inlet works</b>	2Duty/1Standby pumps, 2 No. mechanical screens with aerated grit and grease removal system, flow measurement and grit classifier.	
	<b>EXISTING STREAM</b>	<b>NEW STREAM</b>
<b>Biological Treatment</b>	2 No. Aeration Tanks with 2 No. surface aerators.	- 1 No. Anaerobic tank with 3 No. mixers. - 1 No. Anoxic tank - 1 No. aeration tank with fine bubble disc aeration
<b>Phosphorus Removal</b>	Ferric Sulphate dosing	
<b>Secondary Settling</b>	3 No. 13m diameter final settlement tanks with half bridge sludge scraper.  Sludge settled within the settlement tanks is withdrawn by gravity from each central sludge hopper to the return sludge pump sump.  Surplus Activated Sludge (SAS) is pumped by 2 No. pumps (Duty/Standby) from the pump sump to the sludge blend/holding tank. Return Activated Sludge (RAS) is pumped 2 No. pumps (Duty/Standby) from the pump sump and is mixed with the incoming influent.	1 No. 20m diameter final settlement tanks with half bridge sludge scraper.

<b>Sludge Treatment</b>	<ul style="list-style-type: none"> <li>- 1 No. sludge acceptance tank, 45m<sup>3</sup>, 1 No. mixer and sludge pump sump equipment with 2 No. Pumps.</li> <li>- 1 No. Sludge Blend/Holding tank, 251m<sup>3</sup>, 1 No. mixer and sludge pump sump equipment with 2 No. Pumps.</li> <li>- 1 No. Picket Fence Thickener for thickening from 0.5% to 2% Dry Solids, 183m<sup>3</sup>.</li> <li>- 2 No. Sludge Belt Presses with 2 No. sludge transfer pumps, 1 No. poly make-up unit with 3 No. dosing pumps.</li> </ul>
<b>Effluent Discharge</b>	1 No. 450mm gravity outfall pipe to Blackwater River.

Ancillary equipment at the WWTP also includes the following:

- Odour Treatment Unit with 2 No extractor fans.
- SCADA system covering all the plant including sludge treatment process.
- Buildings - Inlet and sludge building, electricity transformer building, laboratory and control room building with fire alarm and security alarm systems.

The Mallow WWTP is currently operated by a Cork County Council. Tender documents for a 20 year Operation and Maintenance Contract are being prepared. The plant is manned during the working week 8.00am - 5.30pm (Monday - Friday) by a plant manager . During out of hours the SCADA system will send alarms to a mobile phone of the person on standby.

It is proposed to accept leachate into the WWTP for treatment from the local authorities landfill site at Bottlehill. The estimated quantity is approximately 107m<sup>3</sup>/day (85 Kg/day) equivalent to approximately 1430 PE capacity. The available reserve capacity at the plant can cater easily for this load and storage facilities will be provided for the leachate at the plant .

### **The Sources of Emissions from the Waste Water Works**

The pollution load for the Mallow agglomeration arises from the following areas:

- The local Population
- The local Industries

The pollution load from these sources varies greatly with daily, weekly and seasonal producers of effluent. The sewage from all industries is collected via the public sewer and treated in conjunction with domestic waste at the waste water treatment plant.

The domestic population of Mallow has grown over the last three censuses owing to its development as a town within the Cork Metropolitan area. The most recent Census figures show that Mallow Town and environs now has a population in excess of 7,091 (Census, 2006). Other sources of influent that contribute to the sewage scheme would be:

- Commercial premises
- Schools
- Tourism

### **The nature and quantities of foreseeable emissions from the waste water works into the receiving aqueous environment as well as identification of significant effects of the emissions on the environment.**

The final effluent is discharged into the Blackwater River. At design capacity the WWTW will discharge 5,250m<sup>3</sup>/d to the river.



## **Environmental Impacts**

An Environmental Impact Statement was carried out for the Expansion and Upgrading of Mallow Sewage Treatment Works in August 2000 by T.J. O'Connor & Associates. This report stated:

*"The increase in population and industry in the Mallow area will place additional demands on the wastewater treatment facilities in the area and if not provided for could be expected to result in a deterioration of the water quality in the Blackwater River downstream of the town. However, the proposed upgrading and expansion works at the Wastewater Treatment plant are designed to protect the water body downstream of the outfall sufficiently to restore its quality rating to around Q4. Without the proposed works, the town developments would cause a much greater BOD loading to the river, so that the effect of the treatment works expansion is positive."*

It is necessary to consider that the effluent quality will meet the requirements stated in the Urban Waste Water Directive 1994.

## **The Proposed Technology and Other Techniques for Preventing or, Where This Is Not Possible, Reducing Emissions from the Waste Water Works**

### ***Technologies***

In the WWTW at Mallow a sufficient number of standby pumps, fans, etc. is provided in order to ensure continuation of the wastewater and sludge treatment and to comply with all environmental standards in case of equipment failures or breakdowns. Standby equipment is installed, ready for take over, or available in stock on site.

Provision is made for the connection of mobile generators in control panels to enable the plant to operate during mains electric power failure thereby preventing untreated emissions from entering the receiving aqueous environment.

### ***Techniques***

A Performance Management System (PMS) is in place at the Mallow Wastewater Treatment Plant. This Performance Management System was developed by the Water Services National Training Group (WSNTG). The PMS provides a uniform approach to dealing with all relevant performance management issues, including Independent Compliance Audits, Management of Change, Dispute Resolution, Public Relations, Emergency Procedures and Reporting Procedures.

Cork County Council performs the Operation of the WWTP in accordance with the Performance Management System and maintains the design performance capability of the existing treatment plant.

## **Further measures planned to comply with the general principle of the basic obligations of the operator, i.e., that no significant pollution is caused**

### ***Prevention of pollution***

Any alteration upgrading of the existing infrastructure undertaken by Cork County Council shall not increase the potential to cause pollution in the environment. In particular any alterations to the wastewater treatment plant will be designed to enable any operator of the facility to prevent pollution of the environment by the following potential contaminants:

- Surface water run-off
- Spillages
- Solid Waste

### ***Toxic Substances***

Cork County Council shall ensure that any modification or alterations to the plant do not increase the impact by any toxic substances. All chemicals and dangerous substances must be stored safely at all times and all appropriate safety measures must be taken to ensure against leakage and spillage in accordance with the relevant Health and Safety Legislation.

### **Measures planned to monitor emissions into the environment**

Cork County Council, as current operator has developed using the PMS as a template, procedures and processes for sampling and analysis of the incoming raw sewage, outgoing effluent, sludge and other by-products such as screenings, so that analytical results are reliable, repeatable, consistent and accurate. Sampling procedures are in accordance with EU and Irish Regulations, and in particular in accordance with the Environmental Protection Agency's (EPA) monitoring and operating requirements. All laboratory analyses are performed in accordance with the latest edition of the Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association, and the Water Pollution Control Federation or other methods of comparable accuracy.

Regular independent laboratory analysis is also undertaken to externally monitor the operator's performance. Flow proportional or time based 24 hour samples are collected at the same well defined point at the inlet and outlet of the treatment works in order to monitor compliance with the requirements. A refrigerated sampler minimizes degradation between collection and analysis. Certain heavy metal analyses are also required on an annual basis as identified in 'Code of Good Practice for Use of Biosolids in agriculture'.

The operator is responsible for developing and implementing procedures to remedy defects in his laboratory procedures where the independent checking shows variations of more than  $\pm 10\%$ .

The sampling of the statutory samples is in accordance with the following procedures: -

- All samples are representative of the appropriate stream.
- Daily grab samples are taken at approximately the same times each day.
- Samples are fixed, stored and handled as per standard methods. Analysis of the samples (both operator's and Employer's) are undertaken within 24 hours and reported to the Employer's Representative within 48 hours. Exceptions are BOD, metals and pathogens, which are reported within 7 days.

The monitoring and recording of the status of all parameters appropriate to proper control and operation of the plant is carried out.

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