

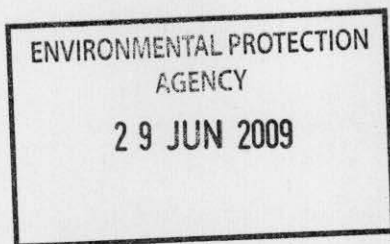
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26th June, 2009.


Re: WWDL for Passage West Monkstown Ref. No. D0129-01.
Response to Notice in accordance with Regulation 18(3)(b) of the
Waste Water Discharge (Authorisation) Regulations 2007.

Dear Mr. Clabby,

I refer to your letter of the 18th May, 2009 concerning the above. Please find enclosed our reply to your request for further information in accordance with Regulation 18(3) (b).

I trust the information enclosed answers the queries you have raised

Yours faithfully,


JOHN LAPTHORNE,
A/DIRECTOR OF SERVICES,
AREA OPERATIONS SOUTH,
FLOOR 5.



REGULATION 18 3(b) RESPONSE

WASTE WATER DISCHARGE LICENCE APPLICATION

D0129-01

PASSAGE WEST/MONKSTOWN



**SUBMITTED TO:
LICENSING UNIT,
ENVIRONMENTAL PROTECTION AGENCY,
WEXFORD**

DATE RESPONSE PROVIDED : JUNE 29th 2009

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SECTION A

Please indicate to what degree, if any, the agglomeration's wastewater and the storm water are segregated.

The existing sewer network, with the exception of the newer residential estates, is presently served by a combined sewer system. The Cork Lower Harbour Sewerage Scheme references proposals made for the separation of storm and foul flows where it has been considered feasible and economical. Under the proposed scheme existing sewers within the Passage West/Monkstown agglomeration will be upgraded to cater for flows from future development areas. Future development areas will have a separate system and storm flows from these areas will be directed to the River.

Provide more details on the West Passage's dispersive capacity in relation to the discharges from the Passage West-Monkstown agglomeration and the existing quality of the receiving waters.

Cork Harbour is considered to be one of the largest natural harbours in the world. It consists of two main sections: the Upper Harbour including the Lee Estuary and Lough Mahon and the Lower Harbour which are connected by an east channel and west channel. A previous study carried out in relation to the primary discharge at Ringaskiddy near the mouth of the harbour revealed that there is approximately 1,300 dilutions available in the receiving waters at that point at the lowest tide level for the current average discharge flow. The west channel is the larger of the two and the majority of the tidal exchange volume occurs through the west channel.

A dispersion modelling report is included as Appendix 3A of Volume 2 of the EIS. As part of the remodelling of the Passage West/Monkstown collection system, the dispersion modelling report included in the EIS and Preliminary Report will be revised to show the effect of the storm water overflows. The revised modelling report will be forwarded separately at a later date. Please refer to Section F2 for details.

SECTION B

B4, B5

With reference to EPA's WWD Application Guidance Notes, please re-evaluate the discharge and overflow points in the agglomeration. In particular please note that each primary and secondary discharge from a wastewater works will be the subject of Emission Limit Values aimed at ensuring Environmental Quality Standards. Also please detail all Storm Water Overflows in the agglomeration, including those, which do not meet the relevant assessment criteria.

Passage West / Monkstown agglomeration contains three main discharge points referred to in the attached maps as SW01, SW02 & SW03. SW01 is the primary discharge point. SW02 & SW03 have been classified as secondary discharge points.

The original application also listed SW04 – SW08 as secondary discharge points. These discharge points are now designated as Emergency Overflows.

Discharge points (SW04 – SW08) can be utilised as storm water overflows during intense rainfall periods to relieve the network. In response to request for further information, secondary discharge points SW04 – SW08 have now been recognised also as Storm Water Overflow points and this additional information has been added in this document for consideration and in the revised application attached.

B10

Please provide details of the extent and the type of work to be undertaken on the collection and conveyance of waste water in the proposed programme of works. In particular detail the work to be undertaken to improve the storm water overflow system.

Work on the Preliminary Report for the Cork Lower Harbour Sewerage Scheme commenced in 2000, with a draft report completed in 2002. The status of the receiving waters at Passage West/Monkstown changed to sensitive under the Urban Waste Water Treatment Regulations of 2004. As a result, the Preliminary report did not consider the current designation of the receiving waters in calculations relating to the storm water overflows.

The Department of the Environment, Heritage and Local Government has issued comments on the Preliminary Report (dated 6th May 2009). The comments included reference to the change in status of the receiving waters and hence the requirement to limit the overflows from the Passage West/Monkstown catchment to 20% of the rainfall runoff. The Department has requested that these revised calculations be completed as part of the Preliminary Report and not postponed to Detailed Design Stage.

Cork County Council met with Mott MacDonald Pettit, Consulting Engineers, who completed both the Preliminary Report and the EIS on 3rd June 2009 to discuss the comments issued by DEHLG. It was agreed that as a result of the change in status of the receiving waters, and the Bathing Water Regulations of 2008 and the Shellfish Water Regulations of 2009, the proposals for the collection system in the Passage West/Monkstown catchment would require remodelling.

The current content of the Preliminary Report in relation to the proposed Collection System for the Passage West/Monkstown catchment requires revision and does not comply with requirements of DEHLG 'Procedures and Criteria In Relation to Storm Water Overflows, 1995' based on the change in status of the receiving waters. The revised proposals for the collection system will be forwarded separately at a later date.

Also, please state whether there has been any update regarding the status of the proposed connection to the Shanbally WWTP. Provide dates of the proposed completion of the Shanbally project and the cessation of discharges from the Passage West-Monkstown agglomeration.

The EIS for the WWTP at Shanbally is with An Bord Pleanála. At a meeting on 22nd May ABP advised that the EIS is with the Bord (i.e. that the Inspector has completed review of the application), and that a decision is expected within a few weeks. Any decision by An Bord may include the holding of an oral hearing, in which case the certification of the EIS would be further delayed.

Given the current delays to the project due to the delay in certification of the EIS, it is anticipated that the collection system upgrades and WWTP will be completed mid 2014. Discharges from the Passage West/Monkstown catchment will cease on completion of the WWTP.

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SECTION C

C1.1

Please identify clearly the storm water overflows in the agglomeration. For each one determine compliance with the DoEHLG 'Procedures and Criteria In Relation to Storm Water Overflows', 1995 and any other guidance as may be specified by the Agency.

Storm water overflow points, SW04 – SW08 are detailed in Section B.5. of the revised WWDL application attached and on new maps (Map 15 Revision 1, Map 16 Revision 1, and Map 17 Revision 1) included. There is no data available regarding the frequency or volume of flow emitted through the storm water overflow points. Compliance with DoEHLG 'Procedures and Criteria In Relation to Storm Water Overflows' cannot be determined for the current system due to insufficient data.

The Cork Lower Harbour Sewerage Scheme will remove primary and secondary discharge points from the agglomeration and pump forward sewage to the proposed waste water treatment plant. The Cork Lower Harbour Sewerage Scheme Draft Report was made in 2002 prior to the status of receiving waters at Passage West/Monkstown being changed to sensitive under the Urban Waste Water Treatment Regulations of 2004. The draft report recommended that flows in excess of 6 DWF will outfall to the river via 6mm screens. This does not comply with requirements of DEHLG 'Procedures and Criteria In Relation to Storm Overflows, 1995'.

The Department of the Environment, Heritage and Local Government (DEHLG), issued comments on the Cork Lower Harbour Sewerage Scheme Preliminary Report on 6th May 2009. DEHLG referenced the change in status of receiving waters and requirement to limit overflows from the agglomeration to 20% of the rainfall runoff. In the interim Cork County Council have met with Mott MacDonald Pettit, Consulting Engineers, and it was agreed that the collection system in the Passage West/Monkstown catchment would require remodelling. These revised proposals for the collection system will be forwarded separately at a later stage

Also please identify whether any of the storm overflows are to be decommissioned, and indicate a date by which these overflows will cease.

The current proposals in the Preliminary Report in relation to the proposed Collection System for the Passage West/Monkstown catchment require revision and do not comply with requirements of DEHLG 'Procedures and Criteria In Relation to Storm Water Overflows, 1995', due to the change in status of the receiving waters. The revised proposals for the collection system will be forwarded separately at a later date. The extent of decommission of overflows will be confirmed as part of the revisions.

Given the current delays to the project due to the delay in certification of the EIS, it is anticipated that the revised collection system and WWTP will be completed mid

2014. Decommissioning of any overflows (where appropriate) will occur at the same time.

C1.2

Please identify clearly, for each pumping station, whether or not it has an emergency overflow. Also, please describe the measures taken in the event of a power failure, especially with regard to any pumping station without an emergency overflow.

There are 6 submersible pumping stations (SPS) within the agglomeration.

Table C1.2 – List of pumping stations

Pump Station	Reference	Emergency Overflow	Pumping Arrangement
Cork Road SPS	SW04	Yes	1 duty & 1 standby
Passage West Central SPS	SW05	Yes	1 duty & 1 standby
Glenbrook SPS	SW06	Yes	1 duty & 1 standby
Monkstown SPS	SW07	Yes	1 duty & 1 standby
Coast Road SPS	SW08	Yes	1 duty & 1 standby
Bun Coille SPS	not applicable	No	1 duty & 1 standby

Buncoille is the only one which does not have an emergency overflow. All pumping stations are inspected on a daily basis. In the event of a mechanical failure backup pumps are used. In the event of a power failure at a pumping station of a duration great enough to cause storage available to be exceeded, the untreated effluent discharges through the emergency overflow instead of the designed discharge point. Backup generators are not in use.

In addition, please provide details of storage capacity at each pumping station, and of the frequency and duration of emergency overflow events in the past three years.

Pump Station	Capacity (m3)	Average inflow (l/s)	Est storage - power failure (mins)
Cork Road SPS	13.04	3	75
Passage West Central SPS	18	3	100
Glenbrook SPS	12.8	5	45
Monkstown SPS	53	15	60
Coast Road SPS	12.6	2.5	85
Bun Coille SPS	not available	not available	not available

There is no data available regarding the frequency and duration of emergency overflow events in the past three years.

SECTION D

D

Please clarify the quantities of DWF for SW01 and SW03 and determine by estimation, or otherwise, the DWF on SW02.

DWF for SW01 = $0.00939\text{m}^3/\text{sec}$

DWF for SW02 = $0.00752\text{m}^3/\text{sec}$

DWF for SW03 = $0.00683\text{m}^3/\text{sec}$

Revised tables form part of the revised application enclosed.

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SECTION E

E.2

Please provide details on any programmes for environmental monitoring, including details of the sampling methods involved and the safety of access to monitoring points. If no programmes exist, please clarify the source, and methods of calculation, of the data included in attachments D and E.

Cork County Council does not have a programme for environmental monitoring in the Lower Harbour. Sampling was carried out at SW01, SW02 & SW03 in preparation for the original discharge licence. Sampling points were chosen due to their proximity to the discharge point and safety of access. In all three cases the last manhole immediately prior to discharge were used as the sampling point and all three were safely accessible.

Analysis of samples was carried out at the accredited laboratory at Inniscarra and further tests for dangerous substances were sent onto an independent laboratory for analysis.

Further information is attached regarding the laboratory accreditation and tables related to section D.1. and E.4. are revised. Details regarding sampling point locations form part of attachment E.2 Map 22 Revision 1.

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SECTION F

F.1

Please provide summary details and an assessment (by adequate cross-referencing to the Shanbally EIS submitted with the application or by any other suitable means) of the impact of the primary and secondary discharges on the existing environment.

In addition, review the data submitted in the application having regard to the DoEHLG circular letter (L8/08) – Water Services Investment and Rural Water Programmes – protection of Natural Heritage and National Monuments. Carry out a screen as set out in Appendix 1 and submit the results of the screen, detailing the response to each question. If the result of the screen is to ‘Assess Impacts’ submit an update of the data in the EIS as specified in the circular letter.

L8/08 – What projects must be screened?

For new projects and significant changes to any existing operations, if the answer is 'yes' to any of the following, the project (i.e. construction, operation and maintenance) must be screened for its impacts:

1. Is the development in or on the boundary of a nature conservation site NHA/SAC/SPA?

In the case of the proposed works the answer is YES.

L8/08 – Appropriate Assessment Flow Diagram

1. Is the development in a nature conservation site?

The proposed development includes laying sewers in the road from Monkstown, through Raffeen to Shanbally along the boundary of the Cork Harbour SPA. The proposed WWTP discharge will be adjacent to the Cork Harbour SPA.

2. Is the development in the surface water catchment of a nature conservation site?

YES

3. Are the qualifying habitats and species of the site water dependent?

YES

L8/08 – Conclusion - Assess Impacts

The Department of the Environment, Heritage and Local Government issued a letter dated 25th June 2008, in relation to Ringaskiddy WWTP discharge licence (DO057-1). The Ringaskiddy WWTP is the proposed plant at Shanbally, to which it is proposed to convey the Passage West/Monkstown effluent. DEHLG wrote as follows:

We refer to your letter dated 6th June 2008 in reference to the above-proposed development. Outlined below are the nature conservation recommendations of the Department of the Environment, Heritage and Local Government.

The proposed discharge is located within or upstream of the following European sites:

Cork Harbour pSPA (4030)

It is understood that the licence is for the existing discharge, and not for that proposed as part of the Cork Harbour Main Drainage Scheme (including the proposed Shanbally WWTP discharges). However, Regulation 6(3) of the Waste Water Discharge (Authorisation) Regulations 2007 (S.I. No. 684 of 2007) states that the Agency shall not grant an authorisation for a waste water discharge if, in the opinion of the Agency, it will "exclude or compromise the achievement of the objectives established for protected species and natural habitats in the case of European sites where the maintenance or improvement of the status of water is an important factor in their protection".

Due to the uncertainty associated with the effects of the following:

1. Ability of WWTP to accommodate extra projected population equivalent loading, taking into account potential effects in combination with other WWTP discharges into the Inner Harbour including the Cork City WWTP;

2. Industrial and other discharges potentially leading to elevated concentrations of heavy metal and persistent organic compounds, which can bioaccumulate and have ecotoxicological effects of bird populations; on the following qualifying habitats and species:

Black-tailed godwit (overwintering);

Redshank (overwintering);

Curlew (overwintering);

Regularly occurring migratory bird wintering assemblage;

the proposed Wastewater discharge is considered likely to have significant adverse effects on a European site. For this reason, the Department of the Environment, Heritage and Local Government submits that an Appropriate Assessment is required with regard to this plan pursuant to Article 6 or 7 of EC Directive 92/43/EEC.

Cork County Council has issued a response to the EPA in relation to the above letter. The response is detailed in the following sections.

F1(A) – PROPOSED WASTE WATER DISCHARGE EFFECTS ON CORK HARBOUR PSPA (4030)

F1(A1) – BACKGROUND

The National Parks & Wildlife Service have suggested that “the proposed Waste water discharge is considered likely to have significant adverse effects on a European site” due to uncertainty associated with the:

“Ability of WWTP to accommodate extra projected population equivalent loading, taking into account potential effects in combination with other WWTP discharges into the Inner Harbour including the Cork City WWTP”

An assessment of the impacts of the proposed Waste water Treatment Plant (WWTP), including discharges to the receiving waters, has been included in Environmental Impact Statement (EIS) for the Cork Lower Harbour Sewerage Scheme. Relevant information has been extracted and included in the sections below to demonstrate the positive effects of the proposed waste water treatment plant.

F1(A2) – EXISTING AND PROPOSED WASTE WATER DISCHARGES

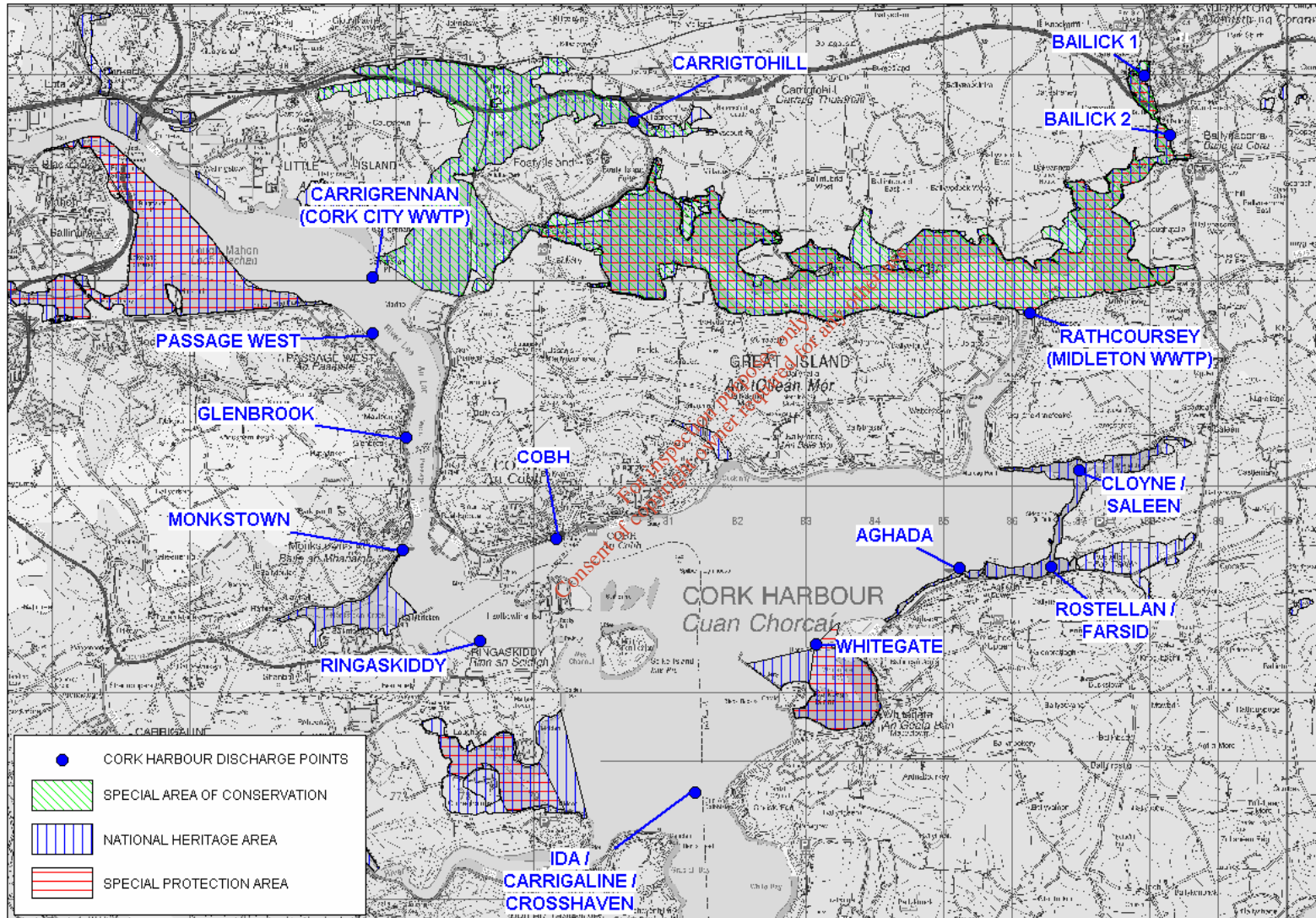
A report was completed for Cork County Council in November 2007 relating to modelling Norovirus contamination in Cork Harbour. The report compiled a list of the treated and untreated discharges to the harbour. These are tabulated below and included indicatively on a drawing overleaf.

Table F1A1 – List of Discharges to Cork Harbour

Location	Treatment	Location	Treatment
Cork City – Carrigrennan	Secondary	Passage West/ Glenbrook/ Monkstown	None
Midleton	Secondary	Whitegate/ Agahda	None
Carrigtohill	Secondary	Ringaskiddy	None
Cloyne	Secondary	Saleen	None
Carrigaline/ Crosshaven	None	Rostellan/ Farsid	None
Cobh	None	Houses -North Channel	None

The modelling completed for the EIS for the Cork Lower Harbour Sewerage Scheme did not consider the background concentrations of coliforms, nitrogen, etc but modelled the improvement in water quality due to the provision of the waste water treatment plant on the existing untreated discharges at Carrigaline/Crosshaven, Cobh, Passage West/ Glenbrook/ Monkstown and Ringaskiddy.

Figure F1 – Existing Treated and Untreated Discharges to Cork Harbour.



The proposed WWTP will initially be sized for a population equivalent (P.E.) of 50,000. The plant will allow for further expansion to 80,000 P.E., the estimated loading for the year 2030. The discharge standards for the treatment plant are:

- < 25 mg/l BOD
- < 125 mg/l COD
- < 35 mg/l SS

The 2001 loading on the harbour from the untreated discharges of the agglomerations of Carrigaline/Crosshaven, Cobh, Passage West/ Glenbrook/ Monkstown and Ringaskiddy has been estimated as:

Table F1A2 – Estimated Untreated Discharge Loadings (2001)

Parameter	Cobh	Passage West & Monkstown	Ringaskiddy Shanbally & Coolmore	Carrigaline	Crosshaven	Total
Flow (m ³ /day)	> 2,776	> 1,919	273	6,105	448	> 11,521
BOD (kg/day)	832	371	86	978	139	2,406
Ss (kg/day)	971	433	100	1,745	162	2,811
Pop. Equiv.	13,865	6,189	1,426	16,305	2,317	40,102

The estimated loading on the treatment plant by the year 2030 has been estimated as:

Table F1A3 – Estimated Loading on WWTP – Year 2030

Parameter	Cobh	Passage West & Monkstown	Ringaskiddy Shanbally & Coolmore	Carrigaline	Crosshaven	Total
Flow (m ³ /day)	5,083	2,189	329	6,478	761	14,841
BOD (kg/day)	1,621	689	108	2,138	243	4,799
Ss (kg/day)	4,030	803	125	2,493	283	7,734
Pop. Equiv.	27,020	11,478	1,798	35,636	4,050	79,982

The predicted 2030 flow rate of 14,841 m³/day equates to a treated discharge of 371 kg/day BOD. Untreated sewage is estimated to average 60g BOD per person per day. Therefore the treated discharge at the 2030 population estimate is equivalent to an untreated discharge of 6,180 P.E. (BOD). By comparison, the 2006 Census records the population of Passage West as 5,203.

The current untreated discharge from Crosshaven and Carrigaline to the existing IDA outfall discharging at the Dognose Bank (i.e. the proposed outfall for the Cork Lower Harbour Waste water Treatment Plant) was estimated, based on 2001 figures, at 26,449 P.E.

F1(A3) – TERRESTRIAL AND MARINE ECOLOGY

A terrestrial and marine ecology assessment and report was prepared by Ecofact Environmental Consultants Ltd. to address the potential impacts of the proposed WWTP and upgraded collection system on the ecology of the receiving environment. The terrestrial and marine ecology report is presented in full in Volume 2, Appendix 2A, and has been summarised as Section 3 - Receiving Environment, Sub Section 3.2 Terrestrial and Marine Ecology, of Volume 1 of the EIS.

Section 3.2.4 of the terrestrial and marine ecology assessment dealt with the impacts of the proposed scheme, and concluded that with correct mitigation measures the construction impacts would be minimal. The report further concluded, in relation to the operational phase impacts:

“Current nutrient inputs by foul water outfalls into the affected aquatic areas would be significantly reduced during the operation of the proposed scheme. Such inputs result in increased primary production and turbidity, indirectly suppressing filter feeder activity. Phytoplankton blooms are expected to be less frequent with the expected reduction in nutrient loading due to the proposed development and restrictions on the edibility of shellfish would ease considerably due to the reduction in associated biotoxins. Water quality around the shorelines within the Harbour and along the Owenboy Estuary is expected to improve, encouraging an increase in diversity of infauna (polychaete worms, bivalves, etc.) and epifauna (crabs, crustaceans, snails, etc.).”

“The reduction of nutrients into the affected aquatic areas would improve water quality, habitats and diversity, and consequently add to the conservation status of Cork Harbour SPA, Owenboy River pNHA and Monkstown Creek pNHA.”

F1(A4) – WATER QUALITY

A computer model of the receiving waters was also developed for the scheme and the results are included in Volume 2 of the EIS as Appendix 3A. The model estimates the relative changes to the quality of the receiving waters of the provision of the treatment plant, relative to the existing untreated discharges, excluding background concentrations of the modelled substances. Hence the model demonstrates the positive impact of the provision of the treatment plant on the receiving waters.

The model concluded that, for both 2010 & 2030 population projections that provision of the treatment plant would lead to a reduction in levels of faecal coliforms by between 80 and 95%, depending on the location within the study area.

The computer model was also used to estimate the effects of nitrogen on the receiving waters by modelling organic nitrogen, ammonia and nitrate. The results of the modelling are discussed in detail in Chapter 6 of the Appendix.

The provision of the treatment plant shows considerable reductions in the predicted nitrogen levels in the Lough Mahon (designated sensitive waters) and in the North Channel. It also leads to improvement of the waters in the Outer Harbour.

F1(A5) – CONCLUSIONS

F1(A5.1) – TERRESTRIAL AND MARINE ECOLOGY

The terrestrial and marine ecology assessment and report prepared by Ecofact Environmental Consultants Ltd concluded that the provision of the waste water treatment plant would improve water quality, habitats and diversity, and consequently add to the conservation status of Cork Harbour SPA, Owenboy River pNHA and Monkstown Creek pNHA.

F1(A5.2) – WATER QUALITY

The conclusions of the modelling report are included as Chapter 7 of the Appendix. The model used was extremely conservative, yet showed a significant decrease in coliform levels when compared with the untreated discharges. Areas including Lough Mahon, the Inner Harbour, East & West Passages and Ringaskiddy show a 95% reduction in coliform levels. Elsewhere the reduction is modelled as 80%.

A less conservative model, based on 98% efficiency of the treatment plant (the efficiency currently achieved by the Midleton plant) would lead to reductions in coliforms concentrations of between 96 and 99% when compared with the untreated discharges.

The model also showed a marked reduction in the levels of Nitrogen as organic nitrogen, ammonia and nitrate within the study area, particularly in the predicted nitrogen levels in the Lough Mahon (designated sensitive waters) and in the North Channel. The provision of the proposed treatment plant will have a significant positive influence on the trophic status of the receiving waters.

The loading on the receiving waters from the treated waste water discharged to the harbour at the 2030 population prediction of 80,000 P.E. will be similar to that from the untreated discharge from Passage West in 2006.

F1(A5.3) – SUMMARY

The proposal for the plant has adequate capacity to cater for future population increases. The provision of the plant will not have an adverse impact on the Cork Harbour SPA. The provision of the Waste Water Treatment Plant at Shanbally, combined with the elimination of other untreated discharges through the provision of additional waste water treatment plants in the East of the Harbour, will result in a significant improvement in the water quality within the Lower Harbour, and add to the conservation status of Cork Harbour SPA, Owenboy River pNHA and Monkstown Creek pNHA.

RESPONSE PART F1(B) – APPROPRIATE ASSESSMENT

Proposed Waste Water Discharge and its effect on Cork Harbour pSPA (4030) in accordance with Articles 6 & 7 of EC Directive 92/43/EEC

F1(B1) – BACKGROUND

The National Parks & Wildlife Service have suggested that “the proposed Waste water discharge is considered likely to have significant adverse effects on a European site” because of uncertainty associated with the discharge due to:

“Industrial and other discharges potentially leading to elevated concentrations of heavy metals and persistent organic compounds, which can bioaccumulate and have ecotoxicological effects of bird populations; on the following qualifying habitats and species:

Black-tailed godwit (overwintering);

Redshank (overwintering);

Curlew (overwintering);

Regularly occurring migratory bird wintering assemblage;”

An assessment of the impacts of the proposed Waste water Treatment Plant (WWTP), including discharges to the receiving waters, has been included in Environmental Impact Statement (EIS) for the Cork Lower Harbour Sewerage Scheme. Relevant information has been extracted and included in the sections below to demonstrate the positive effects of the proposed WWTP.

The assessment included reference to the Department of the Marine Shellfish monitoring programme in relation to heavy metal concentrations but did not address the effect of the treatment plant on the concentrations of heavy metals in the harbour, or the bioaccumulation of persistent organic compounds. These are considered in the sections below.

F1(B2) – PROPOSED WASTE WATER DISCHARGES

As highlighted in a previous response, the proposed WWTP will initially be sized for a population equivalent (P.E.) of 50,000. The plant will allow for further expansion to 80,000 P.E., the estimated loading for the year 2030. The discharge standards for the treatment plant are:

- < 25 mg/l BOD
- < 125 mg/l COD
- < 35 mg/l SS

The predicted 2030 flow rate of 14,841 m³/day equates to a treated discharge 6,180 P.E. (BOD). By comparison, the 2006 Census records the population of Passage West as 5,203.

The current untreated discharge from Crosshaven and Carrigaline to the existing IDA outfall discharging at the Dognose Bank (i.e. the proposed outfall for the Cork Lower Harbour WWTP) was estimated, based on 2001 figures, at 26,449 P.E.

F1(B3) – EXISTING STUDIES

F1(B3.1) – IRISH MARINE INSTITUTE

The Marine Institute monitors the levels of priority hazardous substances in shellfish from selected sites around the Irish coast on an annual basis. This monitoring programme is undertaken to comply with the requirements of EU legislation and to contribute to the Joint Assessment and Monitoring Programme required by the 1994 OSPAR convention. The following are extracts from Marine Institute publications:

“European Regulation 466/2001/EC came into effect on 5th April 2002. It sets maximum levels for mercury, lead and cadmium in foodstuffs, including bivalve mussels. While the monitoring presented here was carried out prior to the adoption of this regulation, results are compared with the values set in the regulation.”

“There are no internationally agreed standards or guidelines for copper, chromium, zinc or chlorinated hydrocarbons in shellfish for human consumption. However there is a compilation of standard and guidance values for contaminants in shellfish, applied by Contracting Parties to OSPAR (Annex 1992). Samples analysed here are compared with these values. None of the countries have set guidance values or standards for chromium in shellfish.”

The results of the Marine Institute Studies including Trace Metal and Chlorinated Hydrocarbon Concentrations in Shellfish from Irish Waters 1997 – 2002 and Trace Metal Concentrations in Shellfish from Irish Waters 2003 – 2005 are available from the National Food Residue Data <http://nfrd.teagasc.ie/>

These studies have included examination of concentrations of pollutants in oysters in Cork Harbour, and are summarised in Table F1B1 of this report. All samples were below permissible levels. It is worth noting that after 2002 the levels of Chlorinated Hydrocarbons, PCBs and Pesticides which had been tested for in earlier surveys were below the limits of detection. This is coincidental, although not necessarily attributable to, with the provision of the Cork City WWTP.

Table F1B1 – Trace Metal and Chlorinated Hydrocarbon Concentrations in Shellfish from Irish Waters 1997-2002 & Trace Metal Concentrations in Shellfish from Irish Waters 2003-2005 in Edible Tissue of oysters in Cork Harbour, 25 samples per annum

Residue	Units	1997	1998	1999	2000	2001	2002	2003	2005
		Residue Concentration							
Cadmium	mg/kg (ppm) wet wt.	0.19	0.26	0.32	0.25	0.23	0.29	0.16	0.12
Chromium	mg/kg (ppm) wet wt.	0.1	0.14	0.31	0.19*	0.23	0.19	0.22	0.14
Copper	mg/kg (ppm) wet wt.	10.9	23.9	22.6	11.4	11.1	24.8	7.37	8.62
Lead	mg/kg (ppm) wet wt.	0.23	0.15	0.08	0.25	0.45	0.12	0.29	0.21

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		1997	1998	1999	2000	2001	2002	2003	2005
Residue	Units	Residue Concentration							
Mercury	mg/kg (ppm) wet wt.	0.03	0.03	0.03	0.03	0.03*	0.03	0.04	0.04
Nickel	mg/kg (ppm) wet wt.					0	-	-	0.13*
Silver	mg/kg (ppm) wet wt.					0	1.21	0.3	0.33
Zinc	mg/kg (ppm) wet wt.	157	270	286	169	165	437	202	162
PCB-028	ug/kg (ppb) wet wt.	0.49	0.82	0.51	0.39	0	0.06		
PCB-031	ug/kg (ppb) wet wt.	0.5	0.79	0.09	0.39	0	0.06		
PCB-052	ug/kg (ppb) wet wt.	0.83	1.61	0.74	0.79	0	0.13		
PCB-101	ug/kg (ppb) wet wt.	0.96	1.37	0.85	1.07	1.1	0.53		
PCB-105	ug/kg (ppb) wet wt.	0.22	-	-	-	0.18	0.11		
PCB-118	ug/kg (ppb) wet wt.	0.7	1.24	0.82	0.64	0.63	0.47		
Pcb-138	ug/kg (ppb) wet wt.	0.92	1.34	1.09	0.61	1.17	0.62		
Pcb-153	ug/kg (ppb) wet wt.	1.57	1.9	1.49	1.53	1.18	1.12		
Pcb-156	ug/kg (ppb) wet wt.	0.05	0.07	0.05*	0.06*	0.03	0.02*	-	
Pcb-180	ug/kg (ppb) wet wt.	0.13	0.22	0.15	0.11	0.04	0.01*	-	
Aldrin	ug/kg (ppb) wet wt.					-			
Cis-Chlordane	ug/kg (ppb) wet wt.	0.06*	0.06*	-	0.03	0.04	0.01**	-	
Dieldrin	ug/kg (ppb) wet wt.	0.83	0.97	2.31	0.12	0	0.54		
Endrin	ug/kg (ppb) wet wt.					0.09	0.05*	-	
Hexachlorobenzene	ug/kg (ppb) wet wt.	0.24	0.05	0.09	0.07	0.03*	0.01*	-	
Hexachlorohexane-alpha (HCH-alpha)	ug/kg (ppb) wet wt.	0.09	0.07	0.04		0	0.12		
Hexachlorohexane-beta (HCH-beta)	ug/kg (ppb) wet wt.					0	0.17*	-	
Isodrin	ug/kg (ppb) wet wt.					0.03*	-	-	
Lindane (HCH-gamma)	ug/kg (ppb) wet wt.		0.22	0.26	0.43	0.47	0.04		
op' DDT	ug/kg (ppb) wet wt.				0.04	0	0.01*	-	
pp' DDD	ug/kg (ppb) wet wt.	0.42	0.87	0.48	0.39	0.31	0.21		
pp' DDE	ug/kg (ppb) wet wt.	1.33	2.4	0.91	1.39	1.3	0.76		
pp' DDT	ug/kg (ppb) wet wt.	0.06	0.54	0.24	0.1	0.34	0.11*	-	
Trans-Chlordane	ug/kg (ppb) wet wt.	-	-	-	0.05	0.04	0.04		
Trans-nonachlor	ug/kg (ppb) wet wt.			0.04	0.07	0.09	-	-	

*Residue Concentration is below the Limit of Quantisation

Table F1B1 – Trace Metal and Chlorinated Hydrocarbon Concentrations in Shellfish from Irish Waters 1997-2002 & Trace Metal Concentrations in Shellfish from Irish Waters 2003-2005 in Edible Tissue of oysters in Cork Harbour, 25 samples per annum

F1(B3.2) – ENVIRONMENTAL PROTECTION AGENCY

The following are extracts from Water Quality in Ireland 2004-2006 published by the EPA:

“MONITORING OF TOXIC CONTAMINANT LEVELS IN ESTUARINE AND COASTAL WATERS

The Marine Institute monitors the levels of priority hazardous substances in a range of commercial fish species landed at Irish ports and also in shellfish from selected sites around the Irish coast. These are substances, such as mercury, that have been

identified as being of particular concern to the marine environment and to consumers of seafood. Levels of such substances in fish and shellfish are a good indicator of contamination in the marine environment as a whole. Inter alia, the monitoring is part of Ireland's contribution to the Joint Assessment and Monitoring Programme (JAMP) of the OSPAR Convention."

"Environmental Contaminants in Shellfish

Concentrations of environmental contaminants such as metals, hydrocarbons and persistent organic pollutants in bivalve molluscs are very good indicators of ambient water quality with respect to these parameters. The Marine Institute monitors contaminants in mussels and oysters from shellfish growing waters but supplements this with additional samples from areas where shellfish are not harvested to give a more representative picture of the status of waters along the Irish coast."

"Seawater samples were collected from the 14 designated shellfish areas twice annually and analysed for trace metals and organochlorines. All organohalogenes (PCBs and pesticides) results were below limits of detection (Marine Institute, 2007). The metal results varied substantially as would be expected for seawater samples, and a number of samples exceeded current Irish standards (Water Quality (Dangerous Substances) Regulations (S.I. No. 12 of 2001)). Individual results do not in themselves imply a breach as these standards apply as annual average concentrations. However, no samples exceed the Imperative values (maximum allowable concentrations) for shellfish waters as set out in SI 268 of 2006."

F1(B3.3) – ENVIRONMENTAL RESEARCH INSTITUTE, UNIVERSITY COLLEGE CORK

University College Cork completed a number of studies as part of the VITOX/BIOMASSTOX projects. These included "An assessment of the pollutant status of surficial sediment in Cork Harbour in the South East of Ireland with particular reference to polycyclic aromatic hydrocarbons"

The assessment, [http://zae.ucc.ie/biomasstox/Kilemade%20et%20al%20\(2004\).pdf](http://zae.ucc.ie/biomasstox/Kilemade%20et%20al%20(2004).pdf), examined the pollution concentrations of heavy metals, PHAs, PCBs, OCPs, BFRs and organotins in surficial, inter-tidal sediments at 3 points within Cork Harbour with the results for the sites compared to a "clean" site at Ballymacoda outside the harbour. Figure 1 of the report which shows the test sites is included overleaf.

The assessment together with additional studies completed by UCC (available at <http://zae.ucc.ie/biomasstox/>) on the effects of the toxic compound discovered in the sediment on clams and turbot concluded that Cork Harbour is polluted principally with PHAs on a scale comparable to levels determined previously for both western and eastern Irish Sea sediments, and that "levels of PCBs, OCPs, BFRs and organotins were on the whole quite low, with the majority of the individual compounds being on or below the detection limit of the method."

Of the 3 sites within Cork Harbour, Whitegate, Aghada and Douglas, the site a Douglas was significantly more polluted than the other sites. The sum of PHAs in Douglas was 3 times that of the other sites and > 5 times that Ballymacoda. By comparison the sum of PHAs in Whitegate and Aghada was less than twice that of the Ballymacoda.

The Douglas site also showed moderately elevated levels of heavy metals.

The reports note:

“Many sources may contribute to sediment PAHs. The relatively constant abundance of most of the PAHs at all sites, together with the special PAH compound ratios, has demonstrated that the sediments owed their PAH loading to a predominantly single mode of origin, i.e. anthropogenic combustion or pyrolysis processes via run-off, industrial and sewage discharges, and atmospheric input rather than petrogenic sources such as oil spills. However, evidence for the input of PAHs from petroleum appeared at one site within Cork Harbour, Whitegate, the site of an oil refinery, which exhibited the highest P/A and Chry/BaA ratios. These indices indicated slight over-impositions of petrogenic inputs into Cork Harbour at the Whitegate site.”

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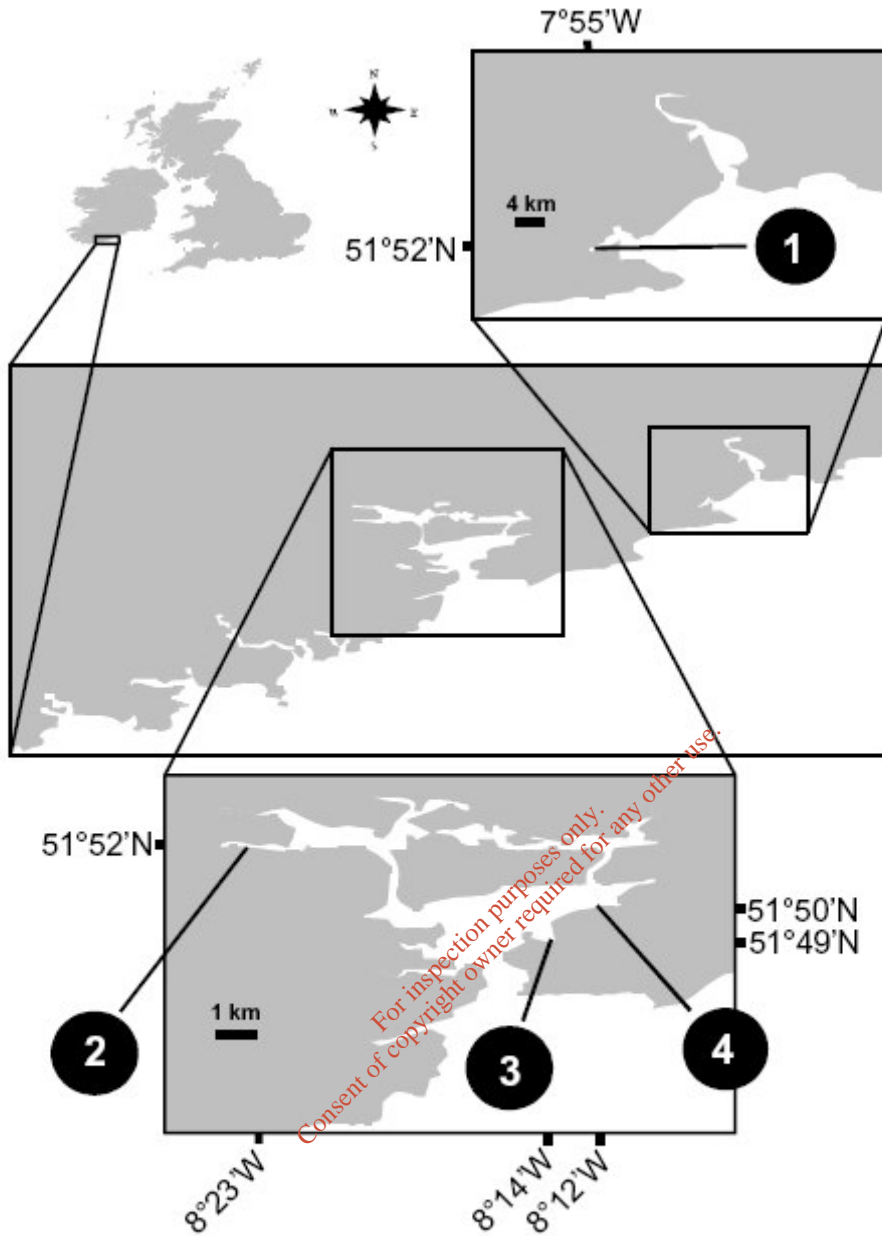


Fig. 1. Map of the sediment sampling sites: (1) Reference site, Ballymacoda and the contaminated sites in Cork Harbour (2) Douglas, (3) Whitegate and (4) Aghada.

F1(B4) – CONVENTIONAL SEWERAGE TREATMENT & REMOVAL OF HEAVY METALS

“Sewage sludge composition – a multifunctional information” by Vienna University of Technology; Inst. for Water Quality, Resources and Waste Management and available in full at <http://www.bvsde.paho.org/bvsaar/cdlodos/pdf/sewagesludge1003.pdf> examined the reduction in heavy metals for the Vienna WWTP. “The treatment process in the period of the sampling campaign consists of conventional mechanical treatment with primary settling and a secondary treatment with 80% BOD removal only. P-precipitation was conducted by pre-precipitation in the primary settling and simultaneous precipitation in the secondary treatment.” The plant has a daily loading of approximately 550 000 m³ waste water.

The assessment showed, while the removal efficiency decreased with increasing flow, the following were the removal rates for heavy metals:

“The removal efficiency of the WWTP is lowest for Zn (58%), followed by Cu (73%) and Cd (67%). 80 to 90% of the Ag-, Hg- and Cr-load are retained in the sludge. The highest removal efficiency was found for Pb (92%) and for Al (> 97%).”

A similar study, <http://www.springerlink.com/content/a512424m3k528562/fulltext.pdf>, in Brazil showed the percentages of removal efficiency (RE) as:

“Hg 61.5%, Cd 60.0%, Zn 44.9%, Cu 44.2%, Pb 39.7%, Cr 16,5% and Mn 10.4%”

A study http://www.geo.sc.chula.ac.th/Geology/Thai/News/Technique/GREAT_2008/PDF/14_2.pdf of the activated sludge WWTP for Bangkok concluded that the removal of metals was directly proportional to initial metal concentration in the influent. The study gave the order and range of percentage removal efficiency as:

“Ni (3.6-27.6) < As (6.8-31.7) < Mo (24.0-43.9) < Mn (31.3-66.6) < Zn (36.1-66.0) < Hg (24.9-79.0) < Cd (0.4-87.3) ≤ Cr (3.2-79.5) < Cu (37.3-74.5) < Pb (54.2-78.9) < Fe (80.5-88.3)”

Health Risk and Environmental Pollution In Relation To Removal Of Heavy Metals By Waste Water Treatment http://www.isah-soc.org/documents/2005/sections/77_vol_2.pdf considered the removal of heavy metals in two WWTPs, the second treating urban waste waters from a conglomeration of approx. 100 000 inhabitants with very little proportion of industrial pre-treated waste waters (WWTP-2). Both treatment systems include mechanical and aerobic biological stages. The study concluded that “Approximately 70-75% of Zn, Cu, Cd, Cr, Hg and other metals in raw sewage is removed and transformed to the sludge”

Table F1B2 shows the transfer coefficients for two small treatment plants in Austria, which have been investigated in detail over one year (Zessner 1999).

TP	A, 2-stage ASP ("ts" ~25 d)				B, 1stage ASP (ts ~ 8d)			
	Influent + chemicals for Pprec.		sludge	effluent	influent		sludge	effluent
	g/PE/d	g/Inh/d	%	%	g/PE/d	g/Inh/d	%	%
CSB	110	224	28	7	110	92	43	12
N	8,2	16,7	17	18	1,5	1,3	15	67
P	1,05	2,1	86	14	12,5	10,5	26	74
	mg/PE/d	mg/Inh/ d	%	%	mg/PE/d	mg/Inh/d	%	%
Zn	59	120	51	46	127	106	45	53
Cu	17	34	77	19	15	12,6	56	42
Pb	2,5	5	72	16	3,9	3,2	79	16
Cd	0,13	0,27	53	44	0,19	0,16	38	59
Cr	3	6,1	80	18	3,4	2,9	49	46
Ni	2,5	5,1	68	30	2,9	2,4	34	62
Hg	0,03	0,06	> 46	< 52	0,14	0,11	(55)	(45)

Table F1B2 – Specific loads in the influent and their distribution to the different end products based on a mass balance over one year

F1(B5) – CONVENTIONAL SEWERAGE TREATMENT & REMOVAL OF PERSISTENT ORGANIC POLLUTANTS/COMPOUNDS

Persistent organic pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes. They can persist in the environment, are capable of long-range transport, and can bioaccumulate in human and animal tissue.

In May 1995, the United Nations Environment Programme Governing Council began investigating POPs, initially beginning with a short list of aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, polychlorinated biphenyls, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, and toxaphene.

A number of studies have investigated the removal of persistent organic pollutants/compounds through conventional sewerage treatment.

One study, <http://www.springerlink.com/content/b61512402715w265/fulltext.pdf>, "The Fate of Dissolved Organic Carbon (DOC) in the Waste water Treatment Process and its Importance in the Removal of Waste water Contaminants" showed the reductions in pollutant levels, following secondary treatment (SSE) compared with the raw water (RW) entering the treatment plant in Table F1B3 overleaf.

Table F1B3 – Reductions in pollutant levels, following secondary treatment (SSE) compared with the raw water (RW)

POPs	RW	PSE	SSE
Hexachlorobutadine	ND (4.7)	ND (2.4)	ND (1.2)
Dichlobenil	ND (11)	ND (5.7)	ND (2.8)
Quintozene	20 (4.2)	18 (2.1)	12 (1.1)
Hexachlorobenzene	6.7 (4.7)	3.8 (2.4)	12 (1.2)
α-HCH	23 (6.0)	13 (3.0)	5.8 (1.5)
β-HCH	19 (6.5)	4.1 (3.2)	6.1 (1.6)
γ-HCH	ND (3.6)	ND (1.8)	ND (0.9)
Isobenzan	ND (10)	ND (5.0)	ND (2.5)
α-Endosulfan	39 (6.0)	17 (3.0)	2.7 (1.5)
Aldrin	ND (6.5)	ND (3.2)	ND (1.6)
Isodrin	ND (4.0)	ND (2.0)	ND (1.0)
Dieldrin	15 (5.5)	12 (2.7)	5.7 (1.4)
Endrin	ND (4.0)	ND (2.0)	2.8 (1.0)
Heptachlor	25 (3.7)	4.3 (1.7)	2.3 (0.9)
Heptachlor-exo-epoxide	110 (5.5)	79 (2.7)	18 (1.4)
Heptachlor-endo-epoxide	ND (5.0)	ND (2.5)	ND (1.2)
p-p'-DDE	2.4 (4.5)	1.3 (2.2)	0.73 (1.1)
p-p'-DDD	9.8 (4.7)	7.8 (2.4)	4.7 (1.2)
p-p'-DDT	ND (7.0)	ND (3.5)	ND (1.7)
PCB-28	2.5 (6.0)	3.6 (3.0)	2.7 (1.5)
PCB-52	210 (4.7)	110 (2.4)	88 (1.2)
PCB-101	140 (10)	72 (5.0)	37 (2.6)
PCB-118	8.6 (6.0)	6.3 (3.0)	4.6 (1.5)
PCB-153	5.7 (4.0)	4.6 (2.0)	0.7 (0.4)
PCB-138	2.7 (4.5)	1.8 (2.2)	1.5 (1.1)
PCB-180	140 (5.5)	140 (2.7)	41 (1.4)

ND: Not detected. The detection limits for individual POPs in wastewater (ng l⁻¹), calculated as signal-to-noise ratio of three, are given in parentheses (Katsoyiannis and Samara 2002)

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F1(B6) – CONCLUSIONS

The Environmental Protection Agency have confirmed that “*Concentrations of environmental contaminants such as metals, hydrocarbons and persistent organic pollutants in bivalve molluscs are very good indicators of ambient water quality with respect to these parameters.*” It is appropriate to take surveys shown existing lack of contamination in Oysters in Cork Harbour into consideration in the assessment of the impact of the proposed WWTP. These surveys do not show elevated pollution levels within the harbour.

F1(B6.1) – HEAVY METAL CONCENTRATIONS IN CORK HARBOUR

Cork Lower Harbour is regularly tested for concentrations of heavy metals and it has been concluded by the Department of the Marine, the Environmental Protection Agency and University College Cork that there is not an issue with heavy metals pollution in the harbour. Section F1(B4) above clearly shows that the provision of primary and secondary treatment with a conventional activated sludge process, as with the proposed WWTP at Shanbally, leads to significant reductions in the levels of heavy metals in the treated waste water. This is as a coincidental part of the process as the metal ions, being heavier than water, tend to settle out into the sludge as part of the treatment process.

The provision of the treatment plant will significantly decrease the levels of heavy metals released to the harbour when compared with the current release of untreated sewage. The provision of the WWTP will not have an adverse effect on the Cork Harbour SPA as it will lead to reduced discharge of heavy metals, not the elevated discharge suggested by the NPWS.

F1(B6.2) – PERSISTENT ORGANIC COMPOUNDS

As with the concentrations of heavy metals, Cork Lower Harbour is regularly tested for persistent organic pollutants. It has been demonstrated by the Department of the Marine, the Environmental Protection Agency and University College Cork that there is no longer an issue with persistent organic pollutants in the water in the harbour. Since 2002, coincidental with the provision of the Cork City WWTP, the levels of all organohalogens (PCBs and pesticides) were below limits of detection in the water samples. The study completed in 2004 by UCC of inter-tidal sediments concluded that levels of PCBs, OCPs, BFRs and organotins were on the whole quite low, with the majority of the individual compounds being on or below the detection limit of the method.

The UCC study did however confirm that the harbour does have a pollution issue with the levels of PAHs in the sediment of the harbour on a scale comparable to levels determined previously for both western and eastern Irish Sea sediments. The study also concluded that, with the exception of Whitegate where some PAH concentrations were clearly associated with the oil refinery, the “relatively constant abundance of most of the PAHs at all sites, together with the special PAH compound ratios, has demonstrated that the sediments owed their PAH loading to a predominantly single mode of origin” i.e. the PAHs at the clean site came from the same source as the PAH within the harbour. The actual source could not however be defined.

As Section F1(B5) above demonstrates, the provision of the treatment plant will significantly decrease the levels of for persistent organic pollutants released to the harbour when compared with the release of untreated sewage. The provision of the WWTP will not have an adverse effect on the Cork Harbour SPA as it will lead to reduced discharge of for persistent organic pollutants, not the elevated discharge suggested by the NPWS.

F1(B6.3) – SUMMARY

The provision of the proposed WWTP at Shanbally will not have a significant adverse effect on the Cork Harbour SPA. It will in fact have a positive effect on the SPA through the reduction in the levels of heavy metals and persistent organic pollutants/compounds released to the harbour.

The harbour does not currently have an issue with the accumulation of heavy metals or persistent organic compounds (other than PHAs) in the sediment of the harbour. There is no evidence of accumulations of either metals or persistent organic pollutants/compounds in the flesh of shellfish with are tested in the harbour every year.

As it has been demonstrated that the provision of the treatment plant will have a positive effect on the SPA no further investigation is required.

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F.2

Provide details of any dispersion modelling that may have been carried out or any other equivalent assessment. This information must give some indication of the impact of the discharge on any protected areas (SPA's, SAC's, Shellfish Waters, etc.) in Cork Harbour. The modelling must also show how tidal flows affect the dispersion of the existing and proposed discharges, and whether it is necessary for the proposed works to discharge on the ebb tide only.

Provide a statement as to whether or not emission of main polluting substances to water (as defined in the Dangerous Substances Regulations SI No. 12 of 2001) are likely to impair the environment.

A dispersion modelling report is included as Appendix 3A of Volume 2 of the EIS. As part of the remodelling of the Passage West/Monkstown collection system, the dispersion modelling report included in the EIS and Preliminary Report will be revised to show the effect of the storm water overflows. The revised modelling report will be forwarded separately at a later date.

The discharges from the proposed works will not impair the environment. The response to section F1 above shows the positive benefits of the proposed works.

F2(1) – BACKGROUND

An assessment of the impacts of the proposed discharges on the receiving waters has been included in Volume 1 of the Environmental Impact Statement (EIS) as Section 3 - Receiving Environment, Sub Section 3.3 Water Quality.

A computer model of the receiving waters was developed for the scheme and the results are included in Volume 2 of the EIS as Appendix 3A. The model estimates the relative changes to the quality of the receiving waters of the provision of the treatment plant, relative to the existing untreated discharges, excluding background concentrations of the modelled substances. Hence the model demonstrates the positive impact of the provision of the treatment plant on the receiving waters.

As part of the correspondence with statutory bodies, the following issues were raised, and included in the EIS.

- South Western Regional Fisheries Board
 - physical impacts of waters containing fisheries
 - effects of sediment disturbance, and impact on commercial/amenity fisheries from the marine crossing
 - Impact on shellfisheries
 - Impacts on fish habitats & water quality (chemical & microbiological)
 - Assessment of the potential for untreated effluent to discharge to harbour waters and Monkstown Creek.
 - Nutrient loading effects on Cork Lower Harbour which is periodically affected by phytoplankton blooms.
 - Measures to avoid and prevent pumping station overflow discharges during operation.

These items are addressed in Chapter 2 - Section 2.11 and Chapter 3 - Section 3.1, 3.2 and 3.3.

- Department of Communications, Marine and Natural Resources
 - noise and vibration details should be noted and limited in accordance with relevant legislation
 - specify in the EIS if dredging for the marine crossing is required
 - details to be provided on proposed pipelines in the foreshore incl. timing/duration
 - refer to the designation of Shellfish Waters
 - potential impacts on navigational safety and passage of migratory fish.

These items are addressed in Chapter 3 - Section 3.1, 3.2, 3.3, 3.4 and 3.7.

The Environmental Protection Agency have asked that additional information be provided in relation to:

“The impact assessment of the proposed discharges having regard to the trophic status of the receiving water and the current uses (shellfish, bathing)”

These impacts were addressed in the EIS, as outlined above, and have been summarised in Section F2(2) of this response.

F2(2) – BATHING & SHELLFISH WATERS

F2(2.1) – EXISTING BATHING WATERS & STANDARDS

The EIS states that “there are no designated bathing areas within the study area, however, Fountainstown beach is a designated bathing area and is located 5.25km from the existing IDA outfall, which is proposed as the sole outfall for discharges from the WWTP.”

Cork Lower Harbour is not designated a sensitive water under the *Bathing Water Regulations* of 1992 however, it is used for recreational purposes. Locations of bathing waters used for recreational purposes, but not designated as such, are highlighted in Map 03 of the original application.

The Bathing Water Regulations (S.I. No. 155 of 1992) a limit is set of:

- ≤ 1000 faecal coliforms/100mls in $\geq 80\%$ of samples
- ≤ 2000 faecal coliforms/100mls in $\geq 95\%$ of samples.

Currently the waters of the Lower Harbour are below these limits. The new Bathing Water Directive 2006/7/EC specifies a standard, in a 95-percentile evaluation for excellent quality coastal waters, of:

- ≤ 100 intestinal enterococci (cfu/100ml)
- ≤ 250 Escherichia coli (cfu/100ml).

F2(2.2) – EXISTING SHELLFISH WATERS & STANDARDS

Cork Lower Harbour is not designated as sensitive water under Statutory Instruments S.I. No. 268 of 2006 – European Communities (Quality of Shellfish Waters) Regulations 2006. The regulations specifies a limit in the shellfish flesh and intervalvular liquid of:

- ≤ 300 Faecal coliforms

Cork Harbour is a shellfish production area (Code CK-CH). This area lies north of a point from Roberts Head to Roches Point up to and including the mean high water mark. In Ireland the main bivalve species are mussels, native and pacific oysters, razorfish, scallops, clams and cockles. Shellfish areas are classified by the microbiological quality of the water. Areas are assigned a classification of A, B or C by the DAFF based on microbiological monitoring.

Table 3.2.5 Designated Bivalve Mollusc Production Areas in Ireland (October, 2005) included in Volume 2 of the EIS lists the shellfish production areas in Cork Harbour based on information contained on the FSAI (Food Safety Authority of Ireland) website. A map showing the locations of these is included as Figure 3.2.5 of the EIS.

F2(2.3) – MODEL OF BACTERIA CONCENTRATIONS

The computer model of the receiving waters developed as part of the EIS included consideration of Faecal coliforms and Intestinal Enterococci and Escherichia coli in the modelling. The results of the faecal coliform modelling were used to estimate the Intestinal Enterococci and Escherichia coli concentrations. The improvement in conditions due to the provision of the waste water treatment plant have been modelled, not actual concentrations of bacteria as background concentrations were not considered.

The model considered 15 no. specific locations, some but not all of which, coincide with the locations identified as bathing waters within the Lower Harbour Area. The model locations are tabulated below and included in Chapter 4 - Figure 4.13 of Appendix 3A of the EIS.

Table F21 – List of locations used to model bacteria concentrations

Fountainstown	Shoreline closest to Outfall	Oyster Farm – Outer Harbour
Myrtleville	Spike Island	Marlogue Point
Roches Point	Ringaskiddy Ferry	Oyster Farm – North Channel
Crosshaven	Monkstown Creek	West Passage
200m upstream of Outfall*	Cobh	Lough Mahon

* This point is just outside the near field mixing zone.

The model concluded that, for both 2010 & 2030 population projections that provision of the treatment plat would lead to a reduction in levels of faecal coliforms by between 80 and 95%, depending on the location within the study area. The points with the lowest concentrations at Fountainstown and the oyster farm in the North Channel.

Concentrations of Intestinal Enterococci were modelled giving a maximum of 27.44 cfu/100ml at a location 200m North of the proposed outfall based on 2030 population estimates. Concentrations of Escherichia coli at this location would be expected to be the same as the concentrations of faecal coliforms.

With the exception of the area immediately surrounding the outfall the maximum concentrations of Escherichia coli are modelled at less than 250 cfu/100ml, the average concentrations at this location were modelled at 76.3 cfu/100ml. Further details of the predicted concentrations are included in Tables 4-9 and 4-10 and Sections 4.5, 4.6 and 4.7 of Chapter 4 of Appendix 3A.

It can be concluded that the provision of the Waste water Treatment Plant at Shanbally will result in a significant improvement in the water quality within the Lower Harbour, improving the potential for use for recreation and shellfish farming.

F2(3) – TROPHIC STATUS

The computer model was also used to estimate the effects of nitrogen on the receiving waters by modelling organic nitrogen, ammonia and nitrate. The results of the modelling are discussed in detail in Chapter 6 of the Appendix. As with the bacteria modelling, the results have been presented for the 15 locations tabulated in Section F2(2.3) above.

The reduction in concentrations of the various forms of Nitrogen are included in Tables 6-2 to 6-4 with spatial mapping demonstrating the reduced concentrations included as Figures 6-17 to 6-20 of the Appendix to the EIS.

The provision of the treatment plant shows considerable reductions in the predicted nitrogen levels in the Lough Mahon (designated sensitive waters) and in the North Channel. It also leads to improvement of the waters in the Outer Harbour.

F2(4) – CONCLUSIONS

The conclusions of the modelling report are included as Chapter 7 of the Appendix, and are summarised below. It should be noted that

- 1) The concentrations of Faecal Coliforms in the raw sewage were assumed to be 4.5 times greater than those used for a similar study in Galway.
- 2) The assumed efficiency of bacteria removal for the treatment plant used in the model is 90%, the efficiency of the existing plant in Midleton is in the region of 98%.
- 3) 98% removal of bacteria would lead to a treated concentration of 5 times less than the concentration assumed for the model purposes.
- 4) The model is therefore extremely conservative. A less conservative model, based on 98% efficiency would lead to reductions in coliforms concentrations of between 96 and 99% when compared with the untreated discharges.

F2(4.1) – FAECAL COLIFORMS

The proposed treatment plant will reduce the number of faecal coliforms in Cork Harbour and the waters outside Roches point.

- The untreated discharge has been modelled giving concentrations of between 2 and 1500 cfu/100ml
- The treated discharge has been modelled giving concentrations of between 2 and 400 cfu/100ml
- The average untreated concentration modelled as 140 cfu/100ml is reduced to 40 cfu/100ml
- Areas including Lough Mahon, the Inner Harbour, East & West Passages and Ringaskiddy show a 95% reduction in coliform levels. Elsewhere the reduction is modelled as 80%.

F2(4.2) – ESCHERICHIA COLI

The proposed treatment plant would lead to reductions in concentrations of Escherichia coli of the same magnitude as those outlined in 4.1 above for Faecal Coliforms.

F2(4.3) – INTESTINAL ENTEROCOCCI

The proposed treatment plant, at the conservative model, would lead to reductions in concentrations of Intestinal Enterococci to levels several orders of magnitude lower than those required by Bathing Water Directive 2006/7/EC. The levels of Intestinal Enterococci associated with a less conservative model have not been predicted, but would be, as with the results for Faecal Coliforms and Escherichia coli, significantly less than those predicted by the model.

F2(4.4) – TROPHIC STATUS

The model shows a marked reduction in the levels of Nitrogen as organic nitrogen, ammonia and nitrate within the study area, particularly in the predicted nitrogen levels in the Lough Mahon (designated sensitive waters) and in the North Channel. The provision of the proposed treatment plant will have a significant positive influence on the trophic status of the receiving waters.

Contents of Attachments

Revised Drawing Schedule

Section A – Non Technical Summary

Revised Non Technical Summary

Section B- General Details

Revised Application Form Section B

Section B.4 – Location of Secondary Discharge Points

Map 10 **Revision 1** – Location of Secondary Discharges { 1 of 2 }

Map 11 **Revision 1** – Location of Secondary Discharges { 2 of 2 }

Map 12 **Revision 1** – Location of Emergency Overflow Discharges { 1 of 3 }

Map 13 **Revision 1** – Location of Emergency Overflow Discharges { 2 of 3 }

Map 14 **Revision 1** – Location of Emergency Overflow Discharges { 3 of 3 }

Section B.5 – Location of Storm Overflow Points

Map 15 **Revision 1** – Location of Storm Overflow Discharges { 1 of 3 }

Map 16 **Revision 1** – Location of Storm Overflow Discharges { 2 of 3 }

Map 17 **Revision 1** – Location of Storm Overflow Discharges { 3 of 3 }

Section B.8 – Notices and Advertisements

Map 18 **Revision 1** – Location of Site Notice

Section C – Infrastructure & Operation

Section C.1 – Operational Information Requirements

Map 19 **Revision 1** – Location of Pumping Stations { 1 of 3 }

Map 20 **Revision 1** – Location of Pumping Stations { 2 of 3 }

Map 21 **Revision 1** – Location of Pumping Stations { 3 of 3 }

Section D – Discharges to the Aquatic Environment

Section D.1 – Discharges to Surface/Ground Waters

Table D.1 **Revision 1** – Discharges to Surface Water

Section E – Monitoring

Section E.2 – Monitoring & Sampling Points

Map 22 **Revision 1** – Sampling Points

Attachment to Application Form – Laboratory Accreditation.

Section E.4 – Table E.4 Sampling Data – **Additional Information**

Section F – Existing Environment & Impact of the Discharge(s)

Section F.1 – Assessment of Impact on Receiving Surface or Ground Water

Table F.1 – Surface/Ground Water Monitoring

Map 23 **Revision 1** – Monitoring Points

REVISION 01

Original Application Drawing Schedule

Section	Ref No.	Drawing Title	Revised Drawing No.s
A - Non Technical Summary	Map 01	Extent of Agglomeration	Map 01
A - Non Technical Summary	Map 02	Outline of Agglomeration	Map 02
A - Non Technical Summary	Map 03	Location of Bathing Waters	Map 03
A - Non Technical Summary	Map 04	Shellfish Waters	Map 04
A - Non Technical Summary	Map 05	NHA Areas	Map 05
A - Non Technical Summary	Map 06	SPA Areas	Map 06
A - Non Technical Summary	Map 07	SAC Areas	Map 07
B.1 - Agglomeration Served by Application	Map 08	Outline of Agglomeration	Map 08
B.3 - Location of Primary Discharge Point	Map 09	Location of Primary Discharge	Map 09
B.4 - Location of Secondary Discharge Points	Map 10	Location of Secondary Discharges {1of3}	Additional information given
B.4 - Location of Secondary Discharge Points	Map 11	Location of Secondary Discharges {2of3}	Additional information given
B.4 - Location of Secondary Discharge Points	Map 12	Location of Secondary Discharges {3of3}	Additional information given
B.8 - Notices and Advertisements	Map 13	Location of Site Notice	Map 18 Revision 1
C.1 - Operational Information Requirements	Map 14	Location of Pumping Stations {1of3}	Map 19 Revision 1
C.1 - Operational Information Requirements	Map 15	Location of Pumping Stations {2of3}	Map 20 Revision 1
C.1 - Operational Information Requirements	Map 16	Location of Pumping Stations {3of3}	Map 21 Revision 1
E.2 - Monitoring & Sampling Points	Map 17	Sampling Points	Map 22 Revision 1
F.1 Assessment of Impact on Receiving Surface Water	Map 18	Monitoring Points	Map 23 Revision 1

Revised Drawing Schedule

Section	Ref No.	Drawing Title	Revised Drawing No.s
A - Non Technical Summary	Map 01	Extent of Agglomeration	Map 01
A - Non Technical Summary	Map 02	Outline of Agglomeration	Map 02
A - Non Technical Summary	Map 03	Location of Bathing Waters	Map 03
A - Non Technical Summary	Map 04	Shellfish Waters	Map 04
A - Non Technical Summary	Map 05	NHA Areas	Map 05
A - Non Technical Summary	Map 06	SPA Areas	Map 06
A - Non Technical Summary	Map 07	SAC Areas	Map 07
B.1 - Agglomeration Served by Application	Map 08	Outline of Agglomeration	Map 08
B.3 - Location of Primary Discharge Point	Map 09	Location of Primary Discharge	Map 09
B.4 - Location of Secondary Discharge Point	Map 10 Revision 1	Location of Secondary Discharge Point {1of2}	Map 10 Revision 1
B.4 - Location of Secondary Discharge Point	Map 11 Revision 1	Location of Secondary Discharge Point {2of2}	Map 11 Revision 1
B.4 - Location of Emergency Overflow Point	Map 12 Revision 1	Location of Emergency Overflow Point {1of3}	Map 12 Revision 1
B.4 - Location of Emergency Overflow Point	Map 13 Revision 1	Location of Emergency Overflow Point {2of3}	Map 13 Revision 1
B.4 - Location of Emergency Overflow Point	Map 14 Revision 1	Location of Emergency Overflow Point {3of3}	Map 14 Revision 1
B.5 - Location of Storm Overflow Point	Map 15 Revision 1	Location of Storm Overflow Point {1of3}	Map 15 Revision 1
B.5 - Location of Storm Overflow Point	Map 16 Revision 1	Location of Storm Overflow Point {2of3}	Map 16 Revision 1
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C.1 - Operational Information Requirements	Map 20 Revision 1	Location of Pumping Stations {2of3}	Map 20 Revision 1
C.1 - Operational Information Requirements	Map 21 Revision 1	Location of Pumping Stations {3of3}	Map 21 Revision 1
E.2 - Monitoring & Sampling Points	Map 22 Revision 1	Sampling Points	Map 22 Revision 1
F.1 Assessment of Impact on Receiving Surface Water	Map 23 Revision 1	Monitoring Points	Map 23 Revision 1

SECTION A: NON-TECHNICAL SUMMARY

Advice on completing this section is provided in the accompanying Guidance Note.

A non-technical summary of the application is to be included here. The summary should identify all environmental impacts of significance associated with the discharge of waste water associated with the waste water works. This description should also indicate the hours during which the waste water works is supervised or manned and days per week of this supervision.

The following information must be included in the non-technical summary:

A description of:

- the waste water works and the activities carried out therein,
- the sources of emissions from the waste water works,
- 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 proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the waste water works,
- further measures planned to comply with the general principle of the basic obligations of the operator, i.e., that no significant pollution is caused;
- measures planned to monitor emissions into the environment.

Supporting information should form **Attachment N° A.1**

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Passage West Monkstown Wastewater Discharge Licence Application.**Section A Non Technical Summary****Description of Passage West – Monkstown Agglomeration and Collection System.****Name of Agglomeration**

The agglomeration for which this application is sought is named 'Passage West – Monkstown'. The agglomeration is made up of the towns/villages of Passage West, Glenbrook and Monkstown. These adjacent coastal population centres stretch for approximately 4km along the western side of Cork Harbour and are mainly residential with little significant industrial development.

At present wastewater produced in the towns and villages in the Lower Harbour area is discharged in an untreated condition into Cork Harbour at numerous dispersed locations. While collection systems exist in Cobh, Passage West, Monkstown, Ringaskiddy, Shanbally, Carrigaline and Crosshaven, none of these systems provides complete wastewater treatment at present. There are plans in place to provide a wastewater treatment plant (WWTP) for the Lower Harbour area as part of the proposed Cork Lower Harbour Sewerage Scheme. However, the WWTP is not likely to be in place within the next 5 to 6 years. This application therefore relates only to the existing untreated discharges from the Passage West Monkstown agglomeration.

The extent of the agglomeration for the Passage West / Monkstown area is shown on Drawing 1 and Drawing 2 attached.

Discharge Points:

The collection system drains to three main outfall points.

[1] Pembroke.

All flows from the North and West of Passage West town are directed to the Pembroke outfall via a comminutor chamber near the old railway line walkway in North Passage.

[2] Glenbrook.

All flows from central Passage, Glenbrook and Carrigmahon are directed to the Glenbrook comminutor and outfall adjacent to the Glenbrook ferry slipway.

[3] Monkstown.

All flows from Monkstown are directed to a comminutor and pumping station in Monkstown Sand Quay and pumped to the Monkstown outfall in the old railway tunnel north of the village.

Comminutors are installed on these discharges to provide screening and screenings maceration. All screenings are macerated and retained in the flow.

Pumping Stations:

There are 6 submersible pumping stations within the system. Two of these are situated in Passage West, one in Glenbrook and three in Monkstown.

1. Cork Road Pumping Station.

The Cork Road Pumping Station serves the low lying catchments to the North West of the Passage West town. Constructed in the late 80's this pumping station, located in the grass verge on the Cork Road entering Passage West, consists of 2 fixed submersible speed pumps, operating on a Duty/Standby arrangement pumping at a rate of 15 litres/sec. Wastewater is pumped to the Pembroke Comminutor Station and discharge point. Cork Road Pumping Station contains an emergency overflow.

2. Passage West Central Pumping Station

Passage West Central Pumping Station serves the centre of Passage West. Constructed in the early 80's, it is located in the public park near the town centre. The station includes a storm overflow at an upstream manhole. A 150mm diameter rising main discharges flow at a pump rate of approximately 19 litres/sec. The station consists of 2 fixed submersible speed pumps, operating on a Duty/Standby arrangement. Wastewater is pumped forward to the Glenbrook comminutor and discharge. Passage West Central Pumping Station contains an emergency overflow.

3. Glenbrook Pumping Station

Glenbrook Pumping Station serves most of the area south of the town centre, as well as pumping the flows from the Passage West Central Pumping Station to the comminutor station south of Glenbrook. Glenbrook pumping station was constructed in the early 80's. The station includes a storm overflow in the form of a weir in the inlet manhole. A 200mm diameter rising main discharges flow through approximately 290 m into the comminutor and discharge adjacent to the Glenbrook Ferry slipway. A pump rate of approximately 28 litres/sec has been established. The station has 2 fixed speed submersible pumps operating on a Duty/Standby arrangement. Glenbrook Pumping Station contains an emergency overflow.

4. Monkstown Pumping Station and Comminutor

The existing pumping station is located on the Sand Quay which serves as a boat yard and a slip-way for the local Sailing Club. It was constructed in the early 1980s. The station consists of a comminutor, two fixed speed submersible pumps, operating on a Duty/ Standby arrangement, with a storm overflow in the form of a weir in the inlet manhole. A pump rate of 75 l/s was established from the pump drawdown tests. A 300 mm diameter rising main discharges the flow at a manhole near the old railway tunnel north of the village. Monkstown Pumping Station contains an emergency overflow.

5. Coast Road Pumping Station

The Coast Road Pumping Station takes the flow from the houses south of Monkstown village and the Buncoille Pumping Station and pumps to a gravity sewer which flows to the Monkstown Pumping Station. It was constructed in the early 1980's and includes an overflow at an upstream manhole. The station consists of 2 fixed speed submersible pumps operating on a Duty/Standby arrangement. A 150 mm diameter rising main discharges the flow at a pump rate of approximately 10 litres/sec. Coast Road Pumping Station contains an emergency overflow.

6. Buncoille Pumping Station

Constructed 2003 this pumping station serves 14 dwellinghouses, pumping forward to the Coast Road Pumping Station.

There are 2 pumps (duty and standby).

There is no overflow at this pumping station. Buncoille Pumping Station does not contain an emergency overflow.

Sources of Emissions

Emissions from the Passage West Monkstown agglomeration arise mainly from the local population i.e. domestic loading. There are no significant commercial or industrial discharges. Currently, waste water from the agglomeration is discharged directly into Cork Harbour West Passage without secondary treatment.

The estimated Population Equivalent (PE) of the agglomeration is 7,600.

The PE is based on the following;

From 2008 Geodirectory:

Number of domestic properties occupied:	2,105
No of commercial with domestic properties:	94
Total domestic properties:	2,199.

Assuming occupancy rate of 3 persons per property = 6597 persons

Adding 10% for other commercial and institutional loadings = 7,256 PEs.

Pending development: approximately 1,120 residential units plus some commercial developments with a total estimated PE of 3435.

As it is Cork County Council policy that any significant developments which would have the effect of increasing discharges to the Harbour area must provide secondary treatment before discharge to the public sewer, the PE of the discharge from pending development is estimated at 10% of the PE loading i.e. = 344 PE

Therefore Total PE: $7256 + 344 = 7600$ PE.

Equivalent BOD 456 kg BOD.

There is also evidence from flow surveys that seawater infiltration - particularly during periods of high tides - and rainfall infiltration into the sewer system also contribute to the discharges.

The Nature and Quantities of Foreseeable Emissions

The existing sewer network within the agglomeration, with the exception of the newer residential estates, is presently served by a combined sewer system. The Cork Lower Harbour Sewerage Scheme references proposals made for the separation of storm and foul flows where it has been considered feasible and economical. Under the proposed

scheme existing sewers within the Passage West/Monkstown agglomeration will be upgraded to cater for flows from future development areas. Future development areas will have a separate system and storm flows from these areas will be directed to the River.

It is expected that the domestic loading will increase with the further development of land zoned for housing and consequent increase in population in the agglomeration. As there are no areas zoned for industrial development in the Passage West Monkstown area non domestic loading is not expected to be significant. In the short term [in the next 5 years] the PE of the agglomeration is not expected to increase above the PE of 7,600 applied for.

The Cork Lower Harbour Sewerage Scheme Draft Report was made in 2002 prior to the status of receiving waters at Passage West/Monkstown being changed to sensitive under the Urban Waste Water Treatment Regulations of 2004. The draft report recommended that flows in excess of 6 DWF will outfall to the river via 6mm screens. This does not comply with requirements of DEHLG 'Procedures and Criteria In Relation to Storm Overflows, 1995'.

The Department of the Environment, Heritage and Local Government (DEHLG), issued comments on the Cork Lower Harbour Sewerage Scheme Preliminary Report on 6th May 2009. DEHLG referenced the change in status of receiving waters and requirement to limit overflows from the agglomeration to 20% of the rainfall runoff. In the interim Cork County Council have met with Mott MacDonald Pettit, Consulting Engineers, and it was agreed that the collection system in the Passage West/Monkstown catchment would require remodelling. These revised proposals for the collection system will be forwarded separately at a later stage

Environmental Impacts

McDonald Pettit, Consulting Engineers have prepared an Environmental Impact Statement (EIS) for the proposed wastewater treatment plant – a copy of which accompanied the original Wastewater Discharge Licence Application. Reference should be made to the EIS for a more detailed assessment of Environmental Impacts.

Receiving Waters – Cork Harbour

The existing discharges from the Passage West Monkstown agglomeration discharge to the West Passage of the River Lee in Cork Harbour. These discharges are downstream of the outfall from the Cork City WWTP at Carrigrenan which has a PE load of 413,000. Cork Harbour is considered to be one of the largest natural harbours in the world. It consists of two main sections: the Upper Harbour including the Lee Estuary and Lough Mahon and the Lower Harbour which are connected by an east channel and west channel. A previous study carried out in relation to the primary discharge at Ringaskiddy near the mouth of the harbour revealed that there is approximately 1,300 dilutions available in the receiving waters at that point at the lowest tide level for the current average discharge flow. The west channel is the larger of the two and the majority of the tidal exchange volume occurs through the west channel.

The Urban Waste Water Treatment (Amendment) Regulations 2004 (SI No 440 of 2004) has designated the 'Lee Estuary/Lough Mahon – from the salmon weir (downstream of Cork City waterworks intake) to Monkstown (excluding North Channel at Great Island) as sensitive waters

Within the Lower Harbour area there are a number of protected conservation areas namely, Cork Harbour Special Protection Area (SPA) and the Great Island Channel Special Area of conservation (SAC). A number of proposed Natural Heritage Areas pNHAs are also designated including: Monkstown Creek pNHA and Owenboy River pNHA. Refer to Maps 5, 6, and 7.

According to the EPA, water quality in the Lower Harbour area is classed as 'intermediate' and water quality within Cork Harbour has exhibited an improvement over the last two years, due, in part, to the operation of Carrigrenan WWTP in 2005. Existing water quality data from the EPA indicate that there is no current negative impact on the transitional receiving waters as a result of the discharges from the agglomeration

A dispersion modelling report is included as Appendix 3A of Volume 2 of the EIS. As part of the remodelling of the Passage West/Monkstown collection system, the dispersion modelling report included in the EIS and Preliminary Report will be revised to show the effect of the storm water overflows. The revised modelling report will be forwarded separately at a later date.

Bathing Waters:

There are no designated bathing waters within the confines of Cork Harbour. Drawing No 3 attached is a location map showing the location of the nearest waters used by members of the public for bathing. Fountainstown beach, located outside the mouth of the harbour, is the closest designated bathing water, at a distance of approximately 14 km from the discharge points.

Bathing Water quality Map of Ireland 2007, prepared by EPA indicates that Fountainstown is compliant with EU guidelines ('good quality').

Shellfish:

There are no areas designated in Cork Harbour under the quality of Shellfish water Regulations 1994. Drawing No 4 shows the location of proposed designated shellfish waters. Cork Lower Harbour is not designated as sensitive water under the *Quality of Shellfish Waters Regulations, 2006 (S.I. 268012006)*.

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

Cork County Council recognises the need for improvement to the existing sewerage system and facilities. In 2000, Cork County Council appointed Consulting Engineers E G Pettit & Company to prepare a Preliminary Report and Environmental Impact Statement (EIS) for the Cork Lower Harbour Area which would make

recommendations concerning the collection and treatment of wastewater from the population centres of Cobh, Passage West, Monkstown, Carrigaline and Ringaskiddy.

The Preliminary report was completed in 2002 and updated in 2004 when an Addendum Report was prepared identifying the impacts of the 2002 Census and the 2003 Cork County Development Plan. The Preliminary report was again updated in 2008. The updated preliminary report, ***Cork Harbour Main Drainage Scheme Preliminary Report March 2008***, takes account of the 2006 Census and the 2005 Local Area Plans, extends the design horizon to 2030 and incorporates the 2004 Addendum within the body of the report.

The EIS has been submitted to an Bord Pleanála in 2008, and the Preliminary Report has been submitted to the Department of Environment, Heritage and Local Government (DOEHLG) for approval. Cork County Council are currently awaiting a decision which is expected before the end of 2008.

A central part of the Cork Lower Harbour Sewerage Scheme is the proposal to provide a Wastewater Treatment Plant (WWTP) to treat all currently untreated wastewater arising in this agglomeration as well as wastewater from Ringaskiddy Village, Crosshaven, Carrigaline, Ringaskiddy Area and Cobh. The proposed WWTP is to be located in the Townland of Shanbally as shown on Drawing 1. It is proposed to discharge the treated effluent through the existing long sea outfall pipe into Cork Lower Harbour (IDA outfall).

This will result in a reduction in the number of outfall points in Cork Harbour to a single outfall point and the discharge of treated effluent, as compared to the existing scenario where untreated effluent is discharged at multiple outfalls throughout the Lower Harbour area. As a result of the WWTP and upgraded collection system, water quality in Cork Lower Harbour is expected to improve within the Lower Harbour area.

The DOEHLG and Cork County Council 2007-2009 Water Services Investment Programme identifies Cork Lower Harbour Sewerage Scheme as one of the projects identified for investment during this period.

The treatment plant proposed will have a capacity of 80,000 population equivalent and can be expected to open with a load of approx. 50,000 p.e. which allows a margin of 30,000 p.e. for future growth. The WWTP is to be constructed on a design, build, operate basis and therefore no specifics regarding the detailed design of the development are available at this stage.

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

All pumping stations and associated overflows will be designed in accordance with the Department of the Environment; Heritage and Local Government guidelines including the guideline document issued entitled *Procedures and Criteria in relation to Storm Water Overflows*. This suggests that overflows to sensitive waters should be limited to

20% of the rainfall run-off volume. The design of the following storm overflows and pump stations will be reviewed at the detailed design stage with a view to limiting the overflows to 20% of the rainfall run-off volume:

- Passage West CSO Chamber
- Passage West Central Pumping Station
- Glenbrook Pumping Station
- Monkstown Pumping Station (upstream overflow manhole)

An automated control operating system will be put in place to ensure that if a downstream pumping station fails to operate, the upstream pumping station will cease pumping.

As it is Cork County Council policy that any significant developments within the agglomeration which would have the effect of increasing discharges into Cork Harbour must provide secondary treatment before discharge to the public sewer.

Measures planned to monitor emissions into the environment

Changes to the Passage West Monkstown collection system proposed under the Cork Lower Harbour Sewerage Scheme will eliminate the existing three major Discharges from the agglomeration, as foul flows will be pumped forward to the proposed WWTP. On completion of the proposed scheme emergency overflows and storm water overflows from the agglomeration will be monitored to comply with guidelines.

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SECTION B: GENERAL

Advice on completing this section is provided in the accompanying Guidance Note.

B.1 Agglomeration Details

Name of Agglomeration:	Passage West / Monkstown
-------------------------------	--------------------------

Applicant's Details

Name and Address for Correspondence

Only application documentation submitted by the applicant and by the nominated person will be deemed to have come from the applicant.

Provide a drawing detailing the agglomeration to which the licence application relates. It should have the boundary of the agglomeration to which the licence application relates clearly marked in red ink.

Name*:	Cork County Council South
Address:	Floor 5,
	County Hall,
	Carrigrohane Road,
	Co. Cork.
Tel:	021-4276891
Fax:	021-4276321
e-mail:	corporate.affairs@corkcoco.ie

*This should be the name of the water services authority in whose ownership or control the waste water works is vested.

*Where an application is being submitted on behalf of more than one water services authority the details provided in Section B.1 shall be that of the lead water services authority.

Name*:	Ms. Patricia Power, Director of Services, Area Operations South.
Address:	Floor 5,
	County Hall,
	Carrigrohane Road,
	Co. Cork.
Tel:	021-4285304
Fax:	021-4342098
e-mail:	Patricia.Power@CorkCoCo.ie

*This should be the name of person nominated by the water services authority for the purposes of the application.

Co-Applicant's Details

Name*:	NOT APPLICABLE
Address:	
Tel:	
Fax:	
e-mail:	

*This should be the name of a water services authority, other than the lead authority, where multiple authorities are the subject of a waste water discharge (authorisation) licence application.

Design, Build & Operate Contractor Details

Name*:	NOT APPLICABLE
Address:	
Tel:	
Fax:	
e-mail:	

*Where a design, build & operate contract is in place for the waste water works, or any part thereof, the details of the contractor should be provided.

Attachment B.1 should contain appropriately scaled drawings / maps ($\leq A3$) of the agglomeration served by the waste water works showing the boundary clearly marked in red ink. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom containing sections B.2, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

B.2 Location of Associated Waste Water Treatment Plant(s)

Give the location of the waste water treatment plant associated with the waste water works, if such a plant or plants exists.

Name*:	NOT APPLICABLE
Address:	
Grid ref (6E, 6N)	
Level of Treatment	
Primary Telephone:	
Fax:	
e-mail:	

*This should be the name of the person responsible for the supervision of the waste water treatment plant.

Attachment B.2 should contain appropriately scaled drawings / maps ($\leq A3$) of the site boundary and overall site plan, including labelled discharge, monitoring and sampling points. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom, containing sections B.1, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
		✓

B.3 Location of Primary Discharge Point

Give the location of the primary discharge point, as defined in the Waste Water Discharge (Authorisation) Regulation, associated with the waste water works.

Type of Discharge	355 mm OD HDPE pipe.
Unique Point Code	SW01PASS
Location	Cork Lower Harbour Townland Pembroke
Grid ref (6E, 6N)	E176559, N069260

Attachment B.3 should contain appropriately scaled drawings / maps ($\leq A3$) of the discharge point, including labelled monitoring and sampling points associated with the discharge point. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing the drawings and tabular data requested in sections B.1, B.2, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

B.4 Location of Secondary Discharge Point(s) REVISED

Give the location of **all** secondary discharge point(s) associated with the waste water works. Please refer to Guidance Note for information on Secondary discharge points.

Type of Discharge	355 mm OD HDPE pipe.
Unique Point Code	SW02PASS
Location	Glenbrook Townland Lackaroe
Grid ref (6E, 6N)	E177181, N067448

Type of Discharge	355 MM OD HDPE pipe.
Unique Point Code	SW03PASS
Location	Monkstown Townland Monkstown (Castlefarm)
Grid ref (6E, 6N)	E177235, N066512

Location of Emergency Overflow Point(s) REVISED

Type of Discharge	To storm system concrete pipe.
Unique Point Code	SW04PASS
Location	Passage West Townland Ardmore
Grid ref (6E, 6N)	E175621, N069656

Type of Discharge	375 mm diameter storm pipe.
Unique Point Code	SW05PASS
Location	Passage West Townland Pembroke
Grid ref (6E, 6N)	E176987, N068831

Type of Discharge	375mm diameter pipe with Non-return flap valve
Unique Point Code	SW06PASS
Location	Glenbrook Townland Lackaroe
Grid ref (6E, 6N)	E177116, N067734

Type of Discharge	300mm diameter pipe with Mitec non return Valve
Unique Point Code	SW07PASS
Location	Monkstown Townland Monkstown (Castlefarm)
Grid ref (6E, 6N)	E177114, N066095

Type of Discharge	300mm diameter pipe.
Unique Point Code	SW08PASS
Location	Monkstown Townland Monkstown (Castlefarm)
Grid ref (6E, 6N)	E176656, N065460

Attachment B.4 should contain appropriately scaled drawings / maps ($\leq A3$) of the discharge point(s), including labelled monitoring and sampling points associated with the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.5, C.1, D.2, E.3 and F.2.

Section B.4

Emergency Overflows listed in Section B.3 were constructed as part of a pumping/comminutor station and are designed to overflow on rare occasions in the event of pump failure. However it is possible in the event of heavy rainfall if pumps cannot cater for heavy flows, these overflows may act as storm overflows. For details regarding Emergency Overflows refer to Sections B3, C1 & D1.

Attachment included	Yes	No
	✓	

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

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

Type of Discharge	To storm system concrete pipe.
Unique Point Code	SW04PASS
Location	Passage West Townland Ardmore
Grid ref (6E, 6N)	E175621, N069656

Type of Discharge	375 mm diameter storm pipe.
Unique Point Code	SW05PASS
Location	Passage West Townland Pembroke
Grid ref (6E, 6N)	E176987, N068831

Type of Discharge	375mm diameter pipe with Non-return flap valve
Unique Point Code	SW06PASS
Location	Glenbrook Townland Lackaroe
Grid ref (6E, 6N)	E177116, N067734

Type of Discharge	300mm diameter pipe with Mitec non return Valve
Unique Point Code	SW07PASS
Location	Monkstown Townland Monkstown (Castlefarm)
Grid ref (6E, 6N)	E177114, N066095

Type of Discharge	300mm diameter pipe.
Unique Point Code	SW08PASS
Location	Monkstown Townland Monkstown (Castlefarm)
Grid ref (6E, 6N)	E176656, N065460

Attachment B.5 should contain appropriately scaled drawings / maps ($\leq A3$) of storm water overflow point(s) associated with the waste water works, including labelled monitoring and sampling points associated with the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, C.1, D.2, E.3 and F.2.

Section B.5

Overflows listed in Section B.5 were constructed as part of a pumping/comminutor station and are designed to overflow on rare occasions in the event of pump failure. However it is possible in the event of heavy rainfall if pumps cannot cater for heavy flows, these overflows may act as storm overflows. For details regarding Emergency Overflows refer to Sections B3, B5, C1 & D1.

It is intended as part of the Lower Harbour Sewerage Scheme that all overflows will be designed in accordance with the Department of the Environment, Heritage and Local Government guidelines including the guideline document issued entitled *Procedures and Criteria in relation to Storm Water Overflows*. This suggests that overflows to sensitive waters should be limited to 20% of the rainfall run-off volume. The design of the following storm overflows and pump stations will be reviewed at the

detailed design stage with a view to limiting the overflows to 20% of the rainfall run-off volume:

- Passage West CSO Chamber
- Passage West Central Pumping Station
- Glenbrook Pumping Station
- Monkstown Pumping Station (upstream overflow manhole)

Attachment included	Yes	No
	√	

B.6 Planning Authority

Give the name of the planning authority, or authorities, in whose functional area the discharge or discharges take place or are proposed to take place.

Name:	Cork County Council
Address:	Floor 1
	County Hall
	Carrigrohane Road,
	Co. Cork.
Tel:	021-4276891
Fax:	021-4867007
e-mail:	planninginfo@corkcoco.ie

Planning Permission relating to the waste water works which is the subject of this application: - (tick as appropriate)

has been obtained		is being processed	
is not yet applied for		is not required	√

Local Authority Planning File Reference N^o:	Not applicable. Current scheme predates requirements for Part 8 or Part 10. Planning.
---	---

Attachment B.6 should contain **the most recent** planning permission, including a copy of **all** conditions, and where an EIS was required, copies of any such EIS and any certification associated with the EIS, should also be enclosed. Where planning permission is not required for the development, provide reasons, relevant correspondence, etc.

Attachment included	Yes	No
	√	

B.7 Other Authorities

B.7 (i) Shannon Free Airport Development Company (SFADCo.) area

The applicant should tick the appropriate box below to identify whether the discharge or discharges are located within the Shannon Free Airport Development Company (SFADCo.) area.

Attachment B.7 (i) should contain details of any or all discharges located within the SFADCo. area.

Within the SFADCo Area	Yes	No
		√

B.7 (ii) Health Services Executive Region

The applicant should indicate the **Health Services Executive Region** where the discharge or discharges are or will be located.

Name:	Health Services Executive South
Address:	Aras Slainte
	Wilton Road,
	Cork.
Tel:	021-4545011
Fax:	021-4927228
e-mail:	Not Available

B.7 (iii) Other Relevant Water Services Authorities

Regulation 13 of the Waste Water Discharge (Authorisation) Regulations, 2007 requires all applicants, not being the water services authority in whose functional area the relevant waste water discharge or discharges, to which the relevant application relates, takes place or is to take place, to notify the relevant water services authority of the said application.

Name:	NOT APPLICABLE
Address:	
Tel:	
Fax:	
e-mail:	

Relevant Authority Notified	Yes	No
		√

Attachment B.7 (iii) should contain a copy of the notice issued to the relevant local authority.

Attachment included	Yes	No
		√

B.8 Notices and Advertisements

Regulations 10 and 11 of the Waste Water Discharge (Authorisation) Regulations, 2007 require all applicants to advertise the application in a newspaper and by way of a site notice. See *Guidance Note*.

Attachment B.8 should contain a copy of the site notice and an appropriately scaled drawing ($\leq A3$) showing its location. **The original application must include the original page of the newspaper in which the advertisement was placed.** The relevant page of the newspaper containing the advertisement should be included with the original and two copies of the application.

Attachment included	Yes	No
	√	

B.9 (i) Population Equivalent of Agglomeration

TABLE B.9.1 POPULATION EQUIVALENT OF AGGLOMERATION

The population equivalent (p.e.) of the agglomeration to be, or being, served by the waste water works should be provided and the period in which the population equivalent data was compiled should be indicated.

Population Equivalent	7600
Data Compiled (Year)	2008
Method	Census 2006 + House Count using 2008 Geodirectory

B.9 (ii) Pending Development

Where planning permission has been granted for development(s), but development has not been commenced or completed to date, within the boundary of the agglomeration and this development is being, or is to be, served by the waste water works provide the following information;

- information on the calculated population equivalent (p.e.) to be contributed to the waste water works as a result of those planning permissions granted,
- the percentage of the projected p.e. to be contributed by the non-domestic activities, and
- 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.

B.9. (ii) Population Equivalent of agglomeration.

The estimated Population Equivalent (PE) of the agglomeration is 7,600.

The PE is based on the following;

From 2008 Geodirectory:

Number of domestic properties occupied: 2,105
 No of commercial with domestic properties: 94
 Total domestic properties: 2,199.

Assuming occupancy rate of 3 persons per property = 6597 persons

Adding 10% for other commercial and institutional loadings = 7,256 PEs.

Pending development: approximately 1,120 residential units plus some commercial developments with a total estimated PE of 3435.

As it is Cork County Council policy that any significant developments which would have the effect of increasing discharges to the Harbour area must provide secondary treatment before discharge to the public sewer, the PE of the discharge from pending development is estimated at 10% of the PE loading i.e. = 344 PE

Therefore Total PE: 7256 + 344 = **7600 PE.**

Equivalent BOD 456 kg BOD.

In the short term [in the next 5 years] the PE of the agglomeration is not expected to increase above the PE of 7,600 applied for.

The proposed WWTP will have a capacity of 80,000 population equivalent and can be expected to open with a load of approx. 50,000 p.e. which allows a margin of 30,000 p.e. for future growth. The WWTP is to be constructed on a design, build, operate basis and therefore no specifics regarding the detailed design of the development are available at this stage.

B.9 (iii) FEES

State the relevant Class of waste water discharge as per Column 1 of the Second Schedule, and the appropriate fee as per Columns 2 or 3 of the Third Schedule of the Waste Water Discharges (Authorisation) Regulations 2007, S.I. No. 684 of 2007.

Class of waste water discharge	Fee (in €)
2,001 < P.E. < 10,000	€25,000

Appropriate Fee Included	Yes	No
	✓	

B.10 Capital Investment Programme

State whether a programme of works has been prioritised for the development of infrastructure to appropriately collect, convey, treat and discharge waste water from the relevant agglomeration. If a programme of works has been prioritised provide details on funding, (local or national), allocated to the capital project. Provide details on the extent and type of work to be undertaken and the likely timeframes for this work to be completed.

Attachment B.10 should contain the most recent development programme, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

A programme of works has been prioritised for the development of infrastructure to appropriately collect, convey, treat and discharge waste water from the agglomeration. The scheme is the Cork Lower Harbour Sewerage Scheme which has been approved by the DOEHLG to start in 2009 as part of the Water Services Investment Programme. Refer to Attachment B.10.

An Environmental Impact Statement (EIS) has been submitted to an Bord Pleanála and the Preliminary Report has been submitted to the Department of Environment, Heritage and Local Government (DOEHLG) for approval.

The proposed programme for the Cork Lower Harbour Sewerage Scheme comprises of 4 contracts with estimated costs as follows:

1 Cobh	€ 20.6 m,
2 Carrigaline	€ 6.7 m
3 Passage/Monkstown/Ringaskiddy	€ 10.3 m
4. DBO Treatment Plant at Shanbally including Pumping Stations and River Crossing from Cobh	€ 54.0 m
Total	€ 91.6 m

Crosshaven works were completed under a separate contract and are already collected into Carrigaline from where the sewage is pumped forward with the Carrigaline sewage into the IDA outfall. (Refer to separate discharge licence application).
Current estimated completion date: end of 2013.

WSIP Programme for Cork County Council as published by the DOEHLG is also attached.

Attachment included	Yes	No
	✓	

B.11 Significant Correspondence

Provide a summary of any correspondence resulting from a Section 63 notice issued by the Agency in relation to the waste water works under the Environmental Protection Agency Acts, 1992 and 2003, as amended by Section 13 of Protection of the Environment Act, 2003.

Attachment B.11 should contain a summary of any relevant correspondence issued in relation to a Section 63 notice.

Attachment included	Yes	No
		✓

B.12 Foreshore Act Licences.

Provide a copy of the most recent Foreshore Act licence issued in relation to discharges from the waste water works issued under the Foreshore Act 1933.

Copies of Licence Not Available. Refer to Attachment B.12

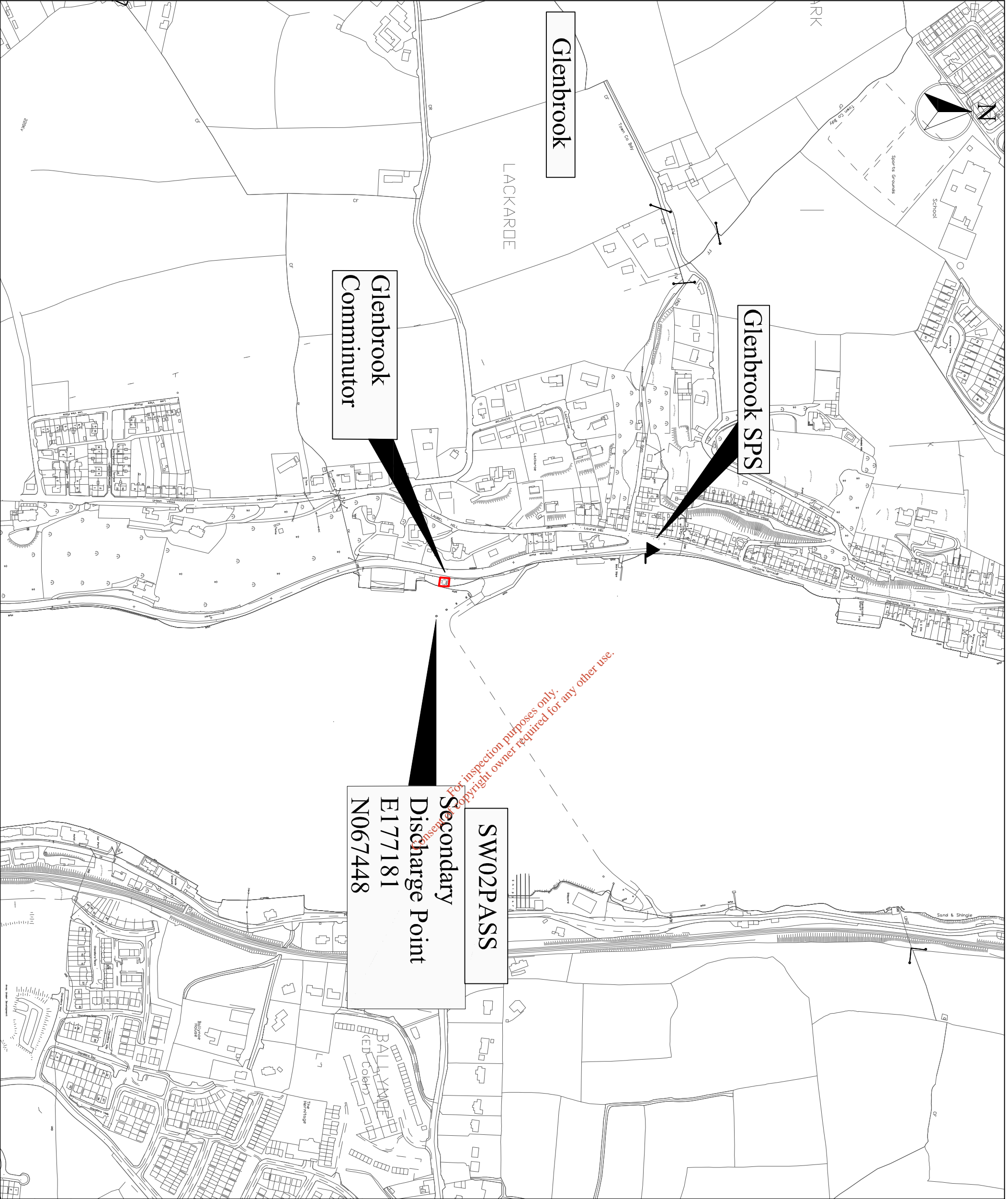
Attachment B.12 should contain the most recent licence issued under the Forshore Act 1933, including a copy of **all** conditions attached to the licence and any monitoring returns for the previous 12-month period, if applicable.

Attachment included	Yes	No √
---------------------	-----	---------

The following information summarises details available of existing Foreshore Licences for Passage West/Monkstown agglomeration.

Table B.10

File Ref	MS51/8/703	MS51/8/601
Deed Number	709	558
Dated	21/01/1982	26/07/1977
County	Cork	Cork
Location	Ardmore, Lackaroe, Monkstown, Pembroke	Passage West
Section	Licence	Licence
Particulars	Constructing, laying, maintaining & using 3 storm water outfall pipes & 3 outfall sewerage pipes	Laying an outfall sewerage pipe
Customer	Cork County Council	Cork County Council
Term	99 years	99 years
Effective from	21/01/1982	26/07/1977
Rental	€0.00	€0.00



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South Cork Division



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 Acting County Engineer
 County Hall, Cork.

P. Power
 Director of Services
 South Cork.

Project:
EPA LICENCE APPLICATION
 Passage West / Monkstown

Title:
 Attachment Section B.4. - Location
 of Secondary Discharge Point (of2)

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:5,000	Map 10
Drawn:	Approved:	Date:	Revision
BOL	BQ	23/06/09	1



SW03PASS
Secondary Discharge Point
E177235
N066512

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 Acting County Engineer
 County Hall, Cork.

P. Power
 Director of Services
 South Cork.

Project:
EPA LICENCE APPLICATION
 Passage West / Monkstown

Title:
 Attachment Section B.4. - Location
 of Secondary Discharge Point {2012}

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:10,000	Map 11
Drawn:	Approved:	Date:	Revision 1
BOL	BQ	23/06/09	

SW04PASS
Emergency
Overflow Point
E175621
N069656

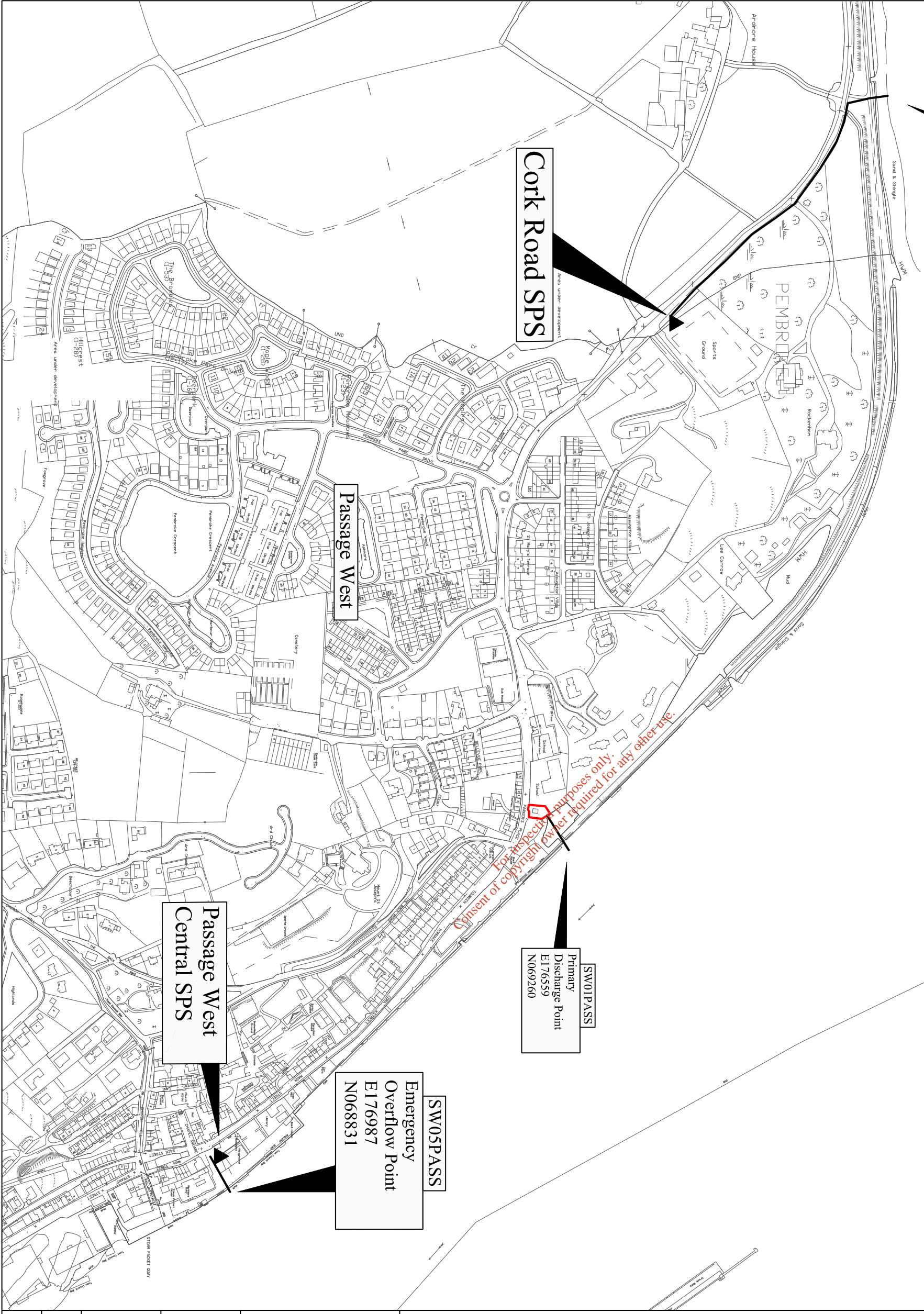
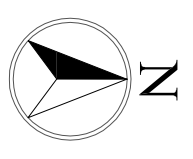
Cork Road SPS

Passage West

Passage West
Central SPS

SW01PASS
Primary
Discharge Point
E176559
N069260

SW05PASS
Emergency
Overflow Point
E176987
N068831



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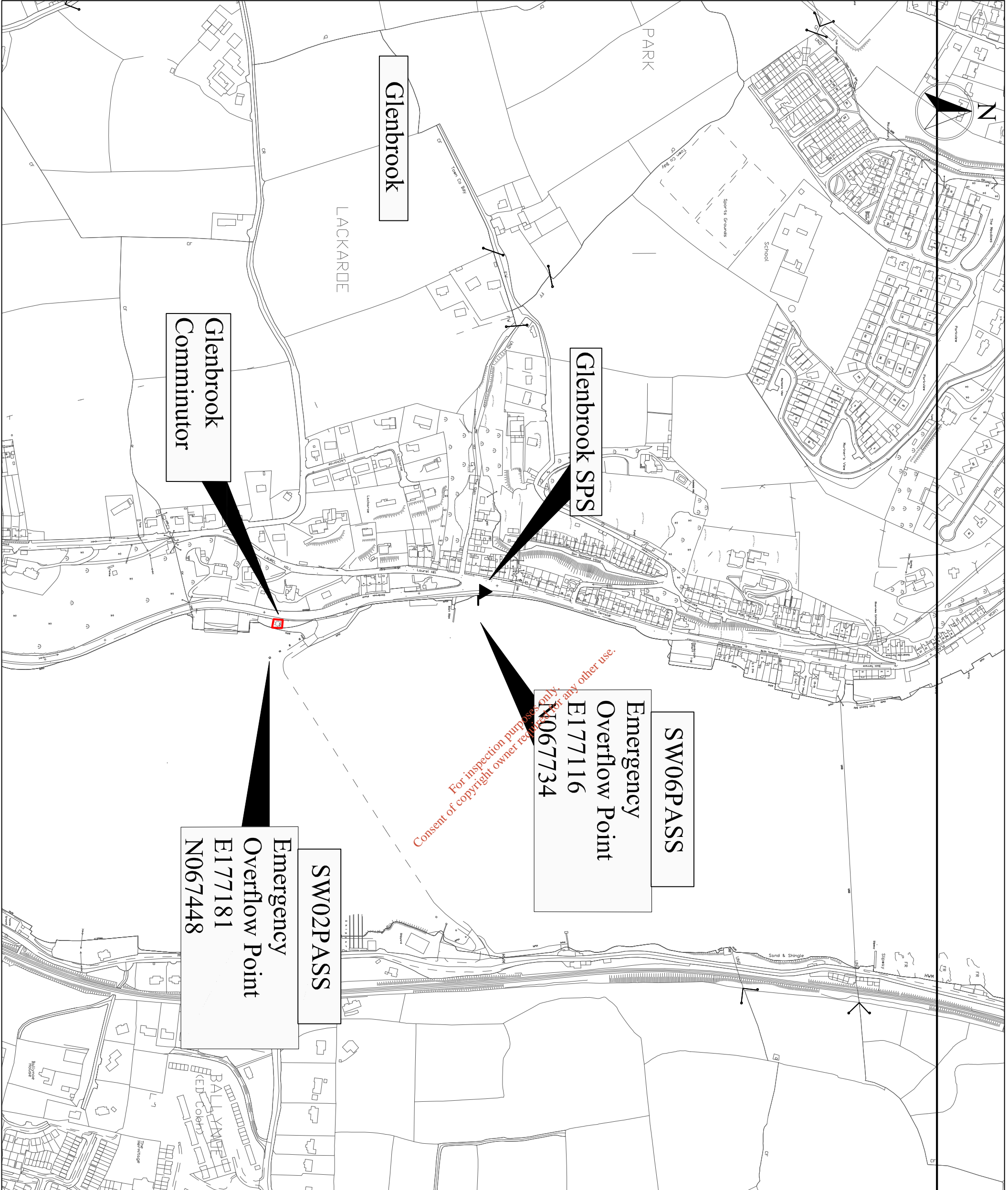
N. O'Keefe, B.Eng., C.Eng., Eur. Ing., F.I.E.I., M.I.C.E.,
 Acting County Engineer
 County Hall, Cork.

P. Power
 Director of Services
 South Cork.

Project:
EPA LICENCE APPLICATION
 Passage West / Monkstown

Title:
 Attachment Section B.4. - Location
 of Emergency Overflows {1 of 3}

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:5,000	Map 12
Drawn:	Approved:	Date:	Revision 1
BOL	BQ	23/06/09	



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SW06PASS

**Emergency
Overflow Point
E177116
N067734**

SW02PASS

**Emergency
Overflow Point
E177181
N067448**

**Glenbrook
Comminutor**

Glenbrook SPS

Glenbrook

LACKARDE

PARK



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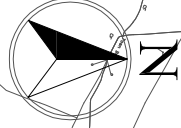
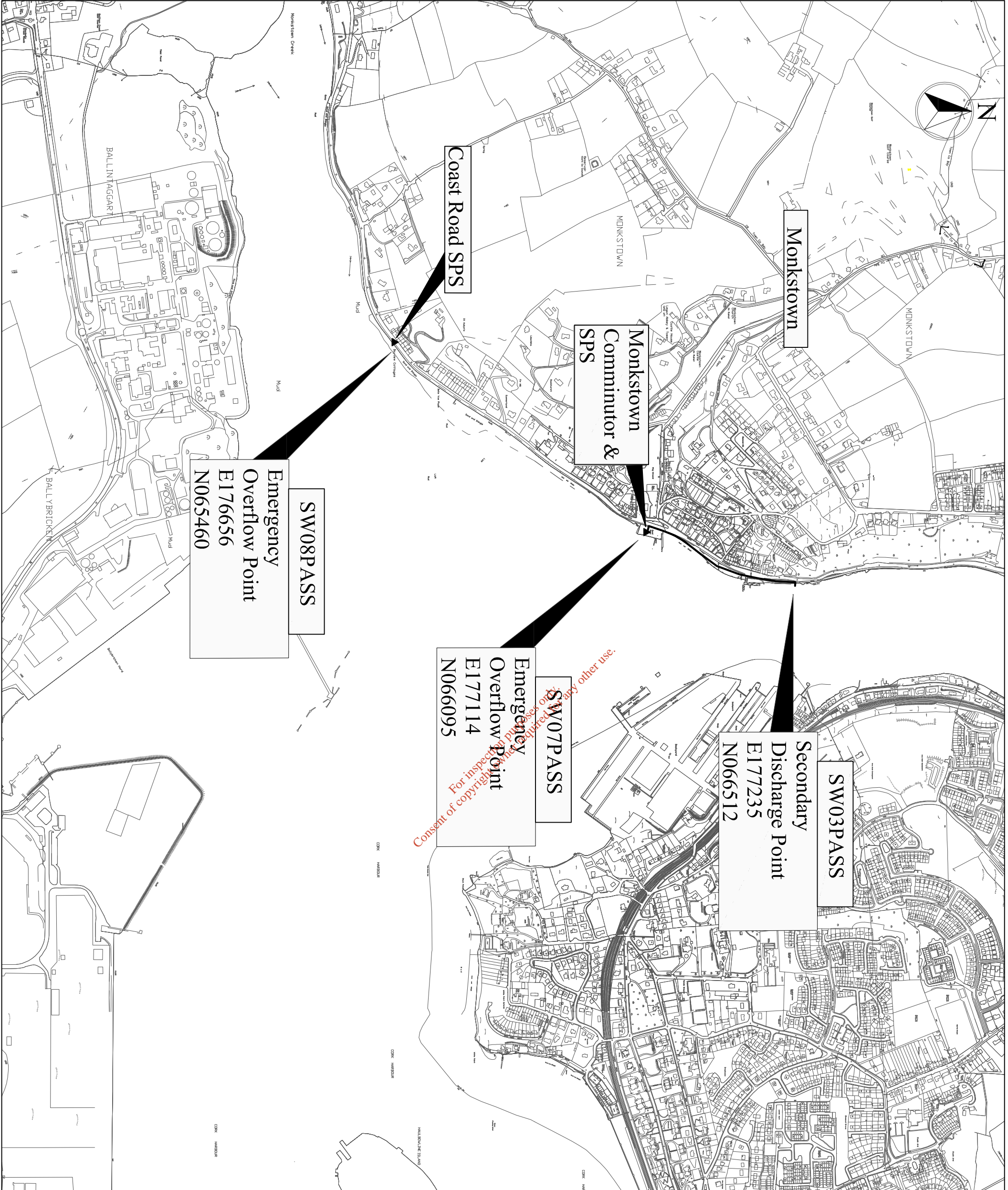
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County Hall, Cork.

P. Power
Director of Services
South Cork.

Project:
EPA LICENCE APPLICATION
Passage West / Monkstown


Title:
**Attachment Section B.4. - Location
of Emergency Overflow {2 of 3}**

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:5,000	Map 13
Drawn:	Approved:	Date:	Revision 1
BOL	BQ	23/06/09	



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P. Power Director of Services South Cork.			
Project: EPA LICENCE APPLICATION Passage West / Monkstown			
Title: Attachment Section B.4. - Location of Emergency Overflow Point{3of3}			
Designed: BOL	Checked: BQ	Scale: 1:10,000	Drawing No. Map 14
Drawn: BOL	Approved: BQ	Date: 23/06/09	Revision 1

SW04PASS
Storm Overflow
Point
E175621
N069656

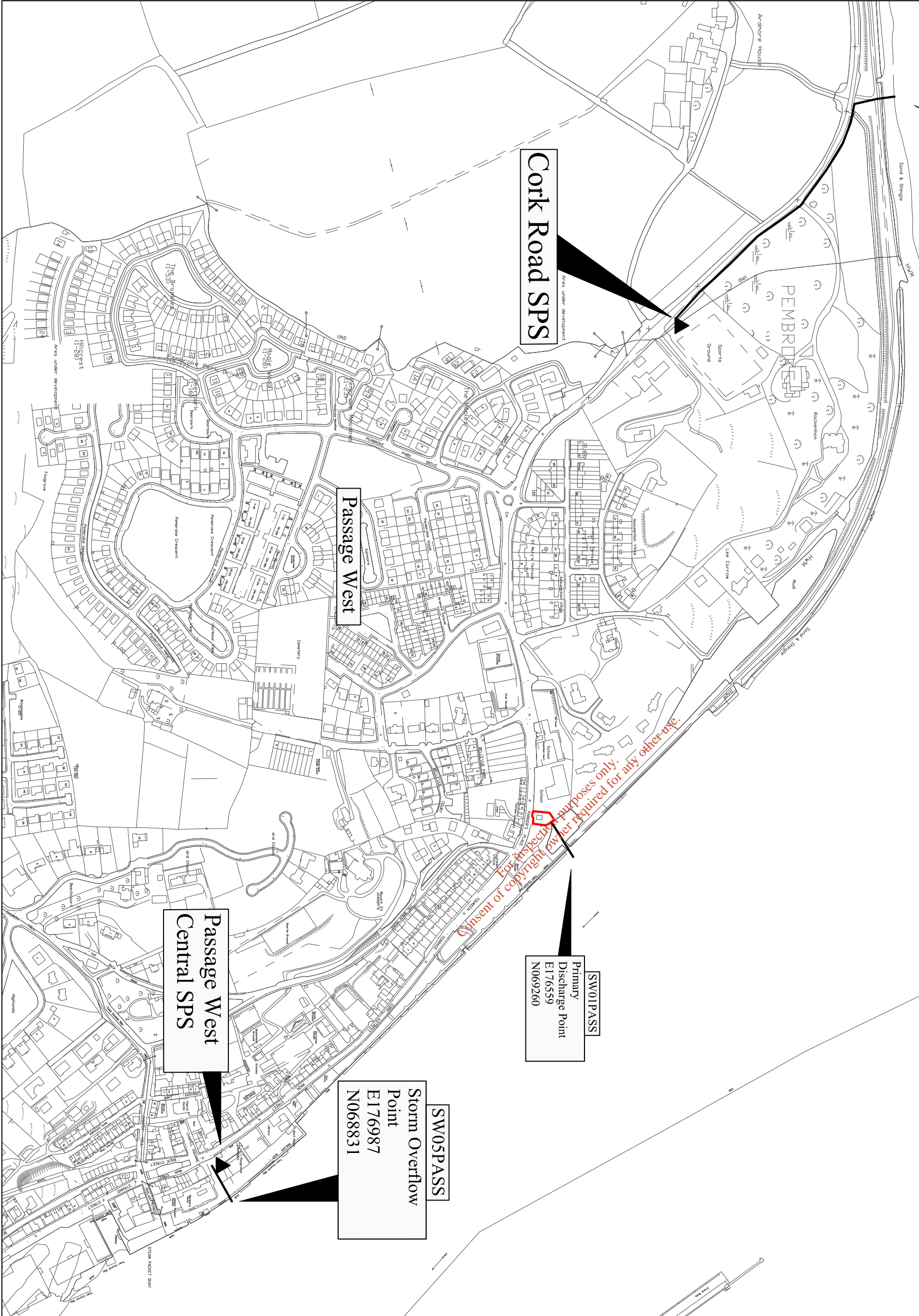
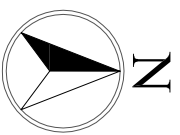
Cork Road SPS

Passage West

Passage West
Central SPS


SW01PASS
Primary
Discharge Point
E176559
N069260

SW05PASS
Storm Overflow
Point
E176987
N068831



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South Cork Division

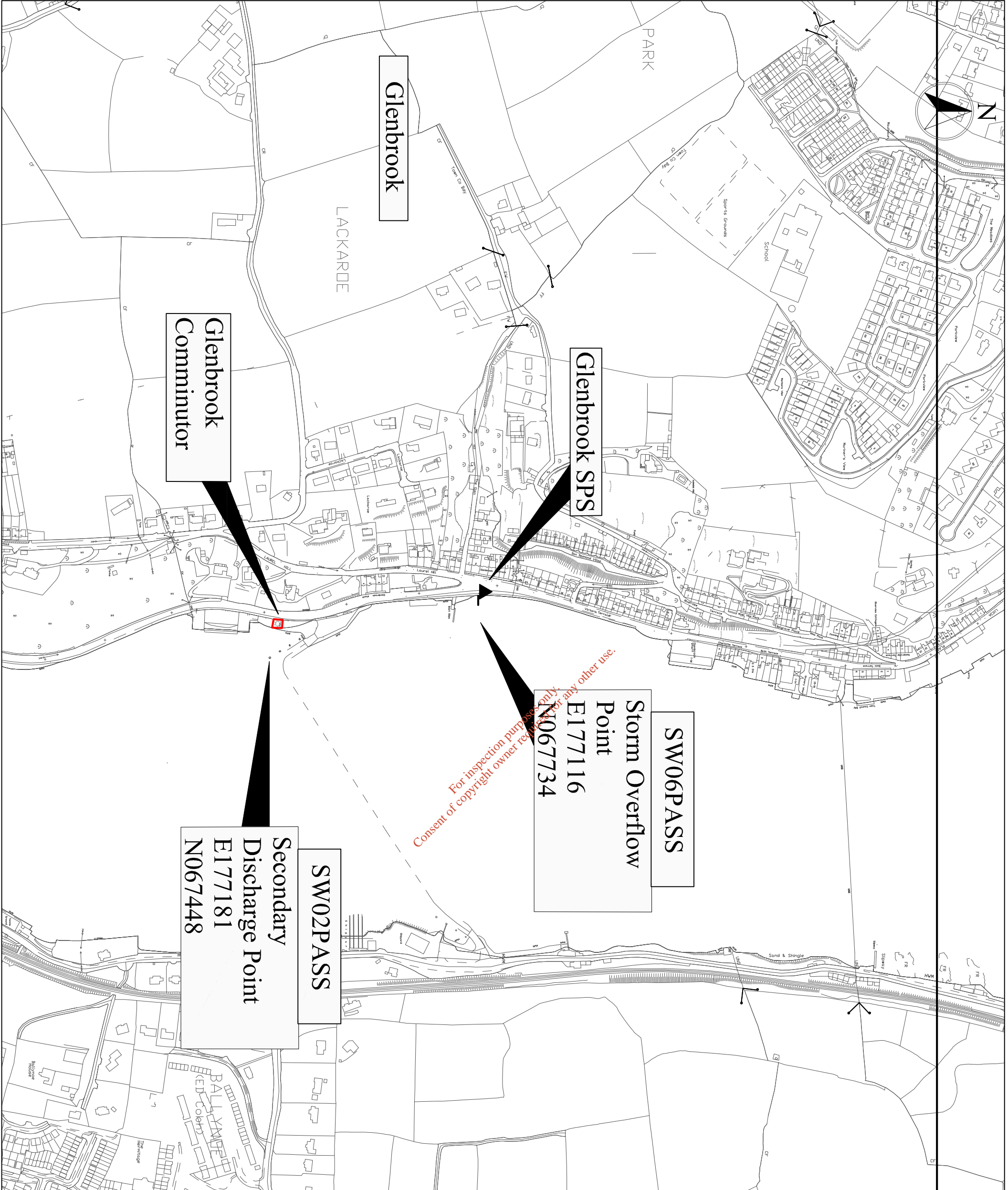


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 Acting County Engineer
 County Hall, Cork.
 P. Power
 Director of Services
 South Cork.

Project:
EPA LICENCE APPLICATION
Passage West / Monkstown

Title:
Attachment Section B.5. - Location
of Storm Overflow Pts {1 of 3}

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:5,000	Map 15
Drawn:	Approved:	Date:	Revision 1
BOL	BQ	23/06/09	



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SW06PASS

Storm Overflow Point
E1771116
N0677734

SW02PASS

Secondary Discharge Point
E177181
N067448

Glenbrook Comminutor

Glenbrook SPS

Glenbrook

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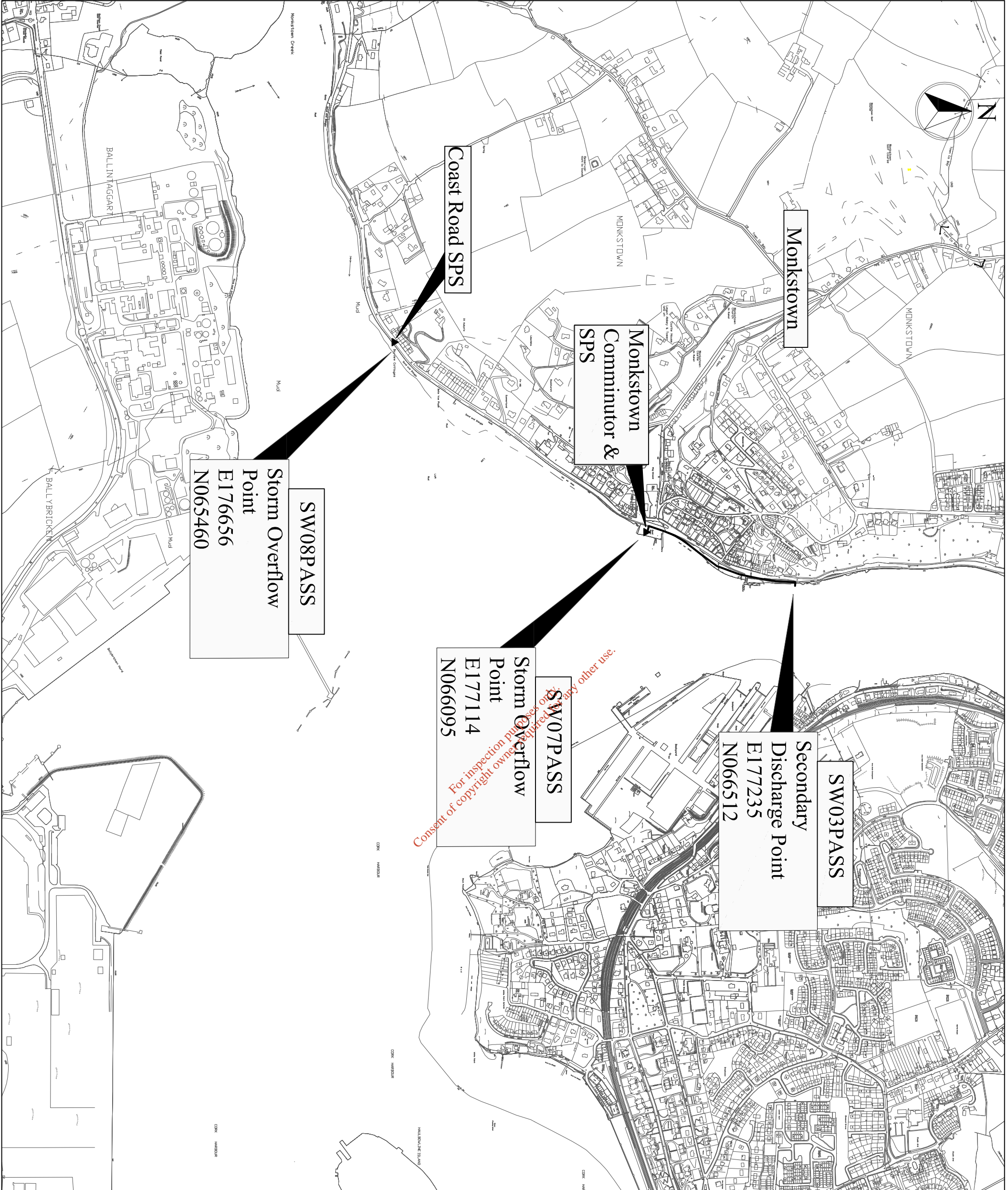


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Acting County Engineer
County Hall, Cork.
P. Power
Director of Services
South Cork.

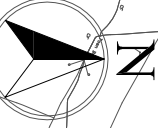
Project:
EPA LICENCE APPLICATION
Passage West / Monkstown

Title:
Attachment Section B.5. - Location of Storm Overflow Point{2 of 3}

Designed: BOL	Checked: BQ	Scale: 1:5,000	Drawing No. Map 16
Drawn: BOL	Approved: BQ	Date: 23/06/09	Revision 1



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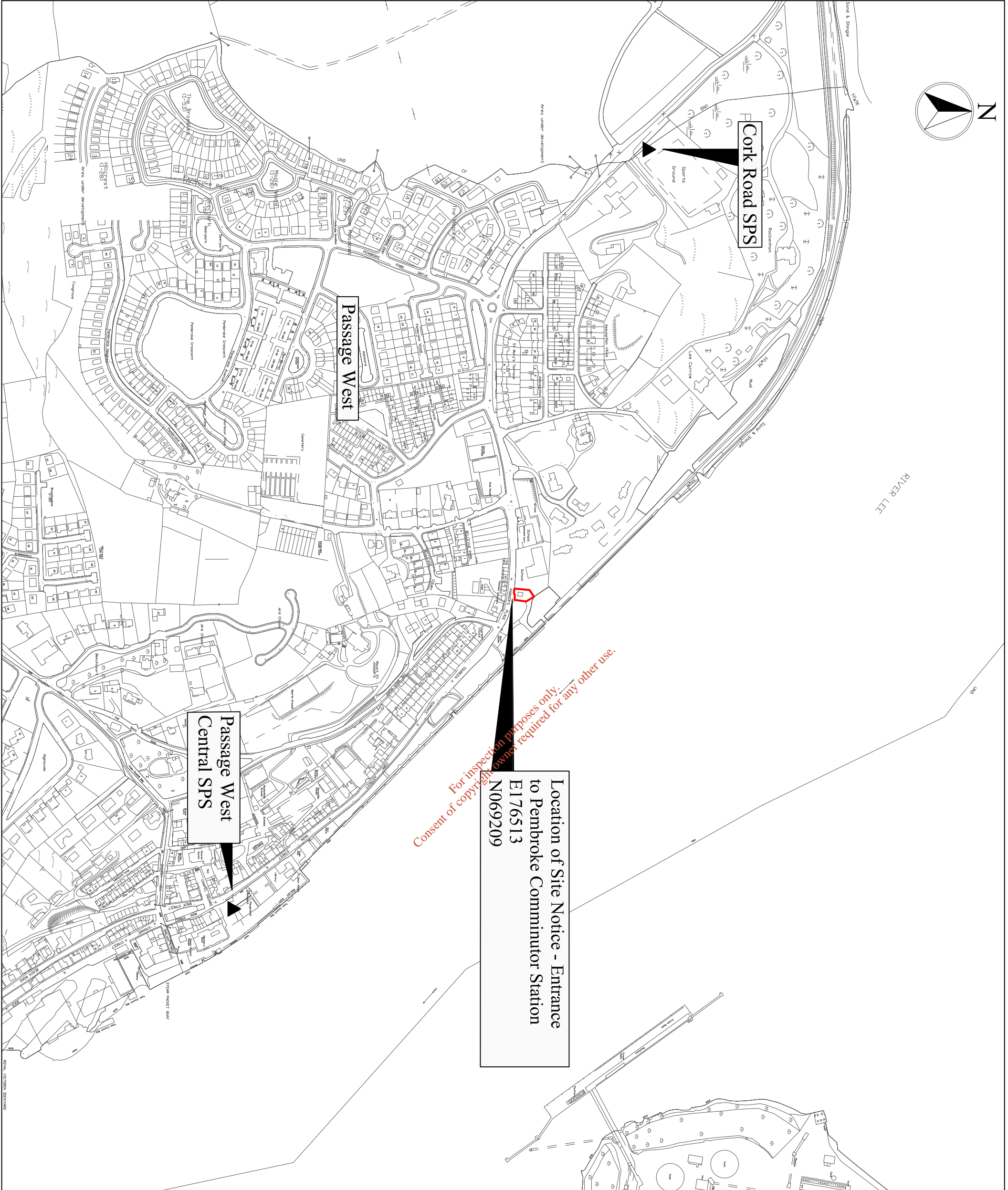
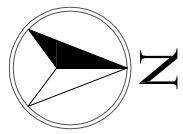
N. O'Keefe, B.Eng., C.Eng., Eur.Ing., F.I.E.I., M.I.C.E.,
 Acting County Engineer
 County Hall, Cork.

P. Power
 Director of Services
 South Cork.

Project:
EPA LICENCE APPLICATION
 Passage West / Monkstown

Title:
Attachment Section B.5. - Location of Storm Overflow Point{3of3}

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:10,000	Map 17
Drawn:	Approved:	Date:	Revision 1
BOL	BQ	23/06/09	



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Location of Site Notice - Entrance
to Pembroke Communitator Station
E176513
N0692209

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Acting County Engineer
County Hall, Cork.

P. Power
Director of Services
South Cork.

Project:
EPA LICENCE APPLICATION
Passage West / Monkstown

Title:
Attachment Section B.8.
Location of Site Notice

Designed:	Checked:	Scale:	Drawing No.
BOL	BQ	1:5,000	Map 18
Drawn:	Approved:	Date:	Revision
BOL	BQ	23/06/09	1