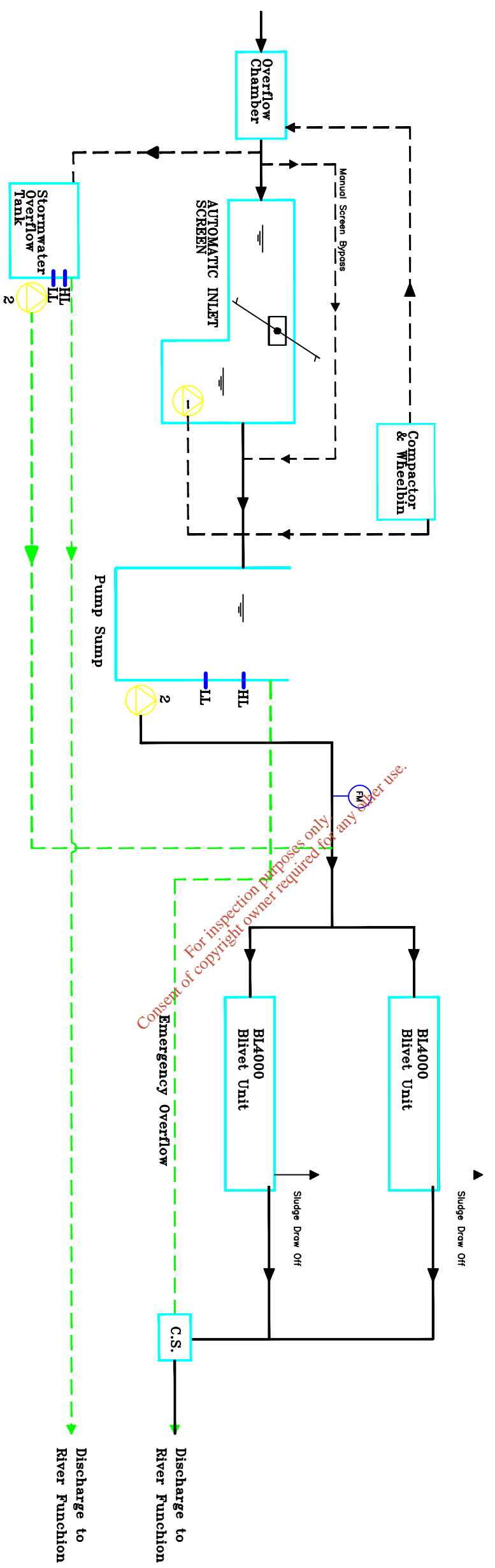
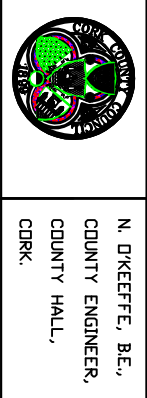


- NOTES**
1. Dimensions are not to be scaled from drawing. For any discrepancies found consult with the design office.
  2. This drawing is to be read in conjunction with the Specification.
  3. This drawing is to be read in conjunction with all other contract drawings.



No.	Date	Drawn/Checked	Revision Description

Cork County Council,  
Northern Division.



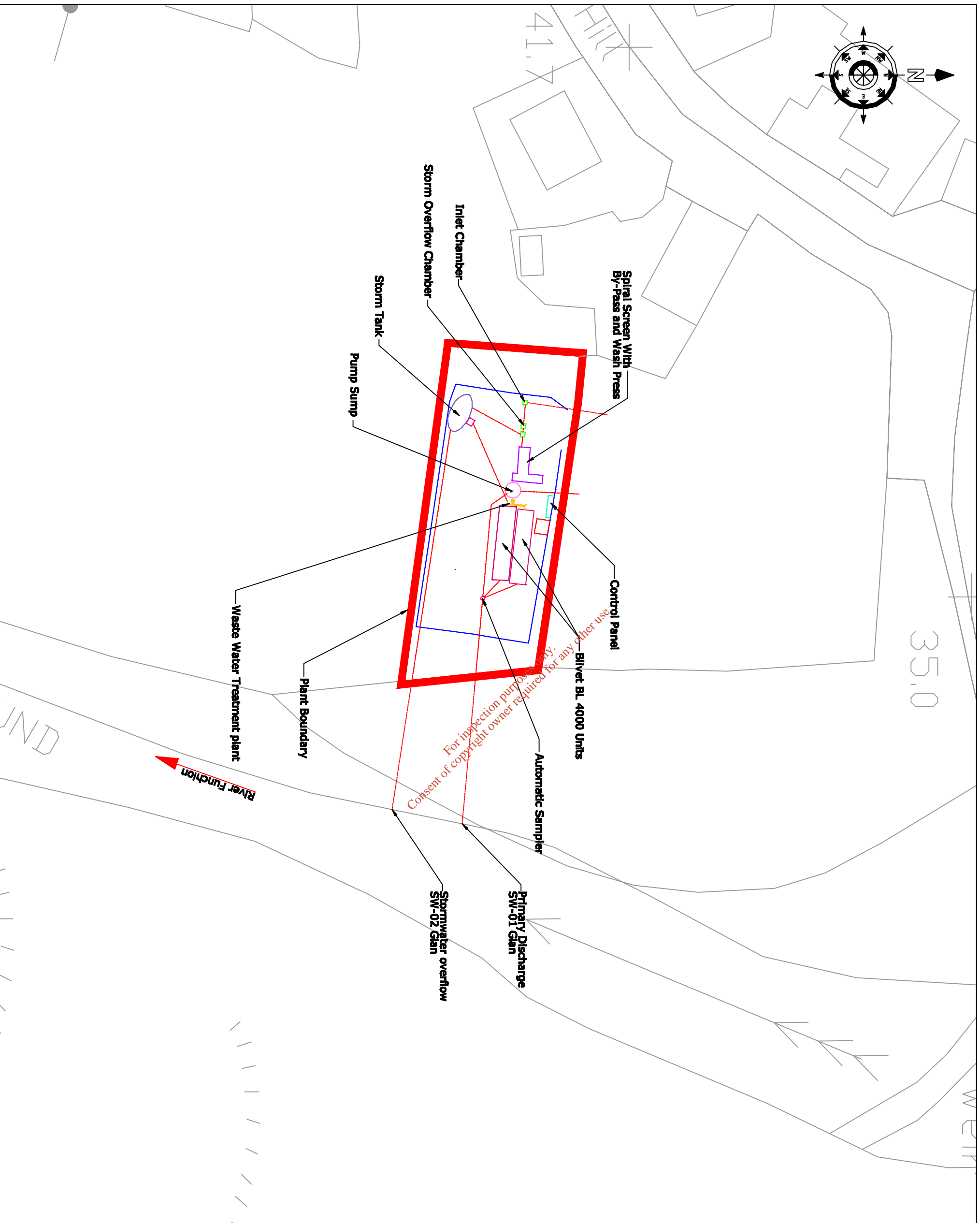
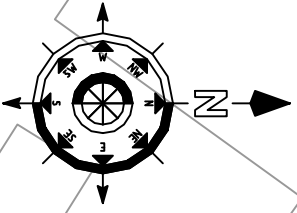
N. O'KEEFE, B.E.,  
COUNTY ENGINEER,  
COUNTY HALL,  
CORK.

Job Title:  
**Glanworth & Environs  
Waste Water Discharge  
Licence Application**

Drawing Title:  
**Schematic showing Existing  
Treatment Plant Process  
Attachment C1 - Drawing 1**

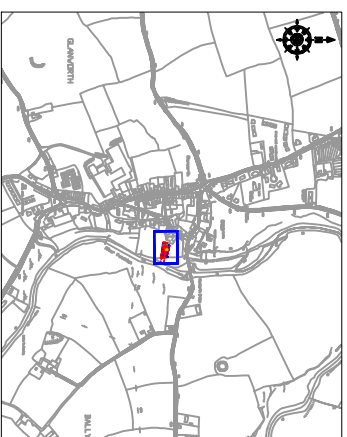
Scales:	1:5000 @ A3	Drawn by:	DL
Designed by:	EM	Checked by:	FL
Drawing number:	C1 - Drawing 1	Date:	June 2009

35.0



**NOTES**

1. Dimensions are not to be scaled from drawing. For any discrepancies found consult with the design office.
2. This drawing is to be used in conjunction with the Specification.
3. This drawing is to be used in conjunction with all other contract drawings.



No.	Date	Drawn/Checked	Revision Description

Cork County Council,  
Northern Division.



N. O'KEEFE, B.E.,  
COUNTY ENGINEER,  
COUNTY HALL,  
CORK.

Job Title:  
**Glanworth & Environs  
Waste Water Discharge  
Licence Application**

Drawing Title:

**Waste Water Treatment Plant  
Site Layout  
Attachment C1 - Map 9**

Scales:		Drawn by:	
1:500 @ A3	D.L.	D.L.	D.L.
Designed by:	Checked by:	Date:	
E.M.	P.C.	June 2009	
Drawing number:	Rev:		
C1 - Map 9	-		

# OUTLINE SPECIFICATION FOR SEWAGE TREATMENT PLANTS

## THE BMS BL 4000 BLIVET RANGE

### 1. GENERAL

The BMS BLIVET system is the most compact "all in one" system available. The civil works are minimal consisting of a flat concrete support slab the plan area of the unit constructed 1.5m below the invert of the incoming pipe.

As the final appearance of the unit is critical, the system may be buried up to deck level such that the impact on the landscape is not intrusive. The units are covered preventing noise and fly nuisance. The BLIVET is a modular unit that lends itself to future expansion or relocation.

### 2. DESIGN PARAMETERS BL4000 BLIVET

Parameter	Influent	Effluent
Design flow	3333 L/Hr	3333 L/Hr
BOD	300 mg/l	20 mg/l
Average flow	80 m3/day	80 m3/day
Suspended Solids	300 mg/l	30 mg/l

Please note: Selection of unit may vary for the final effluent quality required e.g. this unit is nominally 250 PE to produce '20:30' and 310 PE to produce '25:35'. Selection of unit may vary for any other final effluent quality required.

### 3. TREATMENT

#### 3.1 Primary Settlement

The Blivet is capable of receiving raw sewage and settling gross solids without recourse to mechanical means. It incorporates lamella or parallel plates to enhance efficiency and utilisation of space. The Primary Settlement zone reduces the Suspended Solids by 75% and the BOD by 25% to 30%. This zone is relatively maintenance free and contains no moving mechanical parts or electrical devices. Lockable GRP covers with easy access and sufficient ventilation are provided.

#### 3.2 Aerobic Treatment

Settled sewage is treated by means of an efficient and compact system (the BMS Aerotor Biozone) requiring minimal power input and maintenance. It is a combined fixed film reactor and active aeration system mounted on a horizontal shaft. The rotational media is a spiral formation enclosed in outer drum to provide active aeration, intense surface area and net hydraulic lift.

The Biozone is self cleansing and no extraneous pumping or sludge returns are required. For process efficiency it is, in effect, a plug flow system.

#### 3.3 Final Settlement

The final settlement or Humus tank is a discrete compartment denying ingress of untreated or partially treated liquor. The design is similar to the Primary Settlement Tank on an upward flow basis. A Saran Filter or equivalent may be fitted just below the TWL. This is static design i.e. not powered, and set in frames that are easily removable for cleansing. This zone has frequent automatic removal of sludge to sludge storage by means of a timed submersible pump.

#### 3.4 Sludge Storage

Sludge storage is provided in the base of the unit. Depending on the load applied there is approx. 12 weeks capacity provided. Normally desludging is carried out by suction tanker.

## 4. MATERIALS/CONSTRUCTION

### 4.1 Tankage

The Blivet is a unitary tank in multiple modules if necessary. The outside tank is reinforced GRP and is capable of free standing or interment up to deck level without the necessity of a concrete surround. All internal surfaces in contact with sewage are GRP. The maximum weight of the BL4000 unit is 6.8 tonne (unladen) and maximum dimensions are 2.27m width, 10.9m length and 3m overall height. Adequate permanent lifting hooks are provided. All watertight compartments are hydraulically tested before leaving the manufacturer. Quality certificates can also be provided. Copies of certificates of conformity for all major components and materials are available for inspection. The tank and internal components are accessed by a series of lockable GRP covers capable of being lifted by one person. These can be manufactured in a colour of the client's choice to enhance the visual impact of the location.

### 4.2 Mechanical

The shaft supporting the media is EN 8 steel and has a diameter of 60mm. It is driven through a reduction gear box of the helical gear variety with an output speed of 6 RPM. Each section of the shaft is coupled by a duplex chain coupling encased in a chain guard with grease access nipple. Either side of each coupling the shaft is supported by roller bearings in plummer blocks fitted with double lip seals and grease access nipples. The unit has just one drive train. All mechanical components provided are of world renown manufacture with spare parts readily available in the country of operation. A grease gun with extended grease hose is provided with each unit and mounted in the motor/gearbox compartment.

### 4.3 Electrical

In order to minimise power consumption, possible breakdown and extra maintenance, the unit has a maximum of two electrical devices i.e. the main shaft drive and a final sludge return pump. The main motor in the BL4000 unit is only 0.75Kw (in three phase)/1.1hp. It is directly coupled to the reduction gearbox and is easily accessible protected by a locked GRP cover. A submersible pump of maximum 1.5hp is fitted in the final settlement compartment. This is activated by an adjustable minute timer connected in the control box. A single control box is mounted on the motor/gearbox compartment and is accessible from the surface. It contains all the electrical controls and is to I.P 55 standard.

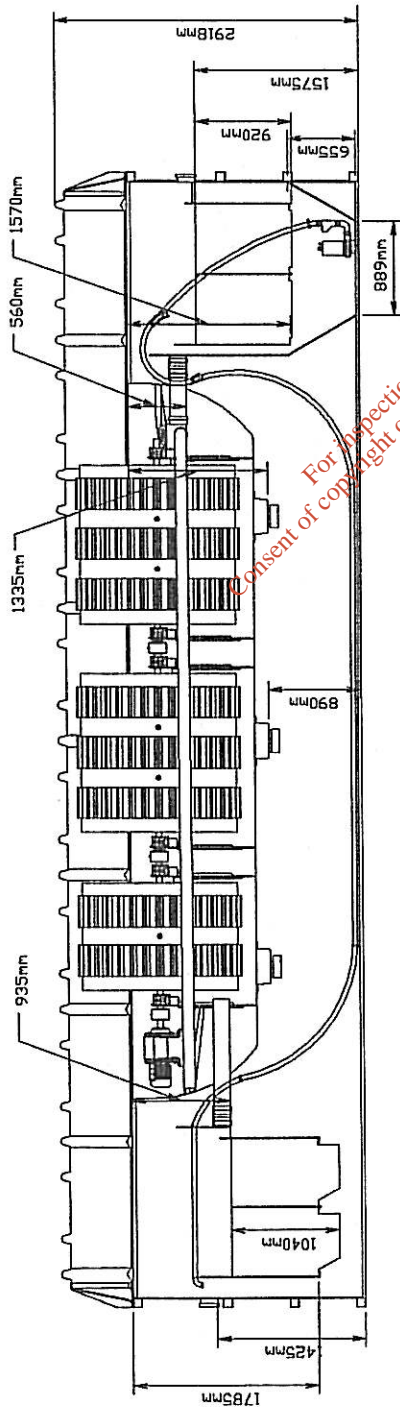
## 5 CIVIL WORKS

For ease of construction the civil works consist of a flat base support slab (2.3m wide by 11m long) in 20N reinforced concrete, the placing of the units thereon, the pipe and electrical connections and back filling with fine material if units are not free standing.

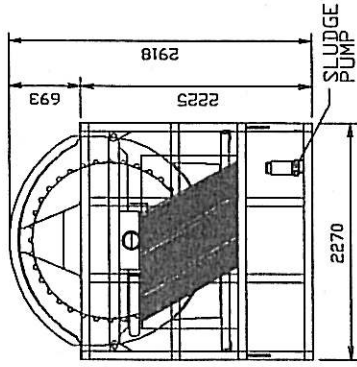
## 6. LOCATION

As with all similar sized sewage works it is preferable to locate a system at least 50m from the nearest habitable building. However if the units are to be inside a building e.g. a basement, then adequate procedures must be taken to ventilate the location remotely to areas not frequented by users of the development.

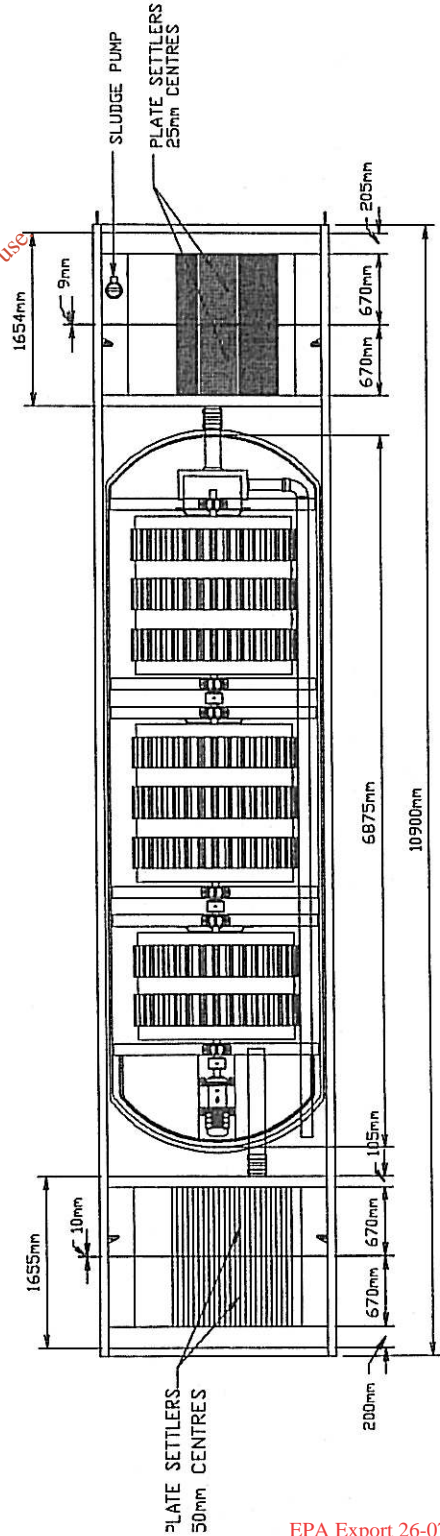
**Particular care must be taken to avoid locations prone to flooding.**



ELEVATION



END VIEW



PLAN

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REVISION	Company	Drawn by
1 April 96 Changed spacings on elevation	BUTLER MANUFACTURING SERVICES LTD	DH
2 Dec 00 Converted to AutoCAD LT		
3 Nov 02 Changed lids		
	Date	22 APRIL 1997
	Title	BL4000 CONTAINERISED
	Scale	1 : 50
	Approved by	BL4001
	Drawing no.	BL4001

PT_CD	PT_TYPE	LA_NAME	RWB_TYPE	RWB_NAME	DESIGNATION	EASTING	NORTHING	VERIFIED
SW01	GLAN	cork county council	river	Funshion	none	175870	103919	N

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## Attachment E4 Glanworth Inlet Table E4

Sample Date	28/01/2009	17/02/2009	19/02/2009	19/03/2009	21/04/2009	19/05/2009	
Sample	Influent	Influent	Influent	Influent	Influent	Influent	Average
Sample Code	GT158	*	GT223	*	GT719	GT801	
Flow M <sup>3</sup> /Day	*	8.5	*	8.3	8.2	8.6	
pH	8	*	*	*	*	*	8
Temperature °C	*	762	*	725	986	733	
Cond 20°C	679	232	*	87	930	199	425.4
SS mg/L	132	22.8	*	85.2	56	17.5	62.7
NH <sub>3</sub> mg/L	38.2	257	*	387	1190	355	445.44
BOD mg/L	201	716	*	616	3020	755	1061.6
COD mg/L	599	62	*	88	79		207
TN mg/L	47.2	*	*	*	*	71.7	59.45
Nitrite mg/L	0.523	*	*	*	*	*	0.523
Nitrate mg/L	3.79	7.1	*	9.5	27.6	5.8	10.758
TP mg/L	8.3	4.4	*	7.3	10.6	3.7	6.86
O-PO4-P mg/L	3.07	*	*	*	*	*	3.07
SO4 mg/L	38	*	*	*	*	*	38
Phenols µg/L	<0.10	*	*	*	*	*	<0.10
Atrazine µg/L	<0.01	*	*	*	*	*	<0.01
Dichloromethane µg/L	<1	*	*	*	*	*	<1
Simazine µg/L	<0.01	*	*	*	*	*	<0.01
Toluene µg/L	<1	*	*	*	*	*	<1
Tributyltin µg/L	not required	*	*	*	*	*	*
Xylenes µg/L	<1	*	*	*	*	*	<1
Arsenic µg/L	<0.96	*	*	*	*	*	<0.96
Chromium ug/L	20	*	10	*	10	10	12.5
Copper ug/L	109	*	23	*	298.7	10	110.175
Cyanide µg/L	<5	*	*	*	*	*	<5
Fluoride µg/L	730	*	*	*	*	*	730
Lead ug/L	<20	*	<20	*	<20	<20	<20
Nickel ug/L	<20	*	<20	*	<20	<20	<20
Zinc ug/L	52	*	129	*	397.7	10	<20
Boron ug/L	<20	*	<20	*	<20	<20	<20
Cadmium ug/L	<20	*	<20	*	<20	<20	<20
Mercury µg/L	<0.2	*	*	*	*	*	<0.2
Selenium µg/L	1	*	*	*	*	*	1
Barium ug/L	49		29.5		107.1	10	48.9

HALF LOD FOR STATISTICAL PURPOSES

# Attachment E4 Glanworth Downstream Table E4

Sample Date	23/10/2008	28/01/2009	17/02/2009	19/02/2009	05/03/2009	19/03/2009	21/04/2009	19/05/2009	Average
Sample	River	River	River	River	River	River	River	River	
Sample Code	GS1138	GT160	GT287	GT222	GT326	GT411	GT722	GT804	
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	
pH		7.8	8.5	*	*	8.1	8.2	7.9	8.1
Temperature °C		*	8.5	*	*		*	*	
Cond 20°C		309	474	*	*	512	498	387	436
SS mg/L		9	7	*	*	<2	3	3	5.5
NH <sub>3</sub> mg/L		0.2	0.09	*	*	0.06	<0.05	0.06	0.1025
BOD mg/L		1	<2	*	*	<2	<2	<2	1
COD mg/L		10.5	2.5	*	*	2.5	8	23	9.3
TN mg/L		4.8	4.9	*	*	4.6	4	4.32	4.524
Nitrite mg/L		0.0235	*	*	*	*	*	*	0.0235
Nitrate mg/L		4.47	*	*	*	*	*	*	4.47
TP mg/L		0.1	0.025	*	*	0.18	0.09	0.08	0.095
O-PO4-P mg/L		0.025	<0.05	0.025	0.10	0.05	0.07	0.08	0.058333
SO4 mg/L		<30	*	*	*	*	*	*	<30
Phenols µg/L		<0.10	*	*	*	*	*	*	<0.10
Atrazine µg/L		<0.01	*	*	*	*	*	*	<0.01
Dichloromethane		<1	*	*	*	*	*	*	<1
Simazine µg/L		<0.01	*	*	*	*	*	*	<0.01
Toluene µg/L		<1	*	*	*	*	*	*	<1
Tributyltin µg/L		not required	*	*	*	*	*	*	not required
Xylenes µg/L		<1	*	*	*	*	*	*	<1
Arsenic µg/L		<0.96	*	*	*	*	*	*	<0.96
Chromium ug/L		<20	<20	<20	*	<20	<20	<20	<20
Copper ug/L		10	10	10	*	43.1	10	<20	16.62
Cyanide µg/L		<5	*	*	*	*	*	*	<5
Fluoride µg/L		57	*	*	*	*	*	*	57
Lead ug/L		<20	<20	<20	*	<20	<20	<20	<20
Nickel ug/L		<20	<20	<20	*	<20	<20	<20	<20
Zinc ug/L		10	10	10	*	29.9	10	<20	13.98
Boron ug/L		10	10	10	*	43.9	10	<20	16.78
Cadmium ug/L		<20	<20	<20	*	<20	<20	<20	<20
Mercury µg/L		<0.2	*	*	*	*	*	*	<0.2
Selenium µg/L		0.9	*	*	*	*	*	*	0.9
Barium ug/L		51	10	25	*	28.2	10	<20	24.84

HALF LOD FOR STATISTICAL PURPOSES



## Attachment E4 Glanworth Inlet Table E4

Sample Date	28/01/2009	17/02/2009	19/02/2009	19/03/2009	21/04/2009	19/05/2009	
Sample	Influent	Influent	Influent	Influent	Influent	Influent	Average
Sample Code	GT158	*	GT223	*	GT719	GT801	
Flow M <sup>3</sup> /Day	*	8.5	*	8.3	8.2	8.6	
pH	8	*	*	*	*	*	8
Temperature °C	*	762	*	725	986	733	
Cond 20°C	679	232	*	87	930	199	425.4
SS mg/L	132	22.8	*	85.2	56	17.5	62.7
NH <sub>3</sub> mg/L	38.2	257	*	387	1190	355	445.44
BOD mg/L	201	716	*	616	3020	755	1061.6
COD mg/L	599	62	*	88	79		207
TN mg/L	47.2	*	*	*	*	71.7	59.45
Nitrite mg/L	0.523	*	*	*	*	*	0.523
Nitrate mg/L	3.79	7.1	*	9.5	27.6	5.8	10.758
TP mg/L	8.3	4.4	*	7.3	10.6	3.7	6.86
O-PO <sub>4</sub> -P mg/L	3.07	*	*	*	*	*	3.07
SO <sub>4</sub> mg/L	38	*	*	*	*	*	38
Phenols µg/L	<0.10	*	*	*	*	*	<0.10
Atrazine µg/L	<0.01	*	*	*	*	*	<0.01
Dichloromethane µg/L	<1	*	*	*	*	*	<1
Simazine µg/L	<0.01	*	*	*	*	*	<0.01
Toluene µg/L	<1	*	*	*	*	*	<1
Tributyltin µg/L	not required	*	*	*	*	*	*
Xylenes µg/L	<1	*	*	*	*	*	<1
Arsenic µg/L	<0.96	*	*	*	*	*	<0.96
Chromium ug/L	20	*	10	*	10	10	12.5
Copper ug/L	109	*	23	*	298.7	10	110.175
Cyanide µg/L	<5	*	*	*	*	*	<5
Fluoride µg/L	730	*	*	*	*	*	730
Lead ug/L	<20	*	<20	*	<20	<20	<20
Nickel ug/L	<20	*	<20	*	<20	<20	<20
Zinc ug/L	52	*	129	*	397.7	10	<20
Boron ug/L	<20	*	<20	*	<20	<20	<20
Cadmium ug/L	<20	*	<20	*	<20	<20	<20
Mercury µg/L	<0.2	*	*	*	*	*	<0.2
Selenium µg/L	1	*	*	*	*	*	1
Barium ug/L	49		29.5		107.1	10	48.9

HALF LOD FOR STATISTICAL PURPOSES

## Attachment E4 Glanworth Discharge Outlet Table E4

Sample Date	18/09/2008	23/10/2008	28/01/2009	17/02/2009	19/02/2009	05/03/2009	19/03/2009	21/04/2009	19/05/2009	Average
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	
Sample Code	GS928	GS1139	GT157	GT285	GT223	GT324	GT409	GT720	GT802	
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	*	
pH		7.4	7.6	7.8	7.5	7.6	7.8	7.4	7.6	7.5875
Temperature °C	*	*	*	*	*	*	*	*	*	
Cond 20°C	*	*	562	643	*	596	617	659	597	612.3333
SS mg/L	48	120	16	10	13	60	17	29	217	58.88889
NH <sub>3</sub> mg/L	*	*	17.7	15.6	*	*	23.4	24	17	19.54
BOD mg/L	56.9	117	19	11	22	36	49	76	36	46.98889
COD mg/L	153	270	123	89	75	76	136	236	103	140.1111
TN mg/L	*	*	21.1	23	*	*	23	26	29.9	24.6
Nitrite mg/L	*	*	0.351	*	*	*	*	*	*	0.351
Nitrate mg/L	*	*	2.72	*	*	*	*	*	*	2.72
TP mg/L	*	*	6.1	7.1	*	*	3.9	5.2	3.4	5.14
O-PO4-P mg/L	*	*	2.71	2.6	*	*	2.4	3.4	2.3	2.682
SO4 mg/L	*	*	<30	*	*	*	*	*	*	<30
Phenols µg/L	*	*	<0.10	*	*	*	*	*	*	<0.10
Atrazine µg/L	*	*	<0.01	*	*	*	*	*	*	<0.01
Dichloromethane	*	*	<1	*	*	*	*	*	*	<1
Simazine µg/L	*	*	<0.01	*	*	*	*	*	*	<0.01
Toluene µg/L	*	*	<1	*	*	*	*	*	*	<1
Tributyltin µg/L	*	*	not required	*	*	*	*	*	*	*
Xylenes µg/L	*	*	<1	*	*	*	*	*	*	<1
Arsenic µg/L	*	*	<0.96	*	*	*	*	*	*	<0.96
Chromium ug/L	*	*	<20	<20	*	*	<20	<20	<20	<20
Copper ug/L	*	*	10	24	*	*	10	59.1	<20	25.775
Cyanide µg/L	*	*	<5	*	*	*	*	*	*	<5
Fluoride µg/L	*	*	544	*	*	*	*	*	*	544
Lead ug/L	*	*	<20	<20	*	*	<20	<20	<20	<20
Nickel ug/L	*	*	<20	<20	*	*	<20	<20	<20	<20
Zinc ug/L	*	*	10	22	*	*	10	77.5	<20	29.875
Boron ug/L	*	*	<20	30	*	*	<20	<20	<20	30
Cadmium ug/L	*	*	<20	<20	*	*	<20	<20	<20	<20
Mercury µg/L	*	*	<0.2	*	*	*	*	*	*	<0.2
Selenium µg/L	*	*	1.1	*	*	*	*	*	*	1.1
Barium ug/L	*	*	23	20	*	*	20.8	26.5	<20	22.575

HALF LOD FOR STATISTICAL PURPOSES

# Attachment E4 Glanworth Upstream Table E4

Sample Date	23/10/2008	28/01/2009	17/02/2009	19/02/2009	05/03/2009	19/03/2009	21/04/2009	19/05/2009
Sample	River	River	River	River	River	River	River	River
Sample Code	GS1140	GT159	GT286	GT224	GT325	GT721	GT803	GT803
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*
pH		7.8	7.9	*	*	8.1	7.9	7.95
Temperature °C		*	8.5	*	*	*	*	
Cond 20°C		304	451	*	*	505	387	435.75
SS mg/L		6	3	*	*	3	6	3.25
NH <sub>3</sub> mg/L		0.2	0.3	*	*	0.06	0.07	0.1525
BOD mg/L		<1	<2	*	*	<2	<2	<2
COD mg/L		10.5	2.5	*	*	2.5	31	9.8
TN mg/L		4.8	4.7	*	*	4	4.23	4.426
Nitrite mg/L		0.0237	*	*	*	*	*	0.0237
Nitrate mg/L		4.6	*	*	*	*	*	4.6
TP mg/L		0.1	0.025	*	*	0.16	0.1	0.093
O-PO4-P mg/L	0.05	0.025	<0.05	0.025	0.10	0.05	0.08	0.055
SO4 mg/L		<30	*	*	*	*	*	<30
Phenols µg/L		<0.10	*	*	*	*	*	<0.10
Atrazine µg/L		<0.01	*	*	*	*	*	<0.01
Dichloromethane		<1	*	*	*	*	*	<1
Simazine µg/L		<0.01	*	*	*	*	*	<0.01
Toluene µg/L		<1	*	*	*	*	*	<1
Tributyltin µg/L		not required	*	*	*	*	*	*
Xylenes µg/L		<1	*	*	*	*	*	<1
Arsenic µg/L		<0.96	*	*	*	*	*	<0.96
Chromium ug/L		<20	<20	<20	*	<20	<20	<20
Copper ug/L		<20	<20	<20	*	<20	<20	<20
Cyanide µg/L		<5	*	*	*	*	*	<5
Fluoride µg/L		69	*	*	*	*	*	69
Lead ug/L		<20	<20	<20	*	<20	<20	<20
Nickel ug/L		<20	<20	<20	*	<20	<20	<20
Zinc ug/L		<20	<20	<20	*	<20	<20	<20
Boron ug/L		<20	<20	<20	*	<20	<20	<20
Cadmium ug/L		<20	<20	<20	*	<20	<20	<20
Mercury µg/L		<0.2	*	*	*	*	*	<0.2
Selenium µg/L		0.8	*	*	*	*	*	0.8
Barium ug/L		43	20	23	*	*	10	24

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HALF LOD FOR STATISTICAL PURPOSES

PT_CD	PT_TYPE	MON_TYPE	EASTING	NORTHING	VERIFIED
SWO1	Primary	Sampling	175870	103919	N
aSW01u	u/s	Sampling	175897	103979	N
aSW01u	d/s	Sampling	179240	102995	N

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