

5.0 WATER

5.1 Methodology

To determine the nature of the existing environment, water quality information for the local surface waters was obtained from the EPA and Cork County Council. The EPA also supplied hydrometric data on river flow levels in the area. Published reports on water quality (e.g. Phosphorus Regulations National Implementation Report, 2003; National Rivers Monitoring Programme, 2002; Water Quality in Ireland, 1998-2000; Water Quality in Ireland, 1995-1997) and the recently available State of the Environment 2004 Report from the EPA were also consulted.

In order to determine the impacts of the proposed development on the existing water environment and to ensure the protection of existing water quality, the following legislation documentation was consulted:

- Bathing Waters (76/160/EEC),
- Dangerous Substances (76/464/EEC),
- Freshwater Fish (78/659/EEC),
- Shellfish Waters (79/923/EEC),
- Groundwaters (80/68/EEC),
- Drinking Water (80/778/EEC),
- Urban Waste Water Treatment (91/271/EEC),
- Nitrates (91/676/EEC),
- National Regulations.
- The Water Framework Directive (2000/60/EC),
- The National Environmental Monitoring Programme for Transitional, Coastal and Marine Waters, Environmental Protection Agency October 2003,
- Oslo and Paris Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR),
- National Rivers Monitoring Programme.

5.2 Existing Environment

The site of the proposed development is located on reclaimed land from the Blackwater Estuary. No surface water bodies flow through the site. Flow from the marshlands into the estuary is controlled by a sluice gate south of the site, towards Youghal town. A minor unnamed stream flows into the estuary on the south side of the adjacent Youghal Landfill.

Several surface water bodies enter Youghal Bay. The largest of these is the Munster Blackwater River. The majority of the other water bodies in the region are tributaries of this river.

The Blackwater catchment is one of the largest in the state, draining an area in excess of 2,000km³. The Blackwater surface water catchment is identified in the Hydrometric boundary map as the surface catchment drained by the River Blackwater and all streams entering tidal water between East Point and Knockaverry, Youghal, Co. Cork.

Responsibilities for monitoring of tidal waters come under the aegis of the Department of Communications, Marine and Natural Resources, the Department of Environment, Heritage and Local Government and their executive agencies.

The River Blackwater and tidal estuary is managed and monitored under the national River monitoring programme. The National Rivers Monitoring Programme comprises two main sub programmes as follows:

- The ecological monitoring programme and
- The physico-chemical monitoring programme

The national monitoring programme may be broken down based on the purpose of the monitoring:

1. Surveillance Monitoring (including trend monitoring),
2. Operational Monitoring (including monitoring of protected areas),
3. Investigative monitoring (implemented locally when required),
4. Programmes to fill specific national and international monitoring programme needs.

The River Blackwater is included in the Surveillance Programme and the Protected Areas Programme. The Surveillance Monitoring Programme includes a relatively large number of stations and is designed to provide a broad geographic impact assessment of the susceptibility of rivers to impacts from pollution and detect long-term changes in river status due to natural variation and due to anthropogenic pressures.

The Operational Monitoring Programme will also include additional monitoring for protected areas including special monitoring for rivers that serve as drinking water sources or that are designated as habitat and species protection areas where these are identified as being at risk of failing to meet their environmental objectives under Article 4 of the WFD. Map 2 includes rivers located within Special Areas of Conservation (SACs) under the Habitat Directive or Special Areas of Protection (SPAs) under the Birds Directive.

In addition the Blackwater estuary and coastal waters are to be examined and assessed under the National Environmental Monitoring Programme for Transitional, Coastal and Marine Waters.

Annex C of the National Environmental Monitoring Programme identifies five programmes for Water Quality and Trophic Status for water, namely:

- C.1 Inter Nutrient Levels in Transitional, Coastal and Marine Waters,
- C.2 (D.1) Riverine Inputs of Nutrients to Marine Waters (OSPAR Riverine Inputs and Direct Discharges Programme; RID)
- C.3 (D.2) Atmospheric Inputs of Nutrients to Marine Waters (OSPAR Comprehensive Atmospheric Monitoring Programme; CAMP)
- C.4 General Water Quality of Transitional and Coastal Waters
- C.5 Microbiological Quality of Transitional and Coastal Waters

The Blackwater estuary and tidal waters are to be assessed under the Riverine Inputs of Nutrients to Marine Waters (OSPAR Riverine Inputs and Direct Discharges Programme; RID) and the General Water Quality of Transitional and Coastal Waters programme.

For the purpose of this study water quality data for the River Blackwater was obtained from the EPA. Table 5.1 details the Ecological Status and pollution classification of the Blackwater River. The level of pollution is largely a function of the nutrient loading of the watercourse. Sources of nutrients include direct land runoff, agricultural activities, industrial discharges and precipitation.

Class	Description	Length of River under each category (km)	% of River under each category
Class A	Unpolluted	637	79
Class B	Slightly Polluted	139	17
Class C	Moderately Polluted	29	21
Class D	Seriously Polluted	0	0

Table 5.1 Ecological Status of Blackwater River

As the proposed development is located adjacent to the Blackwater River Estuary and Youghal Bay, coastal waters must be examined.

The Blackwater Estuary was monitored biannually for the period 1997-2000. Samples were taken over the full transition of the river from fully freshwater conditions upstream to full ambient coastal salinity in near shore waters. For the purpose of this assessment, it was decided to focus on the area of the proposed site therefore; data from five monitoring stations were chosen along the Tourig River, the lower Blackwater Estuary and Youghal Bay.

A criterion was developed by the EPA for evaluating eutrophication. Due to the variation of water quality characteristics owing to different degrees of salinity this criteria must be scaled accordingly. The degrees of salinity and the criteria for eutrophication relevant to the chosen monitoring stations, around the proposed site, can be seen in Table 5.2.

Salinity (psu)	DIN Median (mg/l N)	MRP Median (P ug/l)	Chlorophyll, (ug/l mg/m ³)	DO % Saturation 5%ile	DO % Saturation 95%ile
1	3.529	60	15	70	130
20	1.208	57	14.2	72	128
28	0.697	48	11.9	76	124
30	0.569	46	11.4	77	123
31	0.506	44	11.1	78	122

Table 5.2 Criteria for Eutrophication in Irish Estuaries, Bays and Near shore

Coastal Waters

Notes:

psu= practical salinity units

DIN= Dissolved Inorganic Nitrogen

MRP= Molybdate-reactive phosphorus

DO= Dissolved Oxygen

The average of the analysis for each parameter at each of the five monitoring stations is shown in Table 5.3 Average Concentrations of each Parameter from the chosen Sampling Locations.

Station No	BR040	BR210	BR220	BR230	BR240
Sample Label	Tourig River	Arsallagh Hse	Landfill	Coastguard	Redbarn
Salinity (‰)	0.7	23.17	30.43	32.02	32.94
Sample Sal	0.7	20.32	28.63	31.73	30.94
Temp. (°C)	14.0	14.53	13.90	13.93	13.29
pH	7.8	8.04	8.07	8.06	8.07
Turbidity (m)	-	1.34	1.96	2.49	3.12
SS (mg/l)	-	-	3.80	-	6.20
DO % Sat	98.6375	94.81	96.38	97.64	98.07
BOD (mg/l O ₂)	1.5	1.52	1.35	0.96	1.10
TON (mg/l N)	3.551	3.551	0.49	0.25	0.30
NH ₃ (mg/l N)	0.029	0.04	0.03	0.02	0.02
Free NH ₃ (mg/l N)	0.0008	0.00	0.00	0.00	0.00
DIN mg/l N	3.530	1.17	0.52	0.27	0.32
PO ₄ (µg/l P)	34	23.88	13.28	9.30	10.03
TON:NH ₃	245.1	51.34	21.51	9.38	13.15
DIN:PO ₄ (µMol)	244.3	101.23	74.88	46.21	61.87
Chlorophyll a (mg/m)	7.92	16.36	14.23	8.74	8.00

Table 5.3 Average Concentrations of each Parameter from the chosen Sampling

Locations

Note:

SS= Suspended Solids

DO= Dissolved Oxygen

BOD= Biological Oxygen Demand

TON= Total Organic Nitrogen

DIN= Dissolved Inorganic Nitrogen

According to the EPA assessment of the trophic status of Estuaries and Bays 2001, the Upper Blackwater Estuary shows decreased oxygen levels. The State of the Environment Report 2004, highlights that this may be due to effluents from meat processing plants downstream of Cappoquin, though concentrations of oxygen were not observed to fall below half of the normal level in the affected zone, at any time during the monitoring period. Below this area, oxygen levels are increased, even though oxygenation is disturbed throughout the lower estuary and it then recovers fully by the Inner Youghal Bay.

Nitrogen and phosphate concentrations are somewhat elevated in the Upper Estuary under freshwater conditions (refer to Table 5.3). However, under saline conditions the Lower Estuary concentrations of these parameters are reduced to background coastal levels in Inner Youghal Bay.

Chlorophyll concentrations according to the EPA are overall elevated in both the Upper and Lower sections of the Estuary.

The breaching of these criteria levels classifies both sections of the Blackwater Estuary as eutrophic however; this classification does not appear to extend into the waters of Youghal Bay. Consequently, under the Urban Waste Water Treatment Regulations (S.I No. 254 of 2001 & 91/271/EEC) the Upper and Lower Blackwater Estuary are classified as Sensitive Areas.

The lack of and the existing overloaded waste water treatment plants (WWTPs) located in the towns within the Blackwater catchment area has contributed to the pollution of the Blackwater River. For example at Mitchelstown, located adjacent a tributary of the Blackwater River, in the early 1990s the waste water treatment works was overloaded due to expansion in the dairy industry, population growth and a combined foul/storm water network.

However, Waterford County Council is proposing group treatment schemes for several Waterford towns and villages, of which Tallow, Cappoquin and Ballyduff/Kilmeaden are located within the Blackwater Catchment Area. Cork County Council is also implementing measures to improve their sewage treatment network and have a drawn up a priority list of 25 WWTPs for investigation/review of operations. The Cork County Sludge Management Plan, 2000, outlines improvements in waste water treatment facilities throughout the county.

Improvements in the municipal waste water treatment schemes, as well as, the reduction in the landspreading of sludge and the introduction of the Nutrient Management Plans in this area, should lead to a reduction in pollution levels in the river and its tributaries in the future.

5.3 Impact Assessment

Storm waters

For a rain storm event with a return period of 50 years and a rainfall duration of twenty four hours, the rainfall intensity is estimated at 32 mm/hr (Met Éireann data). The run-off from the buildings, roads and hardstanding areas associated with the proposed development is predicted to be approximately 404 m³ for the duration of event. This will be collected in the drainage system, monitored and stored in the storm water retention tanks prior to discharge.

The nearest EPA hydrometric gauge to the site is at Ballyduff, just over 20km north east of the site. Measurements at this station indicate the river Blackwater has a Dry Weather Flow Rate of approximately 5.2 m³/s during summer months. Therefore, the increased run-off from the proposed development, if discharged to the river, will result in a maximum of 2% increase in the flow rate of the river based on the rainfall intensity of a 50 year rain storm event.

This increase is based on the Dry Weather Flow Rate, defined in water quality management plans and applied by the EPA as the *annual minimum daily mean flow with a probability of exceedance of 0.98* (i.e. with a return period of 50 years). This is based on a 'worst case' scenario of a combination of an extreme rainfall event and very low flow rate of the receiving water. In actuality, the site's location at the estuary is at a confluence of the Blackwater and some of its tributaries (Rivers Bride, Tourig, Lucky, etc.) The implication is that flow rates can be expected to be in exceedance of those recorded at Ballyduff, thereby further limiting the actual impact of the site runoff.

Foul Waters

Foul waters shall comprise of sewage effluent from the administration block. These shall be conducted via the site's foul sewage system, leading to the waste water treatment plant for processing. 1 person generates (Person equivalent (PE)), approximately 60g BOD/day and 220L/day therefore, with 17 employee's onsite at full operational capacity, the foul waters sent to the waste water treatment plant will include approximately 1,020g BOD/day with a volume of approximately 3,740L/day.

Process Waters

The only process water on-site shall be the final effluent from the waste water treatment plant. This shall be discharged from the site via the adjacent sewer network to the Youghal Town Council outfall. The anticipated hourly output from the plant is approximately 5 m³ at full design capacity. Applying the same meteorological/hydrological scenario as before (refer to surface water), the increase in flow rate to the river accommodating the WWTP output, would be of the order of 0.013%.

Wastewater discharges will adhere to the following typical values (Table 5.4 Expected Effluent Treatment Parameters). However, these limits will be set by the EPA in agreement with Youghal Town Council.

Parameter	Unit	Values
pH		6-9
Total Suspended Solids	mg/l	30
Temperature	°C	<25
BOD	mg/l	20

Table 5.4 Expected Treated Effluent Parameters

5.4 Mitigation Measures

Storm Waters

Surface water runoff from paved and roofed areas will be collected via the site drainage system. The total area of hardstanding at the site will be approximately 12,500m². The entire site shall be bunded using kerbing to prevent the uncontrolled escape of storm water. Four Class One type oil and grit interceptors or similar will be installed with a 120m³ Storm Water Retention Tank with a monitoring well so that contaminates and or spilled hydrocarbons.

A sluice valve will control discharge of the storm waters to the outfall via the Youghal Town Council sewer network. The monitoring well will ensure that discharges are within acceptable emission limit values, again these limits will be set by the EPA in agreement with Youghal Town Council. In the event on an incident with potential for contamination of surface waters (e.g. spillage), the sluice valve will close preventing any discharge from the site.

Foul Waters

These waters shall be collected in the site foul water system and transported to the waste water treatment plant for treatment.

Process Waters

The only process water on-site shall be the final effluent from the waste water treatment plant. This effluent shall be monitored so that it is within the emission limit values set by the EPA. Monitoring shall be carried out at a frequency, to be specified by the EPA. The impact of the plant output on the river flow rate is negligible and therefore does not require mitigation.

Fire Waters

In the event of an incident, for example a fire, the potential contaminated waters will be collected through the storm water drainage system with the entire site acting as a large bunded area using the raised kerbing as an extra backup measure. Fire water will be stored in the Firewater Retention Tank which has a capacity of 475m³ as a back-up measure to the water mains. Any spent fire water will then be treated at the waste water treatment plant.

Bunds

There are a number of bunded areas at the proposed development and include the following:

- Fuel storage area,
- Quarantine area,
- Standby generator pad.

All these bunds will be tested for integrity and a discharge valve will be installed to pump out any contaminated water and hydrocarbons to be treated at an EPA approved facility.

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