




Administration,
Office of Climate, Licensing and Resource Use,
Environmental Protection Agency,
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford.
23/2/2010

Subject: Ballybunion Agglomeration, Waste Water Discharge License Application, Register number D0183-01, request for further information (ref section 18(3) (b) of the Waste Water Discharge License (Authorisation) Regulations 2007).

Please find attached additional information requested under section 18(3) (b) of the Waste Water Discharge License (Authorisation) Regulations 2007 in relation to the Ballybunion Agglomeration. The information included is in the form of one original and one copy, plus one copy in electronic searchable PDF format on a CD-ROM.

Yours sincerely,


Charles O'Leary (E.E.)

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Kerry County Council

Further Information In Relation to
Waste Water Discharge Licence Application

for

Ballybunion Agglomeration D0183-01

***Regulation 18(3)(b) of the Waste Water Discharge
(Authorisation) Regulations 2007***

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REGULATION 16 – COMPLIANCE REQUIREMENTS D0183-01 (Ballybunion)

- **The non-technical summary should be in non-technical language and summarise the entire application. Revise the non-technical summary and follow the advice in the application form with regard to content.**

Non - Technical Summary:

Historical Summary:

Ballybunion is a seaside town located on the north Kerry coastline at the mouth of the Shannon Estuary, approximately 16km North West of Listowel and 28km Tralee. Access to the national road network is Via the R551 and R553.

Ballybunion provides a wide range of services to the local rural hinterland including two primary schools, a secondary school, a church, numerous shops, several restaurants, a post office, a number of public houses, a Garda station, and a fire station.

However, Ballybunion is better known as a tourist resort and golfing destination and has a large seasonal influx of visitors. As a result many commercial premises in the town close during the winter months. It has two beaches that stretch for two miles in length. These are bordered to the north by high rock cliffs while, to the south, there are sand dunes which accommodate two golf links of international repute that are serviced by a modern club house with dining facilities.

Ballybunion is bounded on the southern side by the River Cashen, which flows to the sea in a westerly direction, about 3 km south of the town centre. The Cashen River and its estuary are popular salmon fishing areas.

The town centre comprises the main street which, being typical of a seaside town, houses a variety of shops, public houses, restaurants, a hotel and various tourist orientated enterprises. A number of other hotels are located on the adjoining cliff road to the north and Sandhills Road to the south. Holiday homes and chalets also feature. There are also quite a number of caravan parks close to the town centre and on the Sandhills Road, which cater for the self-catering end of the holiday market.

Prior to the early 1990s, the town was sewered by a combination of a very old system of stone culverts and 9" earthenware pipes and a network of 9", 12" and 15" pipelines laid in the 1940s along the principal streets of the town. This system discharged to the sea below water level near Black Rock, which is adjacent to the northern boundary of the golf links. A further 9" sewer on Sandhills Road was drained to a septic tank at the southern end of the golf links and this discharged to a nearby section of the beach.

An 1974, E G. Pettit prepared a Preliminary Report for Kerry County Council, which outlined the inadequacies of the existing system and listed proposals for a sewerage improvement scheme to include a treatment plant with an outfall to the Cashen Estuary. This report was reviewed and updated in 1985 and was subsequently adopted by the County Council.

A foreshore license was obtained in 1990 and work commenced on the scheme in 1991 and was concluded in 1993. The principal elements of the scheme were as follows:

- 7,600m of foul sewer and 2,950 m of storm water sewer, together with associated manholes.
- 1 No main pumping station and 4 No subsidiary pumping stations, together with associated rising mains.
- Extended aeration treatment plant
- Outfall pipeline approximately 1.4 km long to the estuary of the River Cashen.

Most of the development area is drained by gravity, generally in a southerly direction to the main pumping station located behind Carmody's Caravan Park adjacent to the Sandhills Road. From the Doon Road to the north, a gravity foul sewer flows down Cliff Road and collects branch sewers from Main Street and Kit Ahern Road before continuing south along Sandhills Road to the main pumping station.

Foul sewers on Church Road, Ahafona Road and on the Listowel Road join at Ahafona Bridge and flow in a southwesterly direction to the main pumping station, connecting a further branch from the southern part of the town en route. A further foul system drains the Ballyeagh Road, which connects from the Tralee Road to the Sandhills Road. The eastern section of this road falls in an easterly direction towards the junction with the Tralee Road where it discharges to the Barracks pumping station. From here, it enters a 100 mm rising main to the head of a gravity sewer on the western half of Ballyeagh Road which drains to the Sandhills Road, collecting the discharge from the golf clubhouse and continuing in a southerly direction to a small housing estate at the mouth of the Cashen Estuary. At this point, there is a small pumping station, which pumps the flow direct to the treatment plant via a 100 mm rising main.

A 600 mm surface water sewer services Church Road and Ahafona Road, discharging to the stream at Ahafona Bridge. A further surface water sewer on Doon Road and Glen Road discharges to the northern end of the beach.

Further small pumping stations collect local areas at Lady's Beach and Rinnbhui and pump them to the main gravity sewer flowing towards the main pumping station.

There is an emergency storm water overflow on the Sandhills Road sewer downstream of which the flow going to the pumping station can be throttled back by a valve, causing excess flows to be overflowed through the old outfall at Rinnbhui.

Current Existing Wastewater Treatment Plant:

A new wastewater treatment plant was put into commission in 1993. It is located in the Ballyeagh area, approximately 600m north of the Cashen Estuary and 2km south of the town centre. The plant has a treatment capacity of 7,500p.e.

The complete treatment process is an extended aeration system with inlet flow measurement, refrigerated influent sampling, coarse & fine screening, grit removal, stormwater overflow, extended aeration, final settlement, final effluent refrigerated sampling & flow measurement, tidal holding tank complete with lunar clock discharge control. Sludge thickening and dewatering also forms part of the process. The process is controlled from a central control building. On site laboratory is also included in the main control building.

Sources of Emissions:

The sources of emissions throughout the agglomeration are as follows:

(1) Pumping Station No.1 (Rinnbhui)

Emergency High Level Overflow - Discharges to the sea.

(2) Pumping Station No.2 (Main Pump Station - Carmody's)

Emergency High Level Overflow - Discharges to a local stream.

(3) Pumping Station No.3 (Barracks Village)

Emergency High Level Overflow – Discharges to a local stream.

(4) Pumping Station No. 4 (Cashen)

Emergency High Level Overflow – Discharges to Cashen Estuary.

(5) Pumping Station No. 5 (Ladies Beach)

No actual overflow constructed at this pumping station.

(6) Emergency Stormwater Overflow – Sandhills Road

There is an emergency storm water overflow on the Sandhills Road sewer downstream of which the flow going to the pumping station can be throttled back by a valve causing excess flows to be overflowed through the old outfall at Rinnbhui.

(7) Main WWTP – Inlet Works - Emergency Stormwater Overflow

Excessive stormwater flows arriving at the inlet works bypass the plant via a stormwater overflow weir. This is located downstream from both the screening and grit removal equipment. The excessive flows which bypass further treatment joins up with the treated effluent discharge line from the tidal holding tank at the effluent discharge valve chamber.

Details relating to the pumping stations are outlined below:

Rinnbhui Pumping Station (1)

- ABS AF 154 (2 x Pumps)
- Wet well chamber installation.
- 2 No. foul sewage pumps, valves and pipe work.
- Duty / Standby Installation.
- Float Switch Pump Control.
- Emergency overflow.
- Electrical control panel and instrumentation Kiosk on site.

Carmody's Pumping Station (2)

- ABS AF 110 – 4G / ABS AF 165 – 6G / ABS AF 1100 – (6 x Pumps)
- Wet well chamber installation.
- 6 No. foul sewage pumps, valves and pipe work.
- 2 of each type of pump. (Small, Medium, Large)
- 2 Discharge Lines to WWTP. 6" & 12".
- Duty / Standby Installation.
- Ultrasonic Level Pump Control (Main Control) & Float Switch Pump Control (Back-Up Control).
- Emergency overflow.
- Electrical control panel and instrumentation building on site.

Barracks Village Pumping Station (3)

- Wilo FA 08.64E-264 (2 x Pumps)
- Wet well chamber installation.
- 2 No. foul sewage pumps, valves and pipe work.
- Duty / Standby Installation.
- Float Switch Pump Control.
- Emergency overflow.
- Electrical control panel and instrumentation Kiosk on site.

Cashen Pumping Station (4)

- ABS AS 30 -2 (2 x Pumps)
- Wet well chamber installation.
- 2 No. foul sewage pumps, valves and pipe work.
- Duty / Standby Installation.
- Float Switch Pump Control.
- Emergency overflow.
- Electrical control panel and instrumentation Kiosk on site.

Ladies Beach Pumping Station (5)

- Flygt 3152.181 (2 x Pumps)
- Wet well chamber installation.
- 2 No. foul sewage pumps, valves and pipe work.
- Duty / Standby Installation.
- Float Switch Pump Control.
- Electrical control panel and instrumentation Kiosk on site.

Nature & Quantities of Foreseeable emissions:

The Wastewater Treatment Plant operates within the standards required by the Urban Wastewater Treatment Directive regulations.

The treated effluent discharged from the WWTP for 2009 had the following characteristics:

BOD mg/l COD mg/l Suspended Solids mg/l Average 3, 19, & 11 respectively.
Maximum 19.1, 77, & 33 respectively.

These results indicate a consistently high quality treated effluent within the standards required i.e. Maximum allowable values of BOD 25mg/l, COD 125 mg/l & Suspended Solids 35mg/l.

The average daily volume of treated effluent discharged from the WWTP for 2009 was 1314 m³/day.

This is equivalent to an average daily discharge of 3.94kg BOD, 24.96kg COD & 14.45kg Suspended Solids.

Technology For prevention or Reduction of Emissions:

The effluent which is being discharged from the WWTP to the Cashen Estuary is consistently well within the standards required by current regulations.

A range of instrumentation is installed at the WWTP and the pump stations. This technology in combination with the mechanical & electrical plant installed on site provides the Plant Manager and Caretaker with many options regarding Process Optimisation for prevention and reduction of emissions.

A major WWTP upgrade project was carried out in recent years. This included the following:

Complete replacement of Influent & Effluent flow measurement equipment with new MagFlow meters and modern electronic data loggers.

- Installation of new Automatic Refrigerated Samplers to replace older units.
- Installation of a new Snoek Finescreen to replace older fine screen unit.
- Replacement of Aeration Motors with modern high efficiency Variable Speed Drive Motors.
- Replacement of Dissolved Oxygen control system with newer technologically advanced equipment.
- Completed major overhaul of sludge handling equipment which included replacement of sludge pumps and polyelectrolyte dosing pumps.
- Replacement of pumps installed at Barracks village pump station with larger

capacity pumps to cope with increased flows due to new residential developments in the area.

An on site laboratory allows Influent & Treated Effluent sample analysis data to be obtained from tests carried out by the Plant Manager. Process control changes which may be necessary for prevention & reduction of emissions can then be made based on analysis data. Sample collection is of the required flow proportional composite type required by current regulations. Sample storage is refrigerated in line with best practice. The expertise and support of the KCC Environment Laboratory is also available to the WWTP should further technical analysis ever be required. The WWTP is staffed by a full time Plant Manager. A full time Caretaker is also employed at the WWTP with weekend operation and checks of the WWTP also forming part of his duties.

Further Measures Planned to Eliminate or Reduce Emissions:

Comprehensive routine & preventative maintenance is carried out in all areas of the Sewerage Scheme by the caretaker. This includes the network, pump stations and treatment plant. Kerry County Council maintenance crews including Fitters & Electricians carry out work as required & directed by the Plant Manager in order to maintain the WWTP in peak operating condition at all times. The services of specialist contractors are also utilised when required. Periodic reviews of operating systems and established procedures in line with current best operating practices and equipment manufacturers' recommendations are also carried out.

Equipment upgrades or modifications which could improve the quality of final treated effluent are periodically investigated as newer technologies become available. Subject to budgetary constraints within Kerry County Council works of this nature are a key objective in the operation of the WWTP.

Measures planned to monitor emissions to the Environment:

As previously stated the sampling and analysis regime in place at the WWTP on site laboratory is in line with required regulations. In fact the frequency of analysis carried out on site is in excess of the number of samples actually required by current regulations.

Data logging equipment has been in operation at the WWTP since commissioning. In recent years this has been upgraded to more modern technologically advanced equipment.

Finally in relation to sludge production on-site a comprehensive sludge register including destination, analysis & tonnage is maintained as required by legislation.

Appendix No.2 Urban Waste Water Returns 2009

Attached documents contain the following:

- Average Flow Data.
- Influent Loadings.
- Effluent Analysis Data.

- **Give details of the sources of waste water arising in terms of industrial, commercial, institutional and domestic.**
 - There is a primary school and a secondary school in Ballybunion and most pupils live within the agglomeration boundaries and therefore the contribution from institutional facilities is insignificant. Similarly as there are no major industries in the town there are no significant industrial waste water flows. Tourism is the principal industry in Ballybunion, accounting for approximately 72% of the waste water load to be treated during the Summer months. Based on the level of tourist accommodation available in the town and the proximity to Tralee, it is estimated that 25% of the town's 8,000 visitors stay overnight in the town.

Ball bunion WWTP 2009	
Average Inlet flow (m3/day)	1314
Maximum flow/day (m3/day)	1845
Average P.E.	2079
Maximum P.E.	6075

- **Give the grid reference for the secondary treatment discharge monitoring location.**
 - X: 86596; Y: 138906
- **Give the depth of the primary outfall below the low water level.**
 - There is no exact level recorded of the depth of the primary outfall below the low water level. However having spoken with the caretaker that was involved in the scheme at the time it is estimated that it is 1-2m below the low water level.
- **Complete section B.5, as appropriate, to include the storm water overflow at the waste water treatment plant, includes drawings/maps.**

In relation to the storm water overflow at the waste water treatment plant, excessive storm water flows arriving at the inlet works bypass the plant via a stormwater overflow weir. This is located downstream from both the screening and grit removal equipment. The excessive flows which bypass further treatment joins up with the treated effluent discharge line from the tidal holding tank at the effluent discharge valve chamber.

This is classified as a storm water overflow point.

However pipe networks from both Primary discharge and Storm water overflow are connected and leave the Plant via one discharge point, SW1,

B.5 Location of Storm Water Overflow Point(s)

Give the location of **all** storm water overflow point(s) associated with the waste water works.

Type of Discharge	Storm Water Overflow
Unique Point Code	SW2
Location	SandHill Road, Ballybunion.
Grid ref (6E, 6N)	086161E, 141002N

Refer to Drawings Appendix 1

EPA Drawing No	Description	Ref No.
13	Location of All Discharges	W/10/21

- **Complete section B.9 (ii), Pending Development, of the application form.**

The calculated Population Equivalent to be contributed to the waste water works as a result of those planning permissions granted is **652P.E.** This is calculated below:

<i>Population Equivalent for future Development in Ballybunion</i>				
<i>Type of Development</i>	<i>Units</i>	<i>No. of Persons</i>	<i>BOD (60) grams/day per person</i>	<i>Population Equivalent</i>
<i>Dwelling</i>	<i>203</i>	<i>548</i>	<i>1</i>	<i>548</i>
<i>Educational</i>	<i>9 classrooms</i>	<i>270</i>	<i>0.33</i>	<i>89</i>
<i>Recreational</i>	<i>1484m²</i>	<i>59</i>	<i>0.25</i>	<i>15</i>

The above Table was compiled using information from the following

(a) Kerry County Development Plan 2009-2015

Urban design and development management

(b) Table 3 Recommended Wastewater loading rates from commercial premises from the Waste Water Treatment Manual

Details from the above documents are included in Appendix 3.

the percentage of the projected p.e. to be contributed by the non-domestic activities, and

Answer:

Based on this information the percentage of the projected P.E. to be contributed by the non-domestic activities is **16%**

□ *the ability of the waste water works to accommodate this extra hydraulic and organic loading without posing an environmental risk to the receiving water habitat.*

Answer:

The total capacity of the plant is 7500PE, the maximum PE is 6075 (see Appendix 2). Therefore the maximum possible future PE is 6727, which is well below the total capacity of the plant.

- **Update Section B.11, Significance Correspondence, as necessary.**
 - There are no records of any significant correspondence resulting from any Section 63 notice issued by the EPA in relation to the wastewater works.
- **Confirm whether the given population equivalent of the agglomeration was calculated in accordance with the definition of population equivalent in the Waste Water Discharge (Authorisation) Regulations 2007.**

The definition of population equivalent in the Waste Water Discharge (Authorisation) Regulations 2007 is as follows:

"population equivalent" is a measurement of organic biodegradable load and a population equivalent of 1 (1p.e) means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60g of oxygen per day; the load being calculated on the basis of the maximum average weekly load entering the waste water works during the year, excluding unusual situations such as those due to heavy rain.

On this basis the PE of 2379 is calculated in accordance with the definition, as can be seen in the Urban Waste Water Returns 2009 in Appendix 2.

Population Equivalent	2379
Data Compiled (Year)	2009
Method	BOD Loading

- Complete Table D.1(i)(a), (b) and (c) of the application form and provide the sampling data pertaining to the discharge for the previous 12 months.

Details to follow later.

- Give details of the trophic status of the receiving water and provide sampling data that includes salinity readings for the Cashen estuary.

Details to follow later.

- Provide a report on the outcome of an "appropriate assessment" of the impact of discharges from the agglomeration on the Lower River Shannon SAC. In compilation of the report, have regard to the guidance document 'Waste Water Discharge Licensing Appropriate Assessment Guidance Notes' which is available on the EPA website, and Department of Environment, Heritage and Local Government Circular L8/08 dated 2nd September 2008.

Answer:

It is proposed to issue contract documents for tender purposes to carry out appropriate assessments to screening level (as per Guidance Notes) within all Agglomerations where there is a requirement to do so.

- **Discuss the effects of discharges on the trophic status of the receiving water and Bathing Water directive 76/160/EEC.**
Details to follow later.
- **Give details of any work necessary to meet relevant effluent discharge standards, and/or environmental quality objectives and standards and include a schedule for such work.**
 - Improvements were made to the aeration process during 2009. No further works are planned at present.
- **Give timeframes for the assessment and remediation of storm water overflows to bring them into line with the DoEHLG *Procedures and Criteria in relation to Storm Water Overflows*.**
 - The general criterion for design of storm water overflows is defined as an absence of visible signs of sewage derived debris (e.g. oil slicks, foaming etc.) and of deposits of algal growth caused by sewage discharge. This requires that the effects of organic/nutrient loads deposited in bed sediments must also be considered.
 - Design criteria for S.W.O.'s must consider the following:
 - Beneficial uses of receiving waters and corresponding standards and water quality objectives
 - The nature and strength of sewage including the effects of re-suspension and 'first foul flush'.
 - The siting of S.W.O. discharges and their potential for aesthetic nuisance.
 - The type of overflow and its efficiency in containing floating debris and solids generally.

This work will be carried out subject to funding being made available.

Your reply to this notice should include a revised non-technical summary which reflects the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary.

In the case where any drawings already submitted are subject to revision consequent on this request, a revised drawing should be prepared in each case. It is not sufficient to annotate the original drawing with a textual correction. Where such revised drawings are submitted, provide a list of drawing titles, drawing numbers and revision status, which correlates the revised drawings with the superseded versions.

Please supply the information in the form of a one original plus one copy within **two** months of the date of this notice. When calculating the appropriate deadline, the period between the 24th day of December and the 1st day of January, both days inclusive, should be disregarded. In addition please submit one copy of the requested information in electronic searchable PDF format on a CD-ROM (no file to exceed

10MB) to the Agency. Please note that all maps/drawings should not exceed A3 in size.

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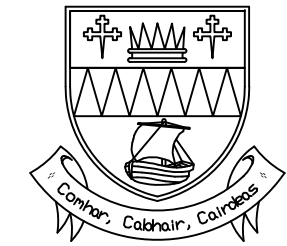
List of Drawing Numbers

EPA Drawing No	Description	Ref No.
13	Location of all Discharges	W/10/21

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Rev	By	Date	Description
KERRY COUNTY COUNCIL WATER SERVICES SECTION			
Mr.O.Ring, B.E. C.Eng., M.I.E.I. Director of Services Water Services. County Buildings, Rathass, Tralee, Co. Kerry.		Mr. John Kennelly, B.A., B.A.I., CEng, M.I.E.I., A/S.E. Water Services Department, County Buildings, Rathass, Tralee, Co. Kerry.	
Project WASTE WATER DISCHARGE LICENCE APPLICATION FOR BALLYBUNNION WASTE WATER TREATMENT PLANT			
Title LOCATION OF ALL DISCHARGES			Drwg. No.13.
Drawn O. Dineen.	Designed	Checked	Date 27/01/2010.
Scales 1/25000.		K.C.C. Drawing No. W/10/21.	

Urban Waste-Water Returns 2009

Plant Name:	Ballybunion WWTP		
Population Equivalent: (Measured)	<u>2379</u> (Average)	<u>315</u> (Minimum)	<u>6075</u> (Maximum)
Population Equivalent: (Design)	8180		
Influent Flow Measured:	Yes		
Daily Influent Flow: (m ³ /day)	<u>1314</u> (Average)	_____	_____
Effluent Flow Measured:	Yes		
Daily Effluent Flow: (m ³ /day)	<u>1314</u> (Average)	_____	_____
BOD Load (kg/day): (kg/day)	<u>743</u> (Average)	<u>19</u> (Minimum)	<u>364</u> (Maximum)

Sample Collection System in Compliance with UWWT Regulations:

Yes - Composite Refrigerated Flow Proportional Samplers in use On-Site.

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2009

Ballybunion Waste-Water Treatment Plant

Influent Samples - Analysis Results

Effluent Samples - Analysis Results

DATE	B.O.D. (mg/l)	C.O.D. (mg/l)	S.S. (mg/l)	B.O.D. (mg/l)	C.O.D. (mg/l)	S.S. (mg/l)
09/01/09	69	139	51	3.6	2.7	8
01/02/09	14	73	9	0	6	2
12/02/09	79	120	95	2.5	6	4
19/02/09	49	122	65	0	12	7
06/03/09	28	96	53	0	18	2
13/03/09	56	161	94	0	17	1
27/03/09	102	207	160	1.7	13	17
20/04/09	99	163	109	2.7	8.6	0
24/04/09	39	139	71	0	0	30
01/05/09	59	179	92	0	29	28
12/05/09	181	224	131	0.6	19	28
21/05/09	27	91	46	0.1	2	16
29/05/09	178	327	134	0	17	0
02/06/09	133	308	139	0.9	31	33
11/06/09	N/A	540	379	N/A	3.2	1
19/06/09	79	189	54	0.2	18	3
24/06/09	212	390	203	1	17	18
03/07/09	276	582	365	19.1	25.5	1
16/07/09	200	320	128	6.2	14.5	4
31/07/09	201	341	118	4.8	5	1
07/08/09	299	481	229	5.2	39	29
14/08/09	270	561	399	10.5	77	20
04/09/09	17	66	23	0	N/A	1
18/09/09	268	489	215	0.4	22	19
23/09/09	223	387	227	9.3	21.9	2
02/10/09	235	370	274	1.2	22	12
16/10/09	154	371	145	0	28	3
28/10/09	72	205	151	0	19	4
05/11/09	15	47	37	0	23	12
27/11/09	52	90	101	9.6	22	8
18/12/09	55	65	62	4.6	39	14
Average	125	253	141	3	19	11
Maximum	299	582	399	19.1	77	33
Minimum	14	47	9	0	0	0

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2009

Ballybunion Waste-Water Treatment Plant

DATE	Influent B.O.D. (mg/l)	Inlet Flow (m ³ /day)	B.O.D. Load (kg/day)	P.E.
09/01/09	69	928	64	1067
01/02/09	14	1380	19	322
12/02/09	79	1428	113	1880
19/02/09	49	1059	52	864.9
06/03/09	28	1362	38	635.6
13/03/09	56	1286	72	1200
27/03/09	102	1319	135	2242.
20/04/09	99	964	95	1591
24/04/09	39	1529	60	993.9
01/05/09	59	1411	83	1387
12/05/09	181	1004	182	3029
21/05/09	27	1296	35	583.2
29/05/09	178	1300	231	3857
02/06/09	133	1314	175	2913
19/06/09	79	1229	97	1618
24/06/09	212	1007	213	3558
03/07/09	276	1184	327	5446
16/07/09	200	1337	267	4457
31/07/09	201	1523	306	5102
07/08/09	299	1219	364	6075
14/08/09	270	1080	292	4860
04/09/09	17	1845	31	522.8
18/09/09	268	1236	331	5521
23/09/09	223	1245	278	4627
02/10/09	235	550	129	2154
16/10/09	154	550	85	1412
28/10/09	72	691	50	829.2
05/11/09	15	1258	19	314.5
27/11/09	52	1813	94	1571
18/12/09	55	797	44	730.6
		36144		
Maximum Design Population Equivalent: 8180		Average	143	2379
		Maximum	364	6075
		Minimum	19	314.5

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Land Use	Units	Parking Space
Clinics, Surgeries	Per Staff member	1
	And per Consultancy room	4
Schools	Staff member	1
	Bus set down / 200 pupils	2
	Car set down/ 30 pupils	1
Offices	100 sq. m.	3
Shops, retail stores etc.	100 sq. m.	5
Banks and libraries	100 sq. m.	4
Hotels and guesthouses	Double bedroom or two single bedrooms	1
Bars, Lounges and Function Rooms (including hotel facilities)	10 sq. m. (public area)	2
Restaurants, Cafés (including hotel facilities)	10 sq. m. (dining area)	2
Church, cinema, theatre	3 seats	2
Dance Hall, Private Dance Club	10 sq. m. (dance floor and sitting space)	1
Manufacturing Industry	100 sq. m.	3
Warehousing	100 sq. m.	2
Golf, Pitch and Putt	Hole	3
	And per staff member	1
Sports Ground / Club	Per pitch	25
Funeral Homes		60
Nursing Homes	Per Bed space	1
Childcare facilities	Per 4 children	1
	And Per staff member	1
Playgrounds	Per 40 m ²	1

TABLE 3: RECOMMENDED WASTEWATER LOADING RATES FROM COMMERCIAL PREMISES

Situation	Source	Flow litres/day per person	BOD ₅ grams/day per person
Industrial	Office and/or factory without canteen	30	20
	Office and/or factory with canteen	60	30
	Open industrial site e.g. quarry (excluding canteen)	40	25
Schools	Non-residential with cooking on-site	60	30
	Non-residential with no canteen	40	20
	Boarding school:		
	(I) residents	180	60
	(II) day staff (includes mid-day meal)	60	30
Hotels	Guests	250	75
	Guests (no meals)	180	45
	Resident staff	180	60
	Day staff	60	30
	Conference	40	20
		Restaurant full meals:	
	(I) luxury catering	25	25
	(II) prepared catering	15	15
	(III) snack bars	10	10
	(IV) function rooms incl. Buffets	10	10
	(V) fast food	10	10
Pubs and clubs	Residents	200	60
	Day staff	60	30
	Bar drinkers	10	10
	Bar meals	10	10
Amenity sites	Restaurants	15	15
	Function rooms	10	10
	Toilet blocks (per use)	5	10
	Toilet Blocks (long stay car parks)	10	15
	Golf clubs	20	10
	Squash, with club house	25	15
	Swimming	10	10
	Football Club	30	20
Caravan Sites	(I) Touring	50	35
	(II) Static not serviced	75	35
	(III) Static fully serviced	150	55
	(IV) Tent sites	50	35
Hospitals	Residential elderly people	250	60
	Residential elderly people plus nursing	300	65
	Nursing homes (convalescent)	350	75