

Figure 5-9. Scenario 6: Indicative quality for DIN within Youghal Harbour

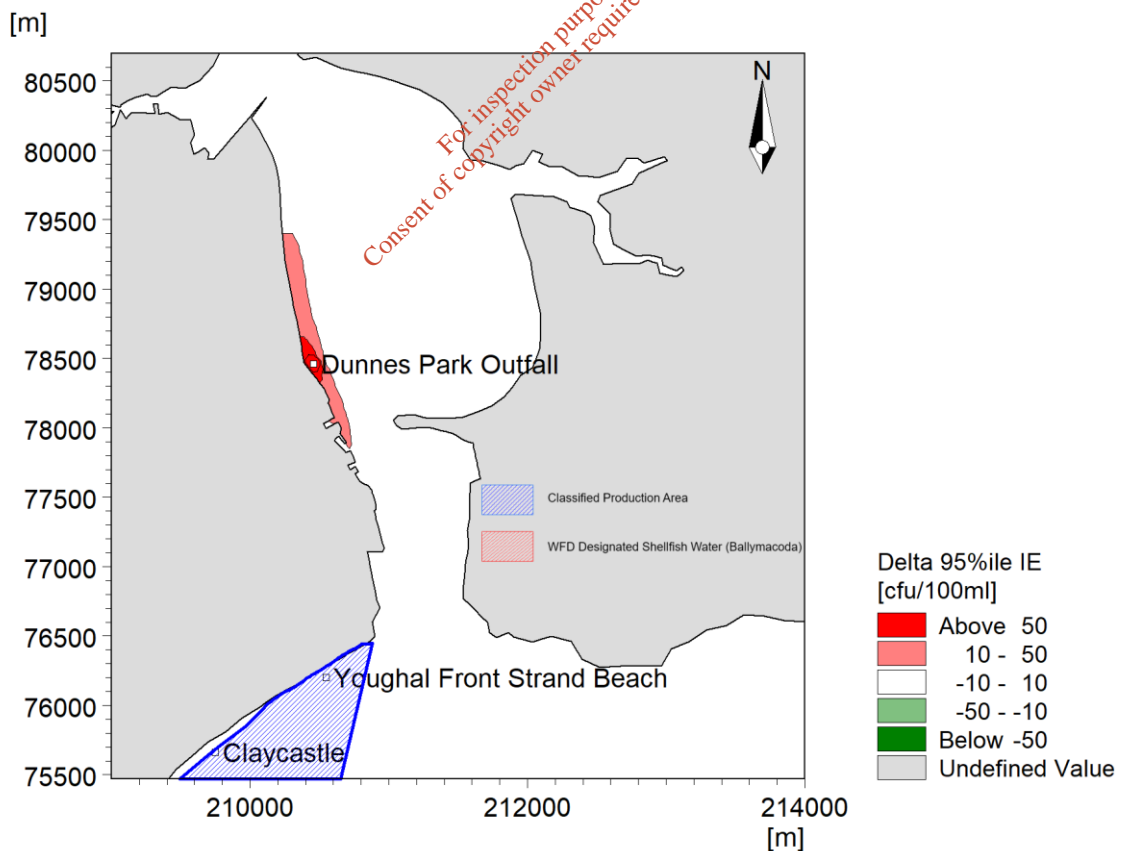
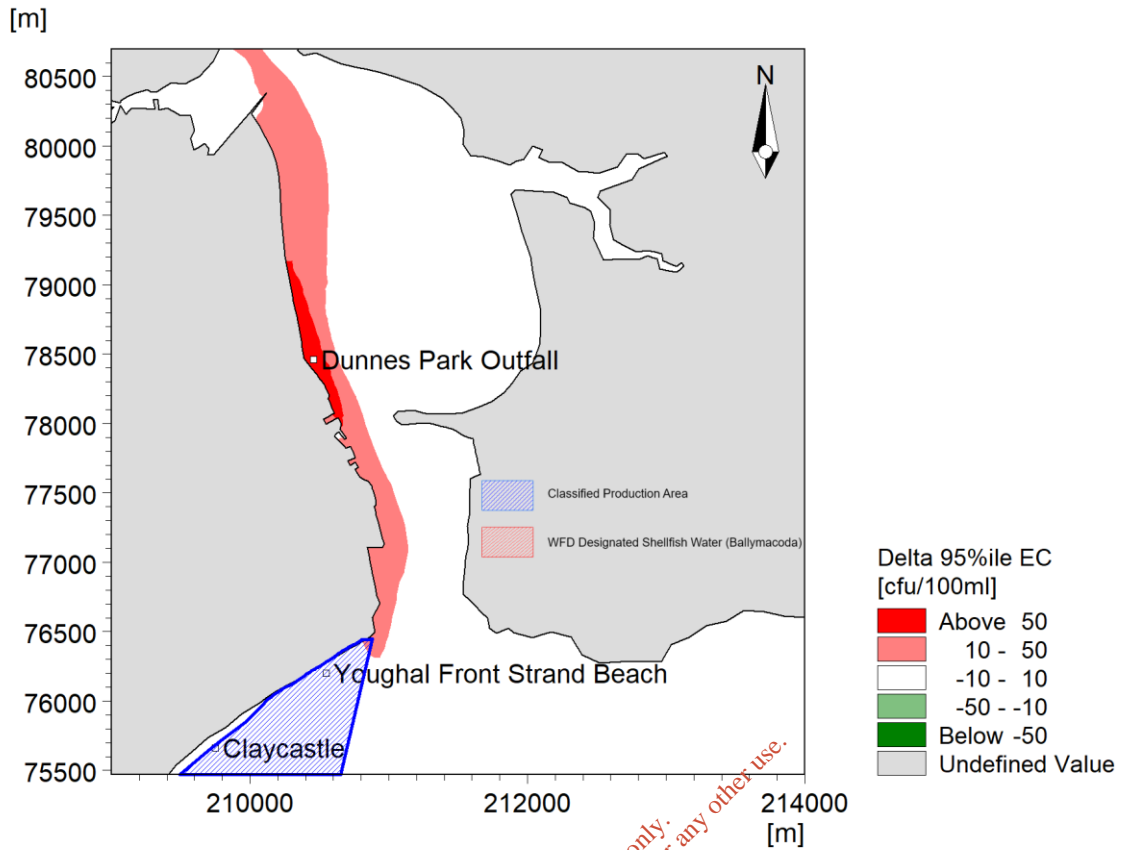


Figure 5-10. Scenario 6: Changes in concentration between Scenario 4 and 6 for EC (top) and IE (bottom)

6. Scenario 7: Future (16,000PE) Summer + New outfall

The Youghal WwTP discharge for the future situation and discharging from the proposed outfall location in the summer is 0.043 m³/s (3 673 m³/day, median of all measured flows for summer 2018 to 2020 plus additional flow for the increase in PE over present day loading) and the water quality parameters as set out in Table 6.1. General model parameters are set out in Table 1.5.

Table 6.1. Effluent discharge rate and concentrations for each parameter for Scenario 7

Discharge [m ³ /s]	BOD [mg/l]	EC [cfu/ 100ml]	IE [cfu/ 100ml]	DIN [mg/l]	MRP [mg/l]	Amm [mg/l]
0.043	25.0	10 000	2500	15.0	10.0	10.0

The concentrations of EC, IE, BOD, DIN, MRP and ammonia are plotted in Figure 6-1 to Figure 6-6. The indicative quality for each parameter is shown in Figure 6-7. Delta plots showing the change in concentration of each bacterial parameter from the baseline of Scenario 3 are shown in Figure 6-8.

The concentration of EC around the outfall is always lower than the 250 cfu/100ml threshold for Excellent Bathing Water Quality and there is no discernible plume (Figure 6-1).

The indicative quality for all parameters is either High (BOD, DIN and MRP) or Excellent (IE and EC).

The concentration of ammonia is less than 0.05 mg/l (Figure 6-6). If unionised ammonia is assumed to be approximately 2% of the ammonia concentration (as described in section 1.6), then the concentration of unionised ammonia is less than 0.001 mg/l.

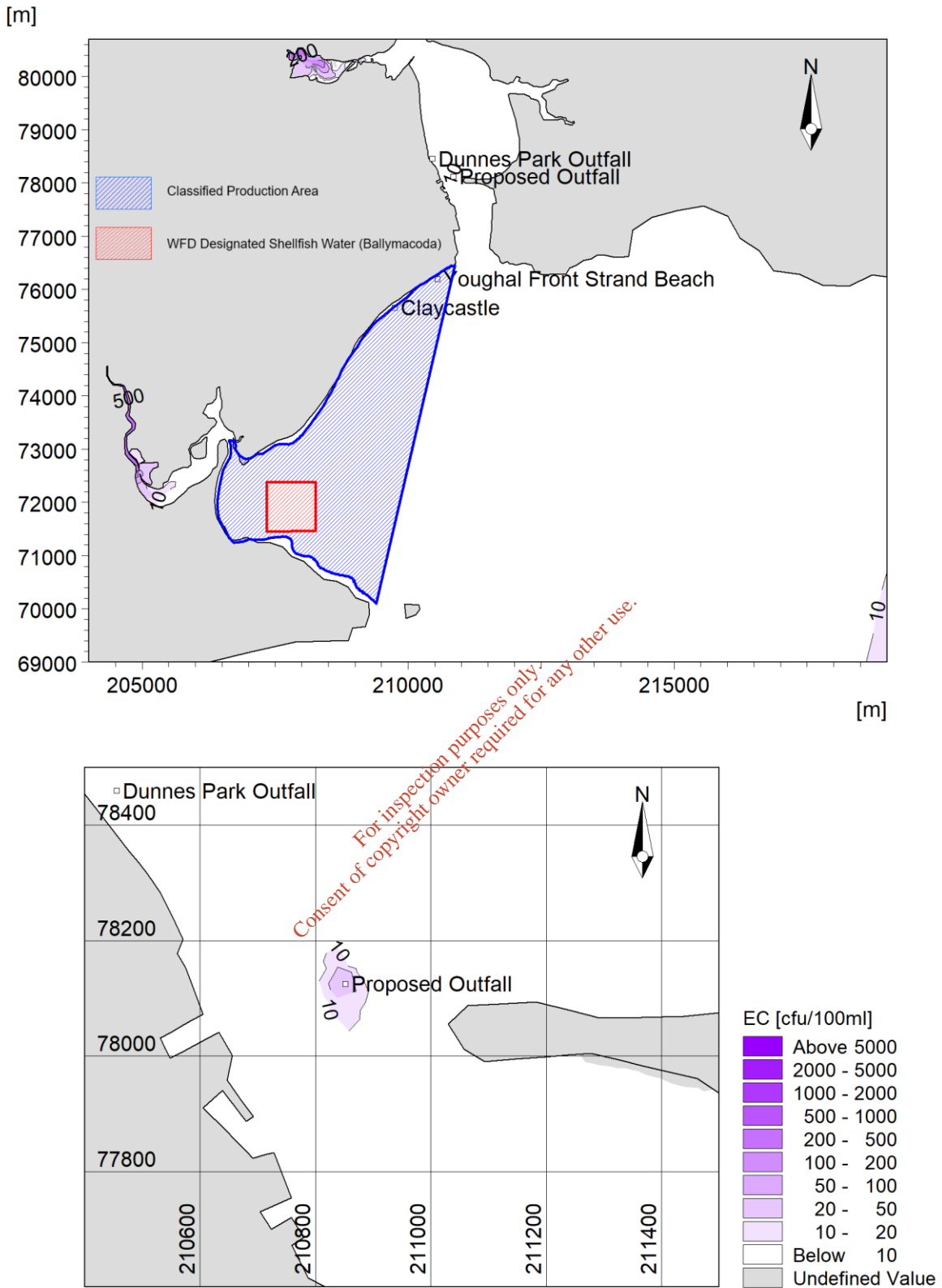


Figure 6-1. Scenario 7: EC 95%ile concentration [cfu/100ml]

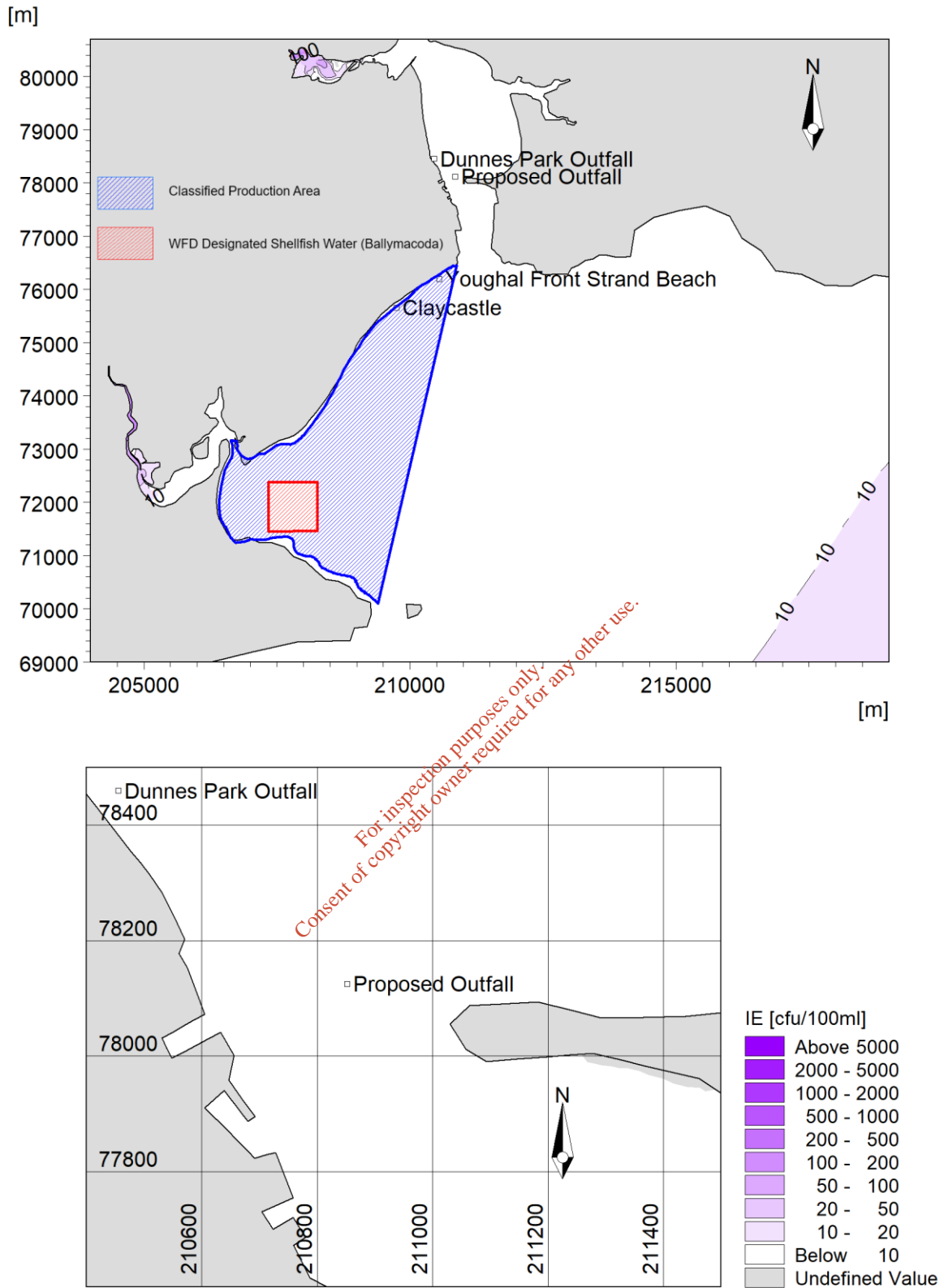


Figure 6-2. Scenario 7: IE 95%ile concentration [cfu/100ml]

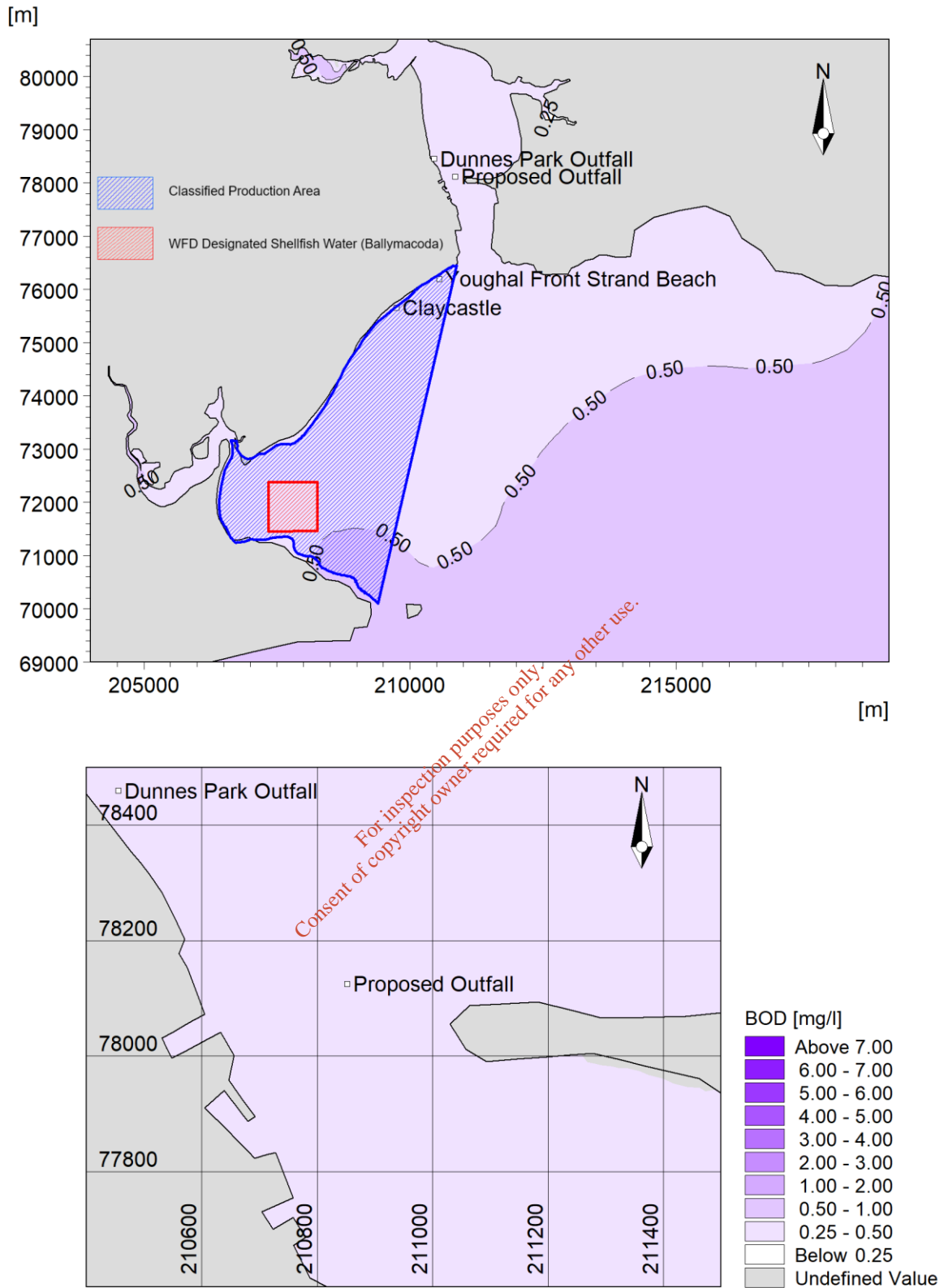


Figure 6-3. Scenario 7: BOD 95%ile concentration [mg/l]

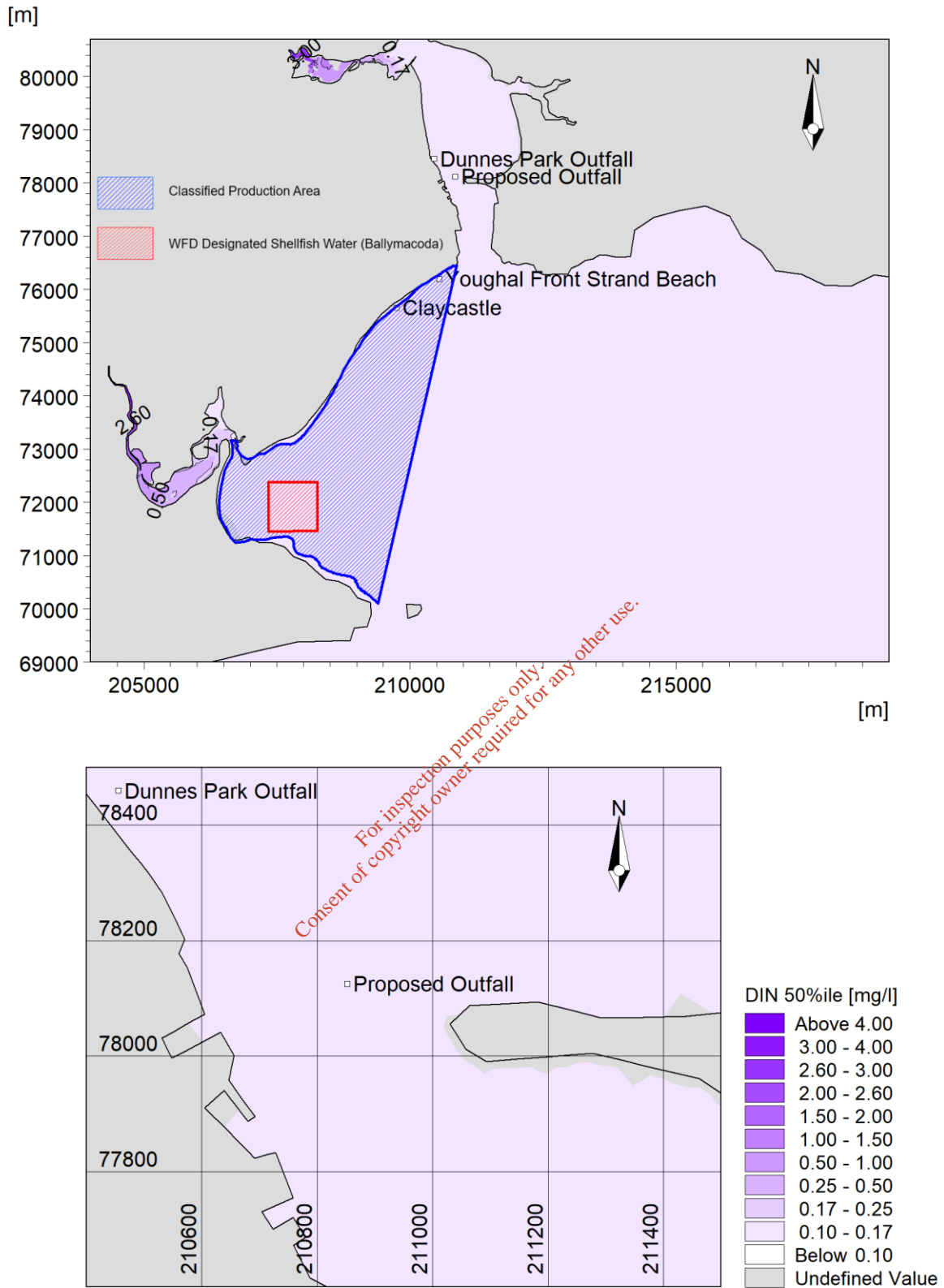


Figure 6-4. Scenario 7: DIN 50%ile concentration [mg/l]

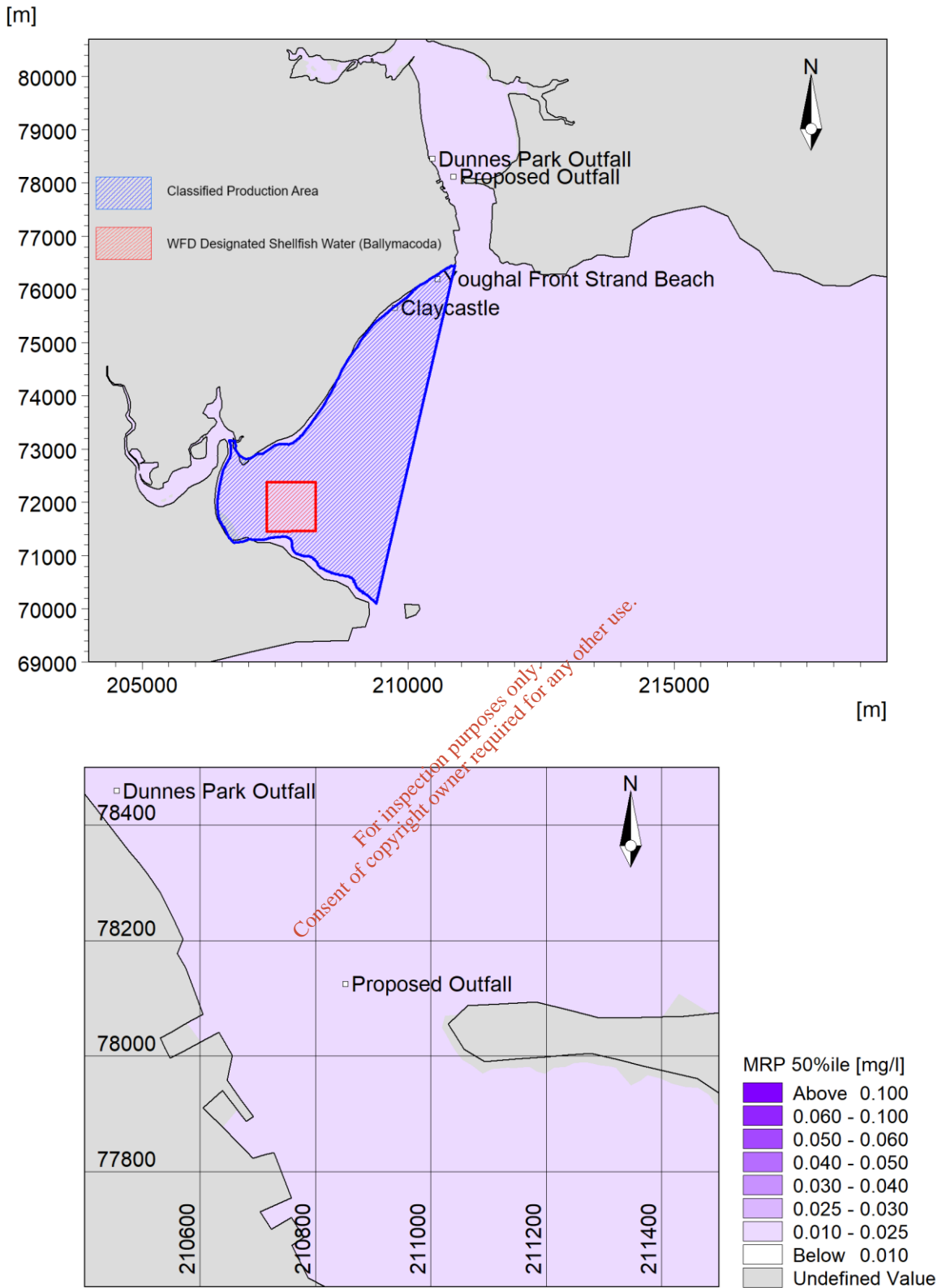


Figure 6-5. Scenario 7: MRP 50%ile concentration [mg/l]

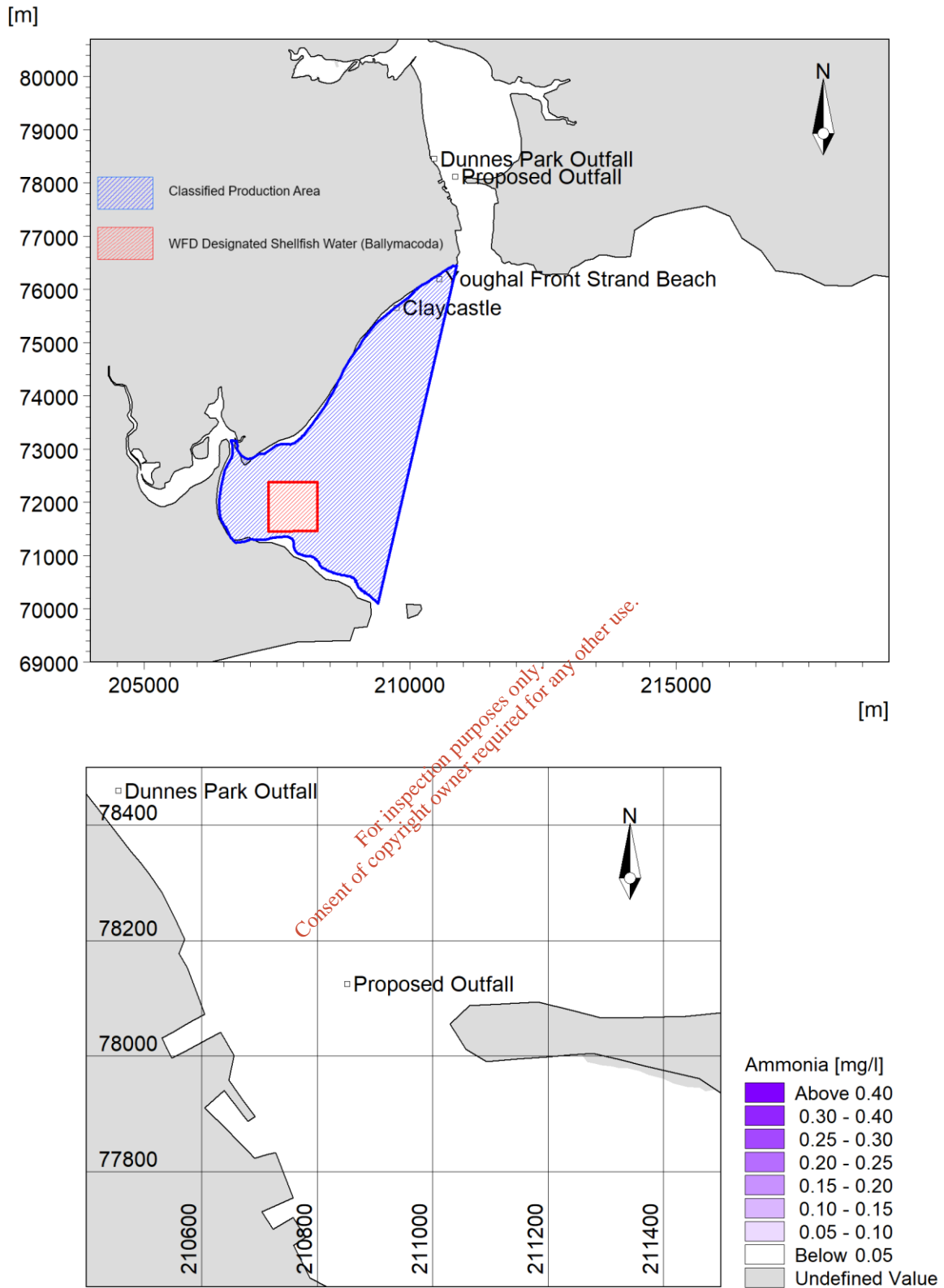
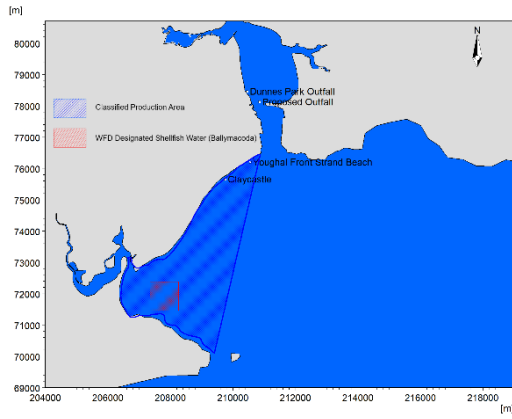
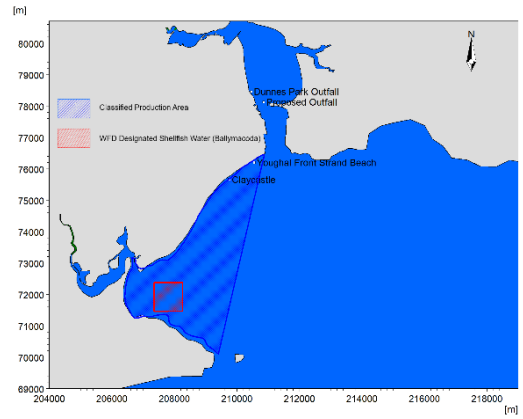


Figure 6-6. Scenario 7: Ammonia 95%ile concentration [mg/l] all concentrations are below 0.05 mg/l.

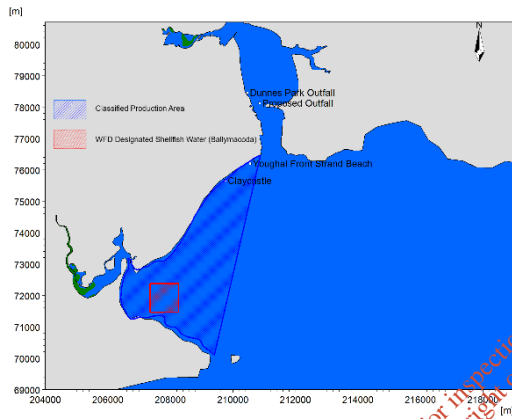
BOD



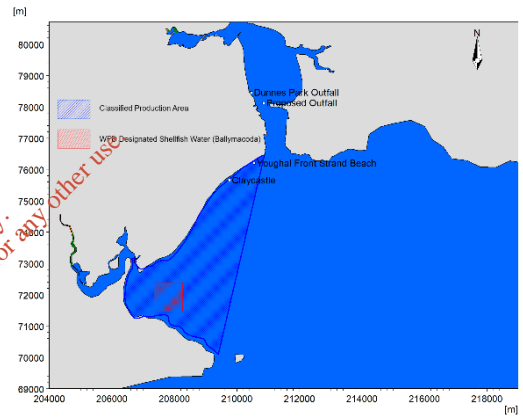
IE



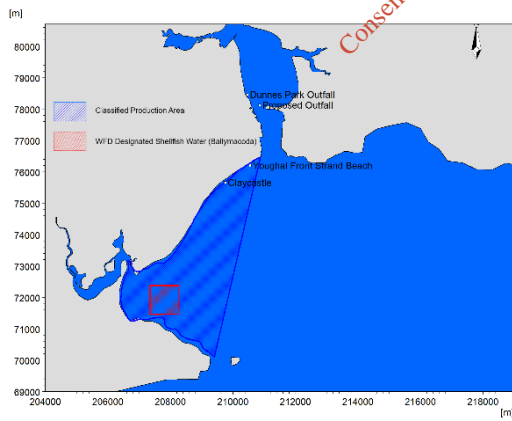
DIN



EC



MRP



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Legend






BOD, DIN, MRP		IE, EC
	High	Excellent
	Good	Good
	Moderate	Sufficient
	Poor	
	Bad	Poor

Figure 6-7. Scenario 7: Indicative quality for BOD, DIN, MRP, IE and EC

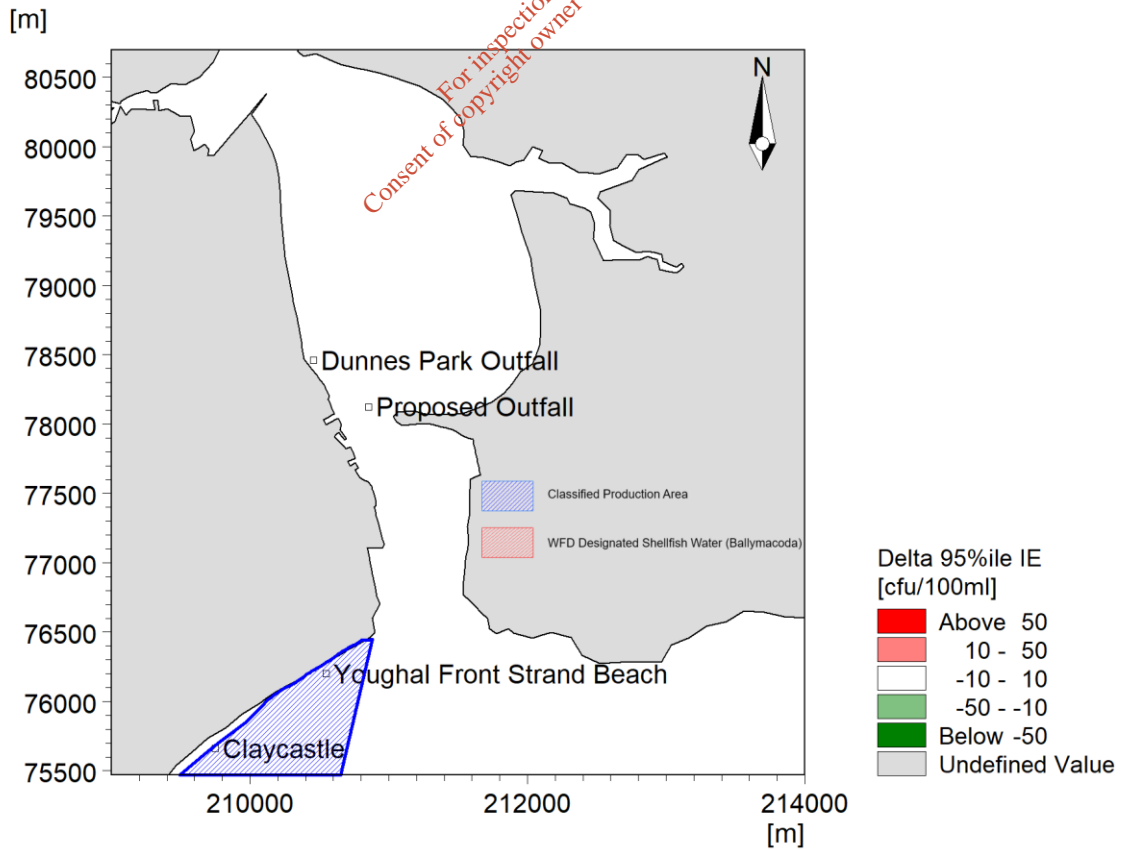
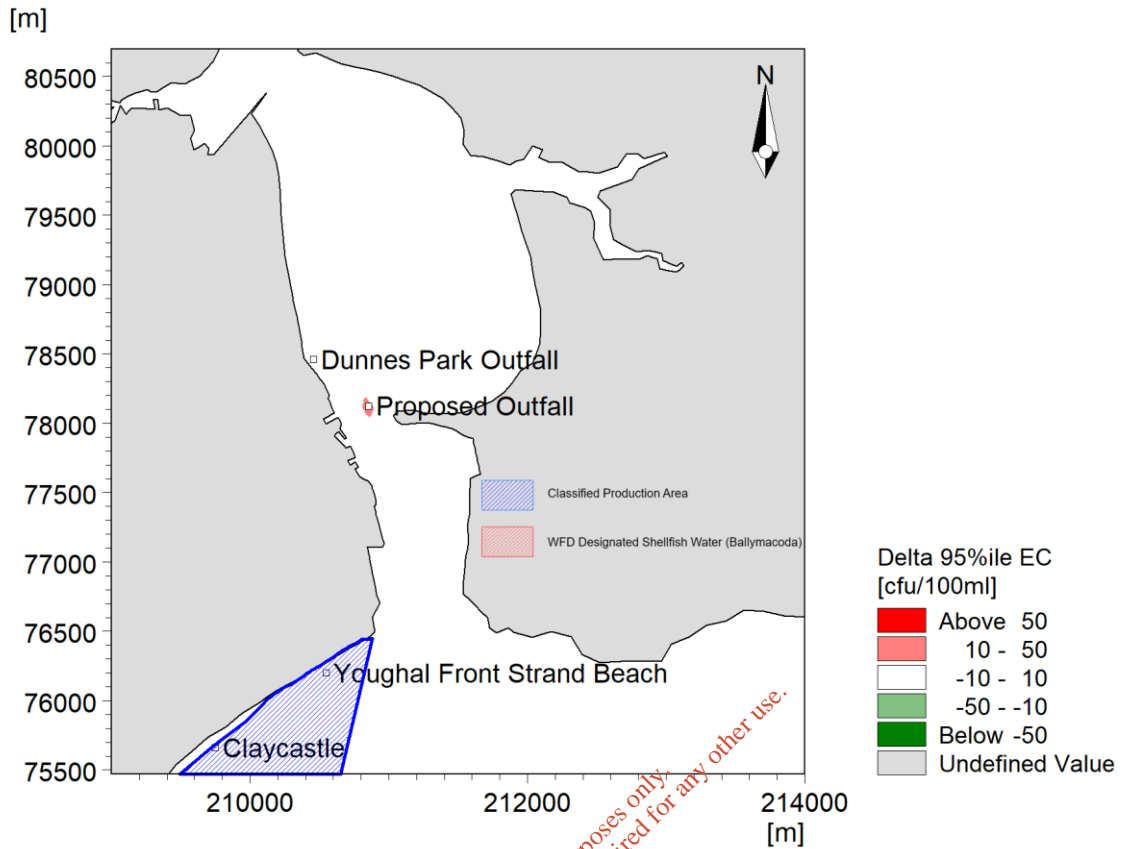


Figure 6-8. Scenario 7: Changes in concentration between Scenario 3 and 7 for EC (top) and IE (bottom)

7. Scenario 8: Future (16,000PE) Winter + New outfall

The Youghal WwTP discharge for the future situation and discharging from the proposed outfall location in the winter is 0.063 m³/s (5 456 m³/day, median of all measured flows for summer 2018 to 2020 plus additional flow for the increase in PE over present day loading) and the water quality parameters as set out in Table 7.1. General model parameters are set out in Table 1.5.

Table 7.1. Effluent discharge rate and concentrations for each parameter for Scenario 8

Discharge [m ³ /s]	BOD [mg/l]	EC [cfu/ 100ml]	IE [cfu/ 100ml]	DIN [mg/l]	MRP [mg/l]	Amm [mg/l]
0.063	25.000	100 000	25000	15.0	10.0	10.0

The concentrations of EC, IE, BOD, DIN, MRP and ammonia are plotted in Figure 7-1 to Figure 7-6. The indicative quality for each parameter is shown in Figure 7-7. Delta plots showing the change in concentration of each bacterial parameter from the baseline of Scenario 4 are shown in Figure 7-8.

The modelled concentration of EC immediately around the proposed outfall is lower for Scenario 8 than Scenario 6 due to the increased dispersion.

For context, a notional¹¹ mixing zone, based on achievement of Excellent Bathing Water Quality (<250cfu/100ml), measures less 50m in all directions (Figure 7-1).

The plume is evident in low concentrations (less than 10 cfu/100ml) at the beaches and the northern edge of the Classified Production Area. However, the indicative quality of the water remains Excellent at these locations (Figure 7-7).

The EC plume does not reach the Designated Shellfish Water.

The pattern is similar for IE with the notional mixing zone to achieve Excellent Bathing Water Quality (<100cfu/100ml) also being less than 50m in all directions.

Figure 7-8 shows the change in location and extent of the plume from the Dunnes Park outfall (Scenario 4) to the Proposed outfall (Scenario 8).

The concentration of ammonia is less than 0.05 mg/l (Figure 5-6). If unionised ammonia is assumed to be approximately 2% of the ammonia concentration (as described in section 1.6), then the concentration of unionised ammonia is less than 0.001 mg/l.

¹¹ This is not a statutory mixing zone, as there is no regulatory EQS for bacteria in the vicinity of the outfall.

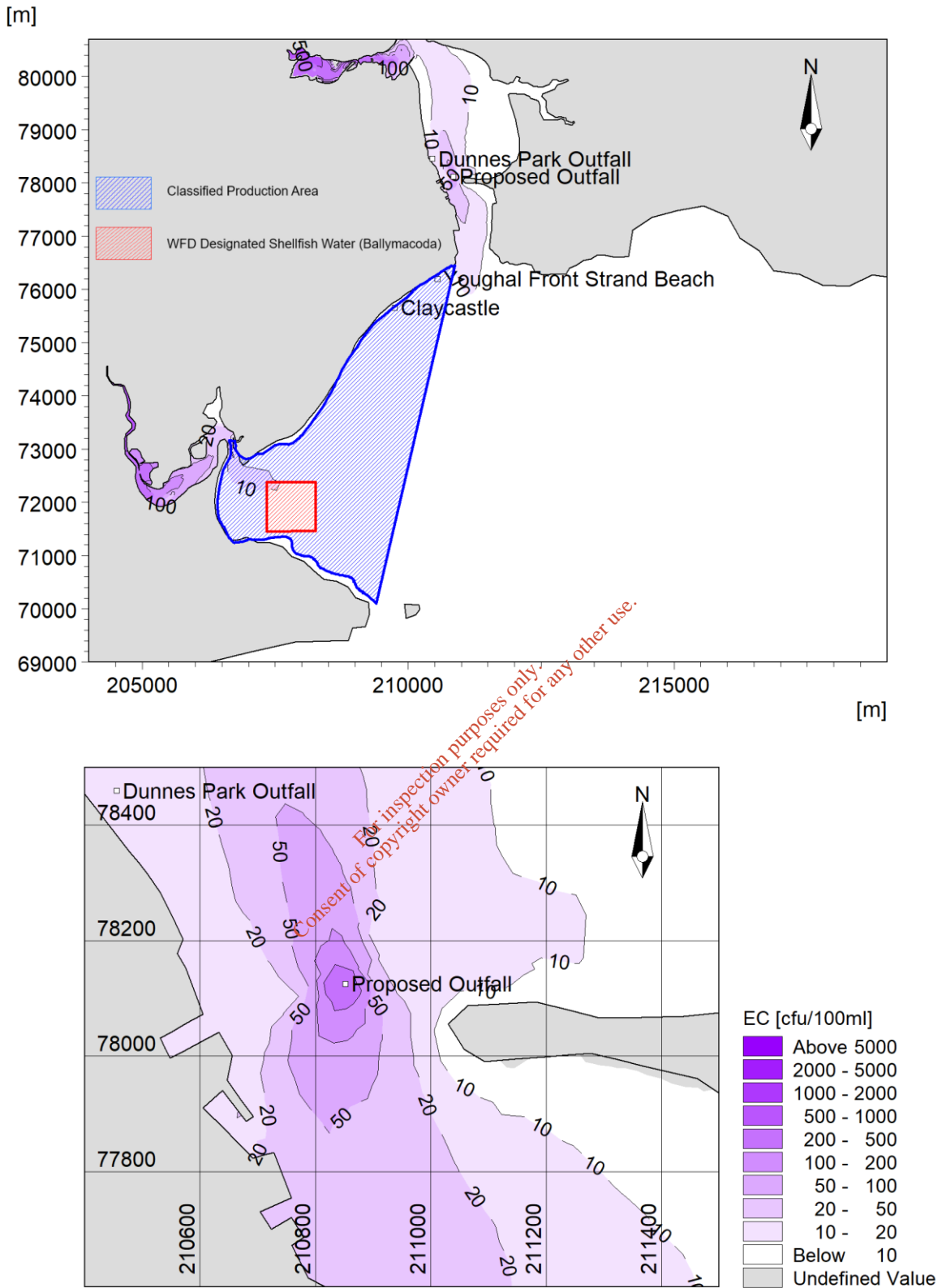


Figure 7-1. Scenario 8: EC 95%ile concentration [cfu/100ml]

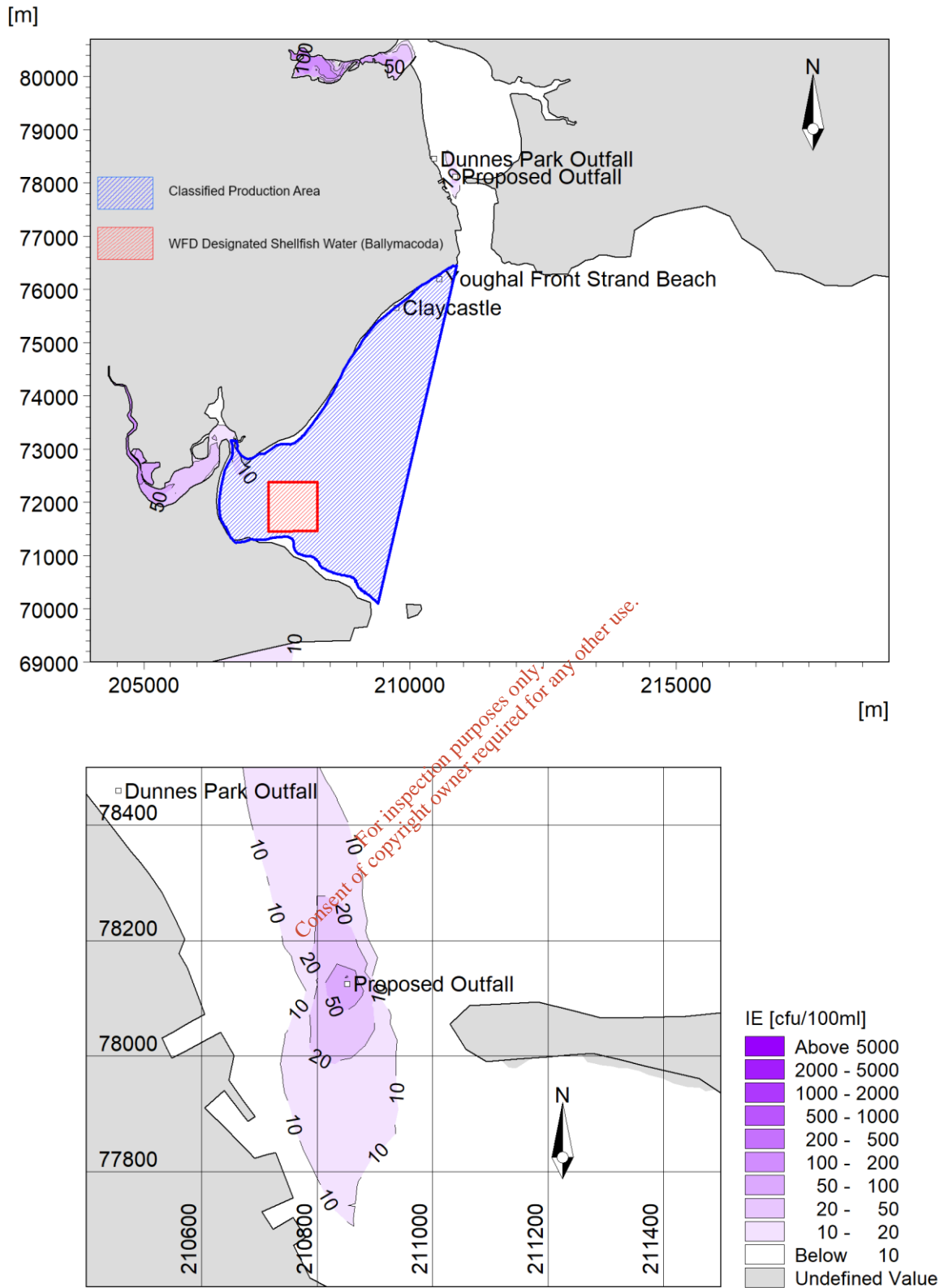


Figure 7-2. Scenario 8: IE 95%ile concentration [cfu/100ml]

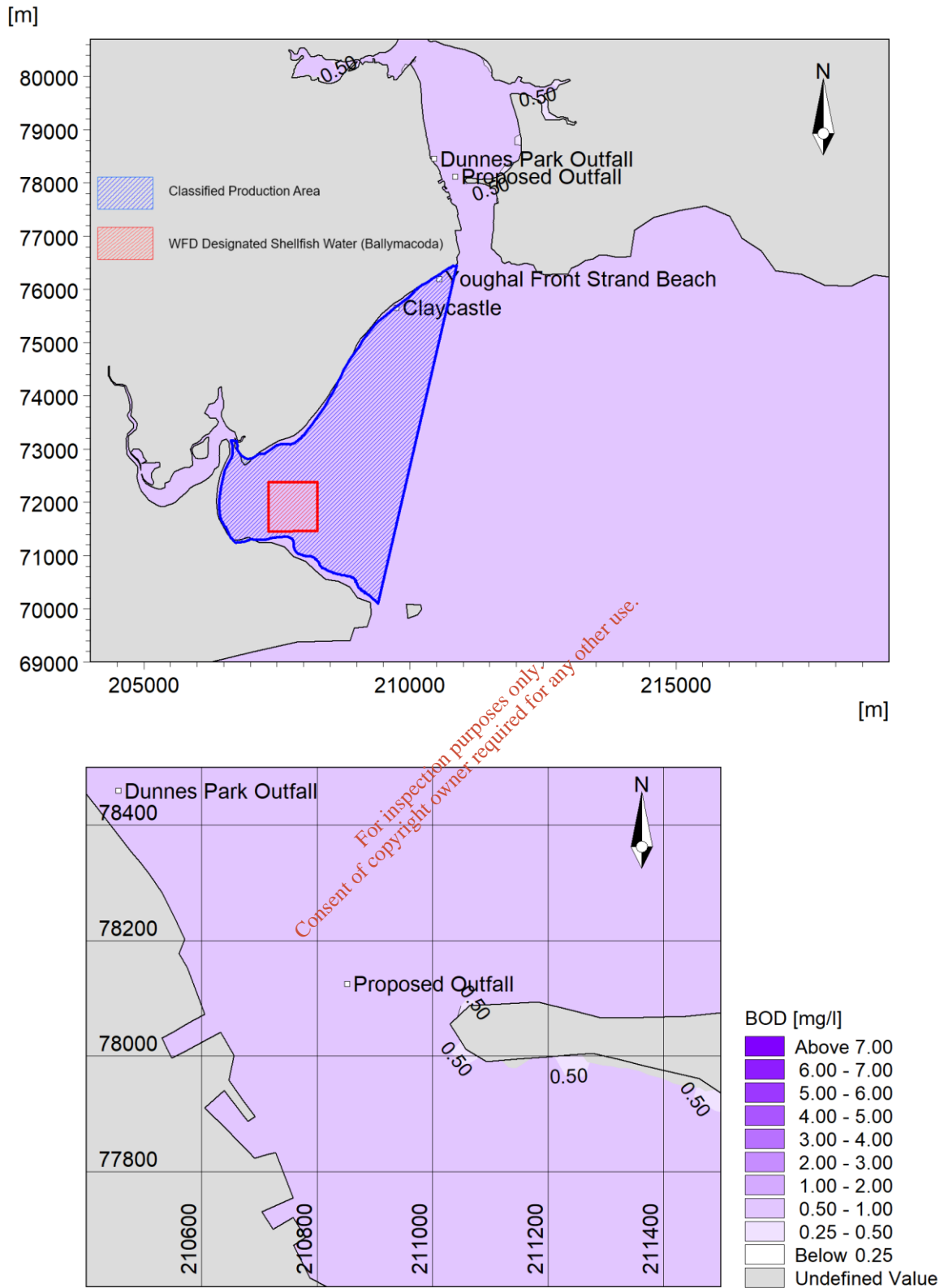


Figure 7-3. Scenario 8: BOD 95%ile concentration [mg/l]

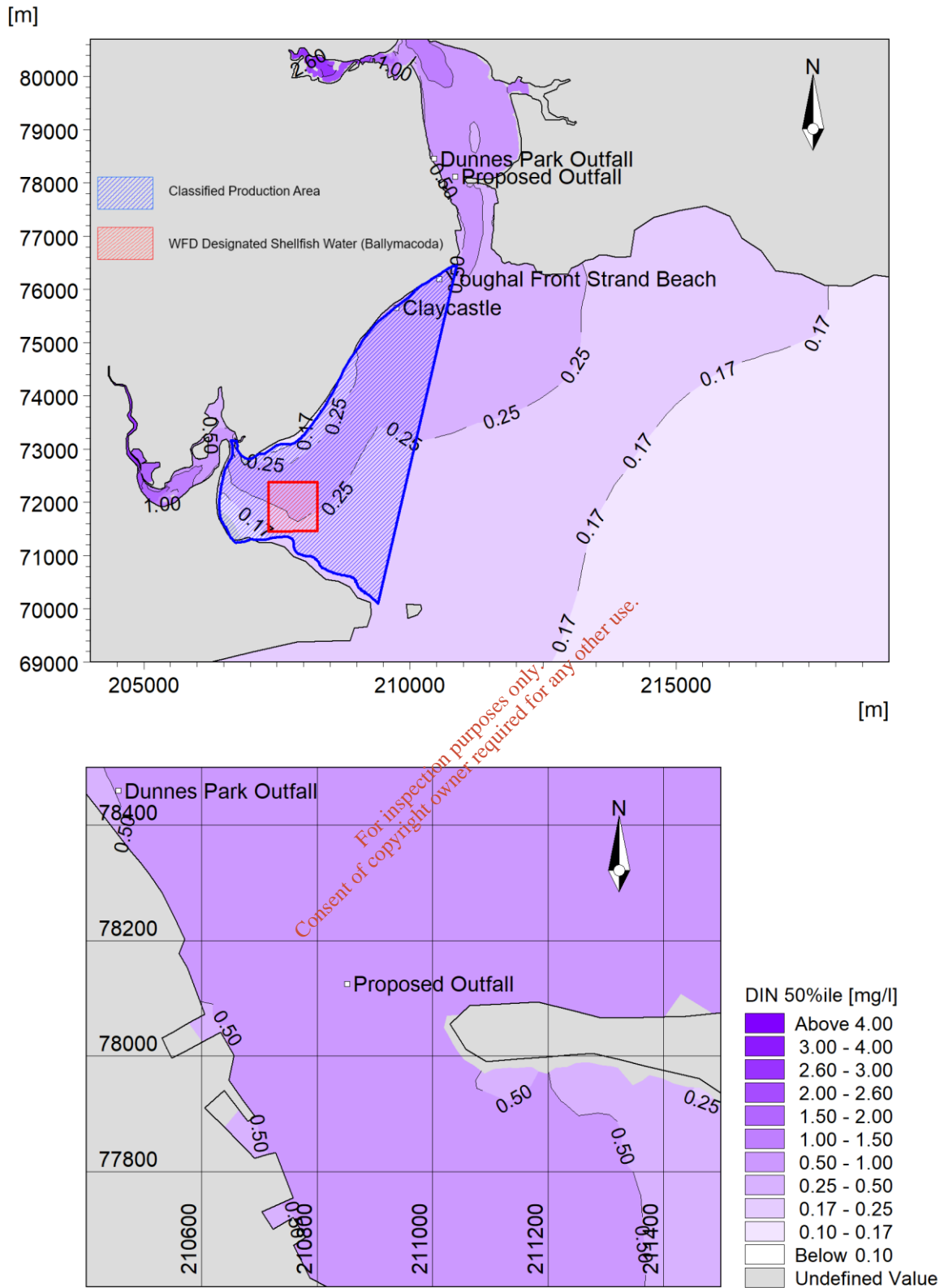


Figure 7-4. Scenario 8: DIN 50%ile concentration [mg/l]

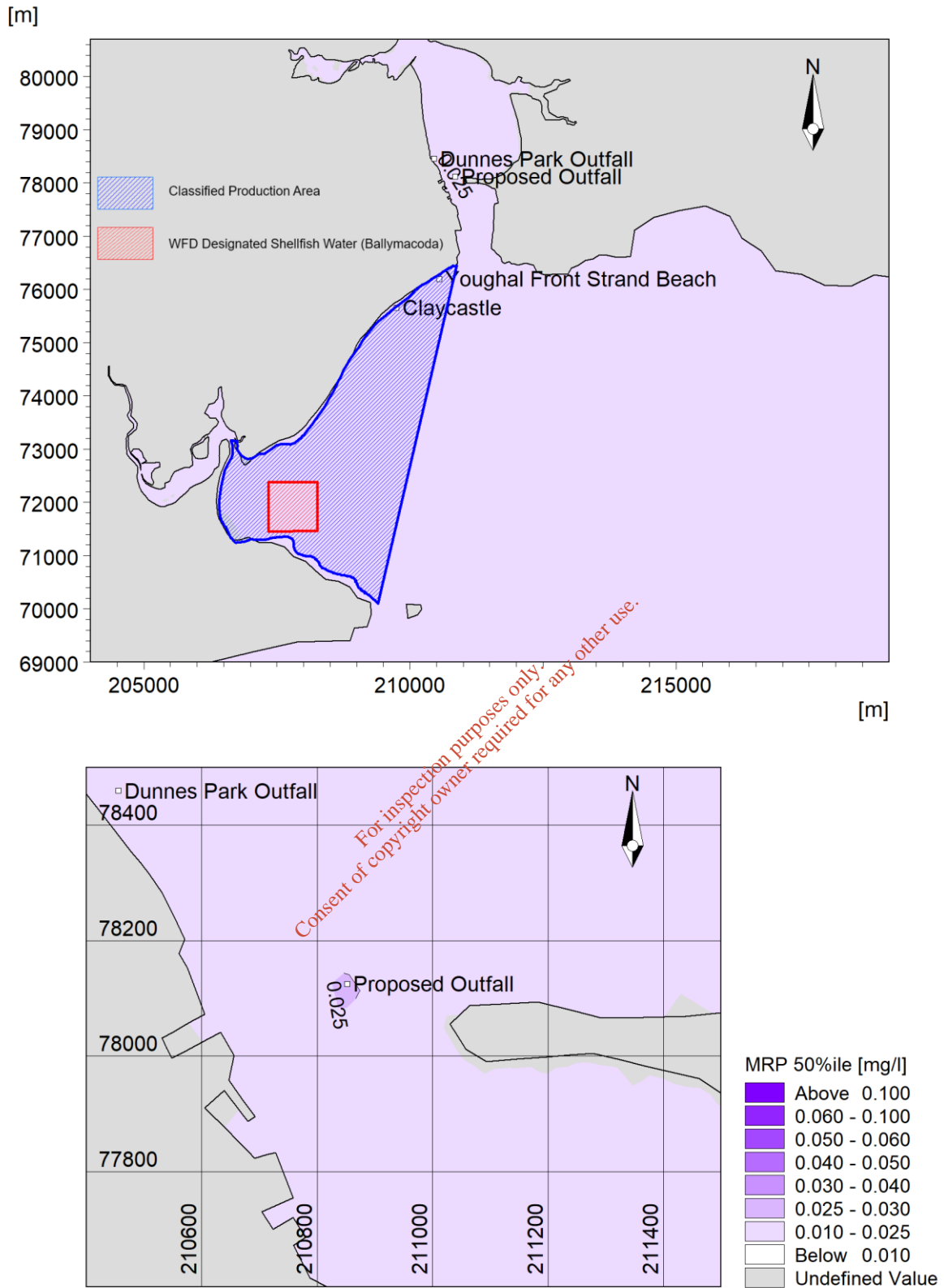


Figure 7-5. Scenario 8: MRP 50%ile concentration [mg/l]

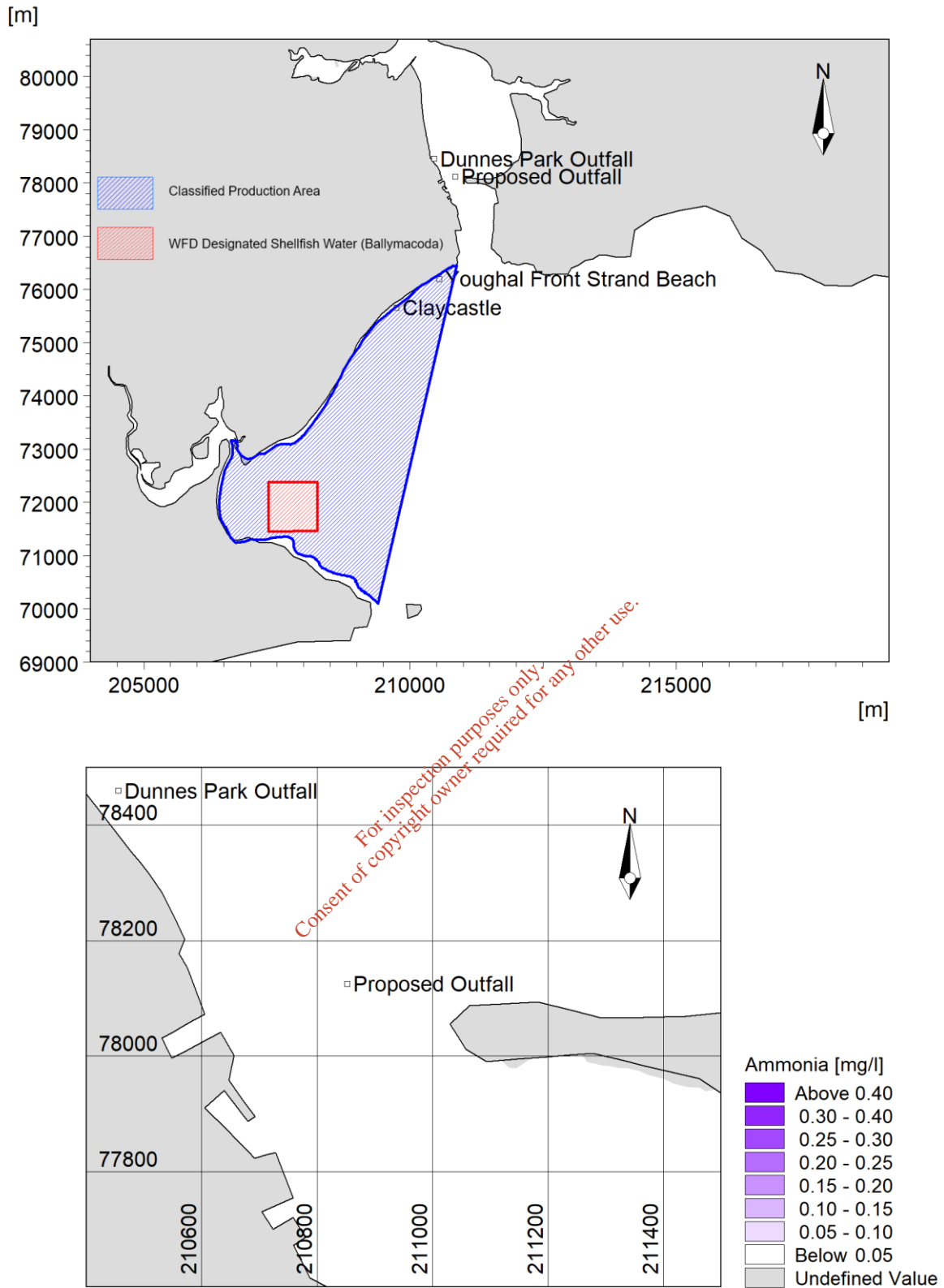


Figure 7-6. Scenario 8: Ammonia 95%ile concentration [mg/l] all concentrations are below 0.05 mg/l.

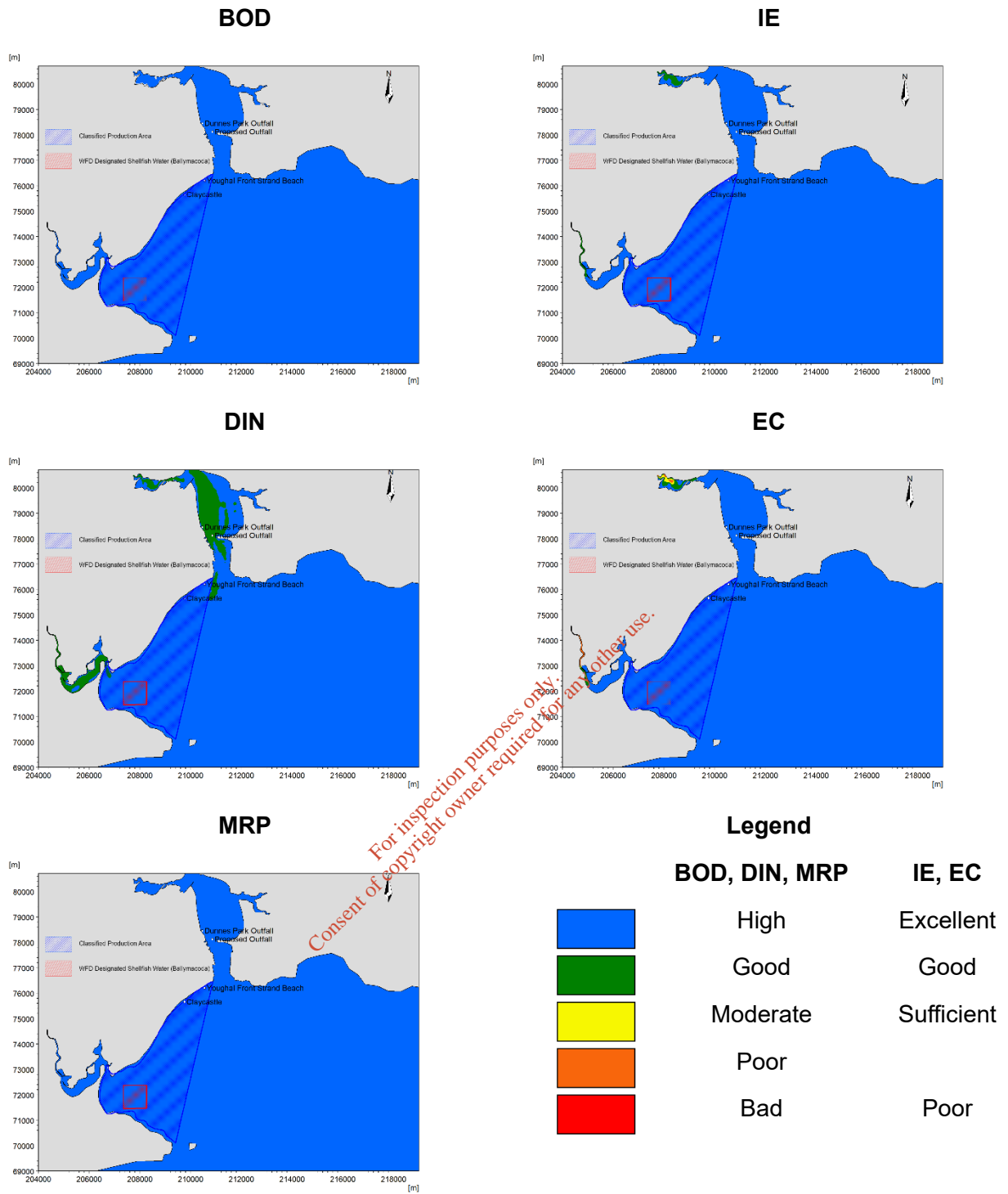


Figure 7-7. Scenario 8: Indicative quality for BOD, DIN, MRP, IE and EC

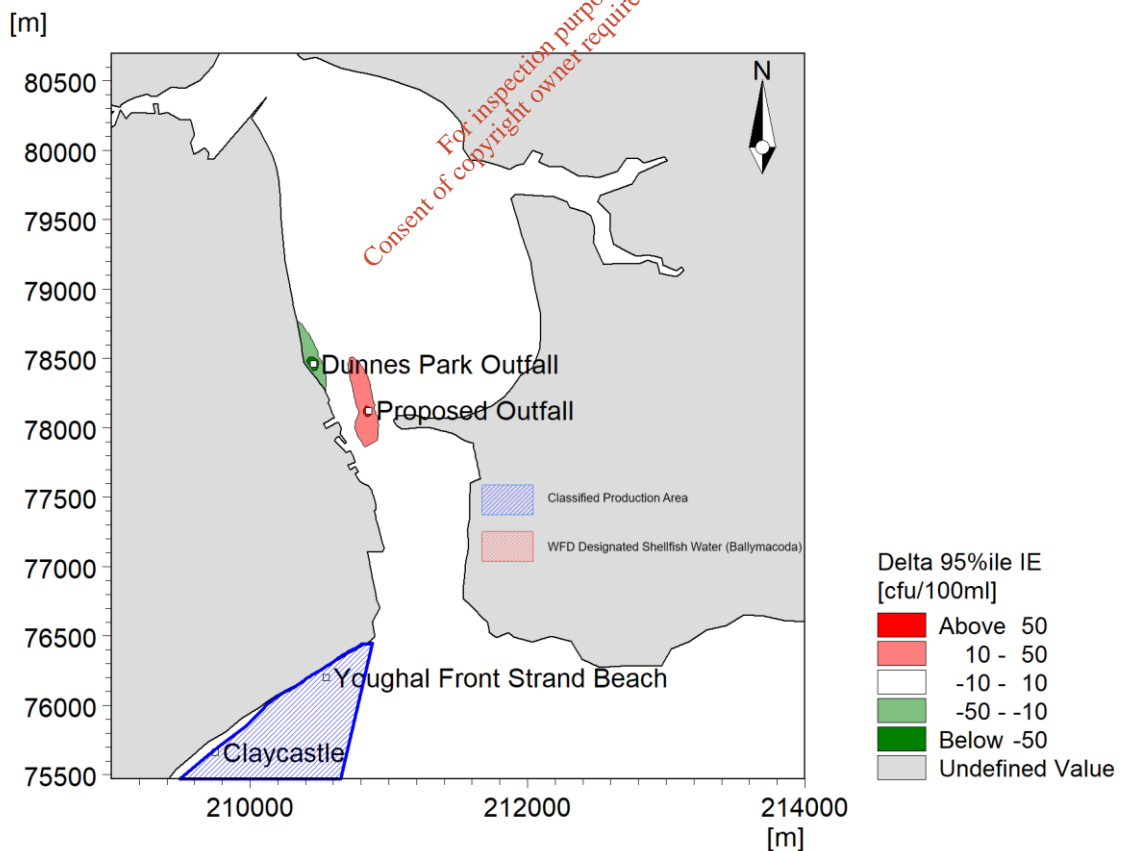
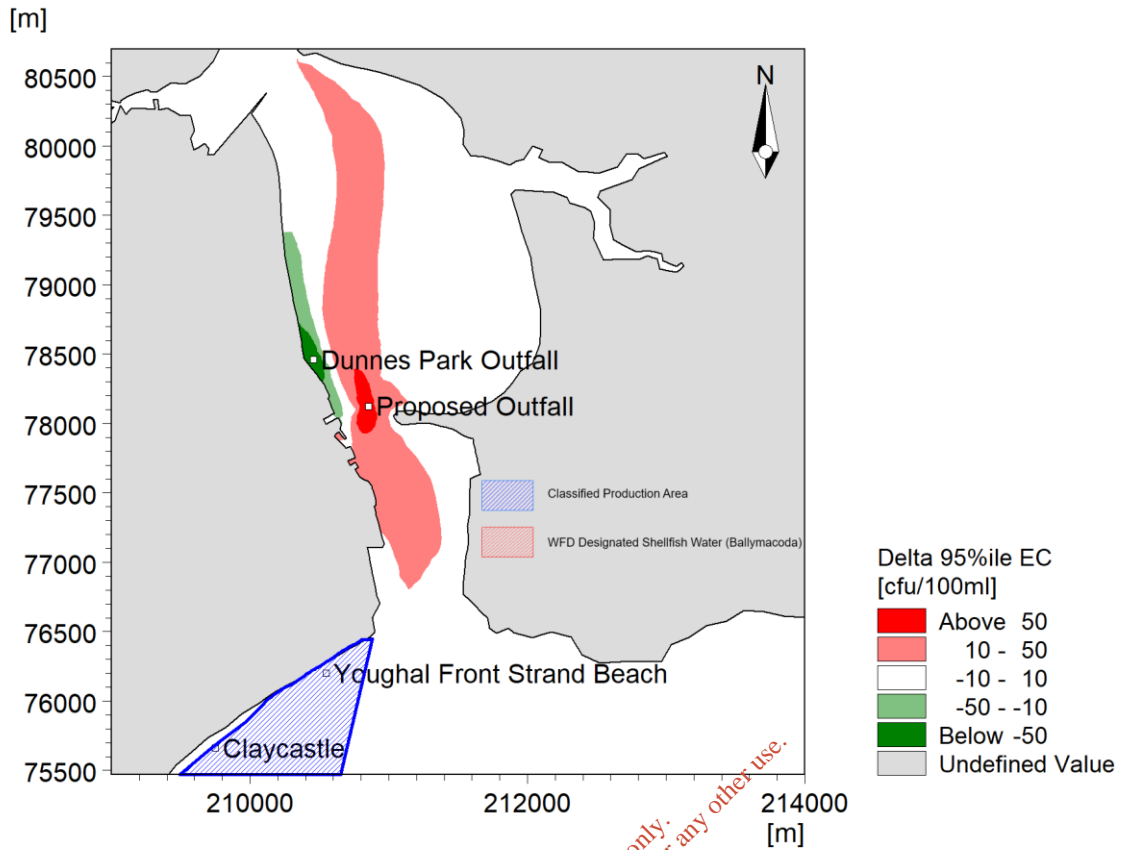


Figure 7-8. Scenario 8: Changes in concentration between Scenario 4 and 8 for EC (top) and IE (bottom)

8. Conclusion

The calibrated model of the water quality in Youghal Harbour and Bay has been used to estimate the concentrations of BOD, DIN, MRP, ammonia, unionised ammonia EC and IE in the receiving waters as a result of the effluent discharged from the primary discharge point for Youghal WwTP at Dunnes Park and a proposed outfall location. The model has examined the following scenarios:

- Baseline of the summer and winter (scenarios 3 and 4) using the existing influent loading and outfall at Dunnes Park;
- Future influent loading of 16 000 PE for summer and winter (scenarios 5 and 6) and the existing outfall at Dunnes Park and
- Future influent loading of 16 000 PE and a new outfall location.

The findings of this study are summarised by assessment criteria in Table 8.1 and by parameter in Table 8.2.

The study concludes that the none of the scenarios modelled indicate a degradation of the overall water quality of any of the receiving waterbodies, nor any degradation of the indicative quality of any WFD supporting quality element for any of the water bodies.

The study also concludes that during summer when the UV system is operational, there will be no measurable impact from the treated effluent from the Youghal WWTP on the microbiological water quality of Designated Shellfish Waters or Classified Production Areas, nor any measurable impact on Bathing Water Quality at the Designated Bathing Waters, under both existing and future (16,000PE Loading) scenarios irrespective of whether the existing Dunnes Park or the proposed outfall are used.

Under the existing winter scenario, when the UV system is not operating, there is no modelled impact on the Designated Shellfish Water (Ballymacoda Bay) under both existing and future (16,000PE Loading) scenarios.

Winter modelled concentrations are in the region of 10-20 cfu/100ml and meet requirements for Excellent Bathing Water Quality at Designated Bathing Waters and the Classified Production Area under the existing and future (16,000PE Loading) scenarios. The magnitude of the modelled concentrations is close to laboratory limits of detection (10cfu/100ml).

In summary, it is concluded that the existing level of treatment at Youghal WWTP and the existing primary discharge location at Dunnes Park are sufficient to support the achievement of WFD objectives for receiving waters under current and future loading scenarios.

Table 8.1. Summary of the findings from the numerical modelling by legislation

Assessment	Description
Surface Water Regulations & TSAS Assessment (BOD, MRP, DIN)	<ul style="list-style-type: none"> The modelled indicative quality for all WFD/TSAS parameters and scenarios is High except for winter scenarios 4 and 6. The modelled indicative quality for Youghal Harbour in the winter scenarios is High and Good with the area of Good extending up the river and with no appreciable difference between scenarios 4 and 6. The modelled indicative quality for Youghal Bay is High for all winter scenarios apart from a small area to the west of the estuary mouth. Mixing zones extents for all WFD/TSAS parameters are less than 50m.
Bathing Water Directive (EU, 2009)	<ul style="list-style-type: none"> The modelled indicative quality of the bathing waters for Youghal Front Strand and Clay Castle beaches is Excellent for all scenarios, summer and winter, although is only applicable to the summer scenarios as per the Regulations.
Shellfish waters (SI, 268/2006)	<ul style="list-style-type: none"> The modelled indicative (bathing water) status¹² of the Designated Shellfish Water (Ballymacoda Bay) is Excellent for both summer and winter seasons. The modelled indicative (bathing water) status¹³ of the Classified Production Areas is Excellent for both summer and winter seasons. The modelled plume of EC concentration from the WwTP does not extend to the Designated Shellfish Waters in the summer (scenarios 3, 5 and 7) and only reaches the northern part of the area at low concentrations in winter (EC: below 10 cfu/100 ml) The modelled plume of EC concentration from the WwTP does not extend to the Classified Production Area in the summer (scenarios 3, 5 and 7) and only reaches the northern part of this area at low concentrations (EC: below 10 cfu/100 ml) in winter (scenarios 4 and 6). The modelled IE plume does not reach either the Designated Shellfish Waters or the Classified Production Area.

¹² In line with the Section 11.5 of the Irish Water Technical Standard (Irish Water, 2020) good bathing water quality is used as an interim target for protection of shellfish water quality.

¹³ In line with the Section 11.5 of the Irish Water Technical Standard (Irish Water, 2020) good bathing water quality is used as an interim target for protection of shellfish water quality.

Table 8.2. Summary of the findings from the numerical modelling by parameter**Parameter Assessments**

EC and IE	<ul style="list-style-type: none"> The seasonal variation in the bacterial concentrations (EC and IE) due to the environment and the outfall are clearly reproduced. For Scenarios 3, 5 and 7 (summer) the UV treatment reduces the concentration in the effluent such that the mixing zone is less than 50 m. For Scenarios 4, 6 and 8 the increase in concentration around the outfall is marked by a mixing zone of the order 100 m across the estuary and 300-400 m up and down stream of the outfall. The indicative quality of the bathing waters for Youghal Front Strand and Clay Castle beaches is Excellent for all scenarios. The indicative (bathing water) status¹⁴ of the Designated Shellfish Waters and Classified Production Area is Excellent for both summer and winter seasons. The EC plume from the WwTP does not extend to the Classified Production Area in the summer (scenarios 3, 5 and 7) and in winter only reaches the northern part of the Classified Production Area at low concentrations (EC: below 20 cfu/100 ml). The EC plume does/does not reach the Designated Shellfish Waters. The IE plume does not reach either the Designated Shellfish Waters or the Classified Production Area.
DIN (50%ile)	<ul style="list-style-type: none"> The seasonal variation in the concentration of DIN is reproduced with elevated levels in the winter. However, the contribution of the WwTP in comparison to the receiving waters is minimal and as a result there is no discernible mixing zone. The modelled DIN indicative quality for Youghal Harbour and Youghal Bay is High for all summer scenarios. The modelled DIN indicative quality for Youghal Harbour in the winter scenarios is High and Good with the area of Good extending up the river and with no appreciable difference between scenarios 4, 6 or 8. The modelled DIN indicative quality for Youghal Bay is High for all winter scenarios apart from a small area to the west of the estuary mouth.
BOD (95%ile)	<ul style="list-style-type: none"> The modelled BOD indicative quality for Youghal Harbour and Youghal Bay is High for all scenarios. The mixing zones for all scenarios is less than 50 m and therefore less than 25% of the width of the estuary.
MRP (50%ile)	<ul style="list-style-type: none"> The modelled MRP indicative quality for Youghal Harbour and Youghal Bay is High for all scenarios. The mixing zones for all scenarios is less than 50 m and therefore less than 25% of the width of the estuary.
Ammonia & unionised ammonia (95%ile)	<ul style="list-style-type: none"> The modelled concentrations of ammonia are below 0.05 mg/l for all scenarios. The estimation of unionised ammonia is less than 0.001 mg/l using a factor of 2%.

¹⁴ In line with the Section 11.5 of the Irish Water Technical Standard (Irish Water, 2020)) good bathing water quality is used as an interim target for protection of shellfish water quality .

9. References

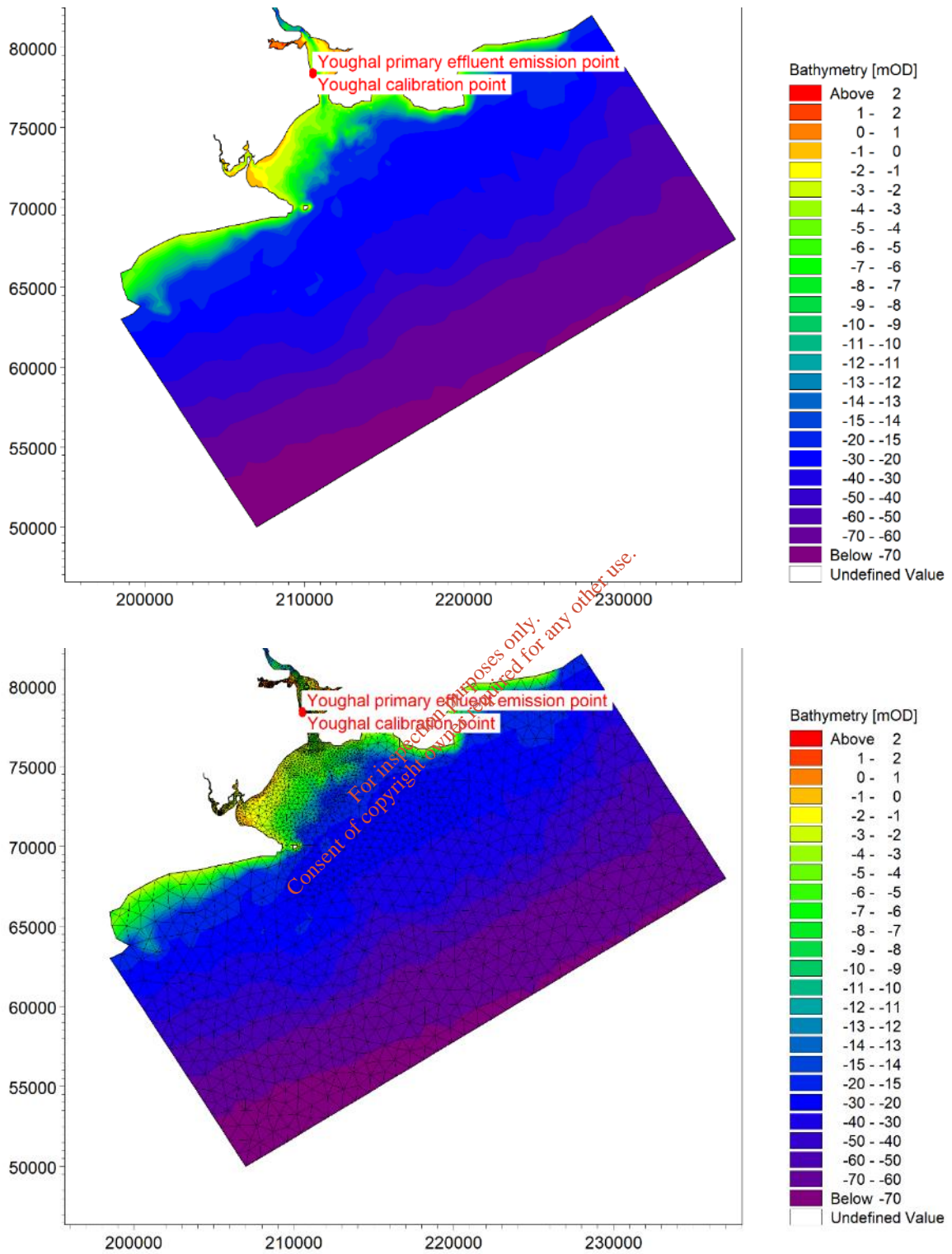
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- SI 254/2001, Irish Statutory Instruments, 2001. S.I. No. 254/2001 – Urban Waste Water Treatment Regulations, 2001. Statutory Instruments No.254 of 2001. 14 June 2001.
- SI 268/2006, Irish Statutory Instruments, 2006. European Communities (Quality of Shellfish Waters) Regulations 2006. Irish Statutory Instruments No. 268 of 2006. 22 May 2006.
- SI 79/2008, Irish Statutory Instruments, 2008. Bathing Water Quality Regulations. Statutory Instruments No. 79 of 2008. 28 March 2008.

Appendix A Model Run Log

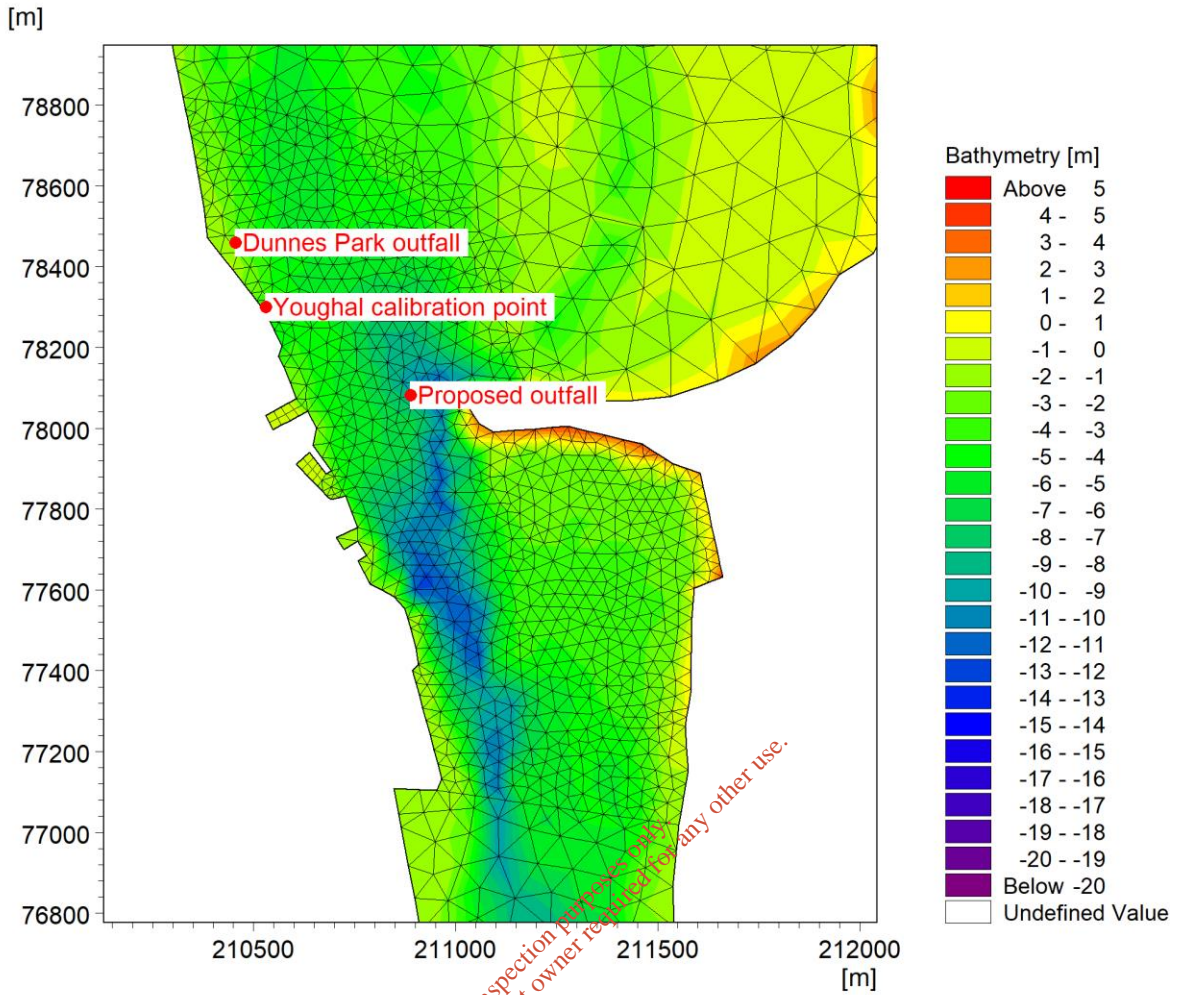
Number	Run Codes			Description	Decay Rates		WwTP		Discharges		
	Season	Params	IW System		T90 [hrs]	/s	Youghal	Cappoquin	Rivers (listed on "River and Coastal Inputs")	Temperature	Salinity
				Temperature Calibration			12.0 deg C	12.0 deg C			
				Temperature Summer			15.0 deg C	15.0 deg C			
3.00	Summer	HD	A01s	Existing (Baseline) Summer out of Dunnes Park			0.027 m³/s	0.003 m³/s	Q95 "River and Coastal Inputs" worksheet	15.0 deg C	0
3.01	Summer	BOD	A01s_BOD		550.0	1.163E-06	5. mg/l	2. mg/l			
3.02	Summer	EC	A01s_EC		24.0	2.665E-05	60 cfu/100ml	500 cfu/100ml			
3.03	Summer	IE	A01s_IE		48.0	1.333E-05	15 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
3.04	Summer	DIN	A01s_DIN		800.0	7.995E-07	2.16 mg N /l	3.63 mg N /l			
3.05	Summer	MRP	A01s_MRP		1600.0	3.998E-07	1.35 mg P /l	1.02 mg P /l			
3.06	Summer	Amm	A01s_Amm		275.0	2.326E-06	1.3 mg N /l	0.07 mg N /l			
4.00	Winter	HD	B01w	Existing (Baseline) Winter out of Dunnes Park			0.047 m³/s	0.003 m³/s	Q30 "River and Coastal Inputs" worksheet	8.0 deg C	0
4.01	Winter	BOD	B01w_BOD		550.0	1.163E-06	5. mg/l	2. mg/l			
4.02	Winter	EC	B01w_EC		48.0	1.333E-05	38,730 cfu/100ml	500 cfu/100ml			
4.03	Winter	IE	B01w_IE		96.0	6.663E-06	9,683 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
4.04	Winter	DIN	B01w_DIN		800.0	7.995E-07	2.16 mg N /l	3.63 mg N /l			
4.05	Winter	MRP	B01w_MRP		1600.0	3.998E-07	1.35 mg P /l	1.02 mg P /l			
4.06	Winter	Amm	B01w_Amm		275.0	2.326E-06	1.3 mg N /l	0.07 mg N /l			
5.00	Summer	HD	A03s	Future (16,000PE Capacity) Summer out of Dunnes Park			0.043 m³/s	0.003 m³/s	Q95 "River and Coastal Inputs" worksheet	15.0 deg C	0
5.01	Summer	BOD	A03s_BOD		550.0	1.163E-06	25. mg/l	2. mg/l			
5.02	Summer	EC	A03s_EC		24.0	2.665E-05	10,000 cfu/100ml	500 cfu/100ml			
5.03	Summer	IE	A03s_IE		48.0	1.333E-05	2,500 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
5.04	Summer	DIN	A03s_DIN		800.0	7.995E-07	15. mg N /l	3.63 mg N /l			
5.05	Summer	MRP	A03s_MRP		1600.0	3.998E-07	10. mg P /l	1.02 mg P /l			
5.06	Summer	Amm	A03s_Amm		275.0	2.326E-06	10. mg N /l	0.07 mg N /l			
6.00	Winter	HD	B03w	Future (16,000PE Capacity) Winter out of Dunnes Park			0.063 m³/s	0.003 m³/s	Q30 "River and Coastal Inputs" worksheet	8.0 deg C	0
6.01	Winter	BOD	B03w_BOD		550.0	1.163E-06	25. mg/l	2. mg/l			
6.02	Winter	EC	B03w_EC		48.0	1.333E-05	100,000 cfu/100ml	500 cfu/100ml			
6.03	Winter	IE	B03w_IE		96.0	6.663E-06	25,000 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
6.04	Winter	DIN	B03w_DIN		800.0	7.995E-07	15. mg N /l	3.63 mg N /l			
6.05	Winter	MRP	B03w_MRP		1600.0	3.998E-07	10. mg P /l	1.02 mg P /l			
6.06	Winter	Amm	B03w_Amm		275.0	2.326E-06	10. mg N /l	0.07 mg N /l			
7.00	Summer	HD	C03s	Future (16,000PE) Summer + New outfall			0.043 m³/s	0.003 m³/s	Q95 "River and Coastal Inputs" worksheet	15.0 deg C	0
7.01	Summer	BOD	C03s_BOD		550.0	1.163E-06	25. mg/l	2. mg/l			
7.02	Summer	EC	C03s_EC		24.0	2.665E-05	10,000 cfu/100ml	500 cfu/100ml			
7.03	Summer	IE	C03s_IE		48.0	1.333E-05	2,500 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
7.04	Summer	DIN	C03s_DIN		800.0	7.995E-07	15. mg N /l	3.63 mg N /l			
7.05	Summer	MRP	C03s_MRP		1600.0	3.998E-07	10. mg P /l	1.02 mg P /l			
7.06	Summer	Amm	C03s_Amm		275.0	2.326E-06	10. mg N /l	0.07 mg N /l			
8.00	Winter	HD	0	Future (16,000PE Capacity) Winter + New outfall			0.063 m³/s	0.003 m³/s	Q30 "River and Coastal Inputs" worksheet	8.0 deg C	0
8.01	Winter	BOD	B03w_BOD		550.0	1.163E-06	25. mg/l	2. mg/l			
8.02	Winter	EC	B03w_EC		48.0	1.333E-05	100,000 cfu/100ml	500 cfu/100ml			
8.03	Winter	IE	B03w_IE		96.0	6.663E-06	25,000 cfu/100ml	125 cfu/100ml	See "River and Coastal Inputs" worksheet		
8.04	Winter	DIN	B03w_DIN		800.0	7.995E-07	15. mg N /l	3.63 mg N /l			
8.05	Winter	MRP	B03w_MRP		1600.0	3.998E-07	10. mg P /l	1.02 mg P /l			
8.06	Winter	Amm	B03w_Amm		275.0	2.326E-06	10. mg N /l	0.07 mg N /l			

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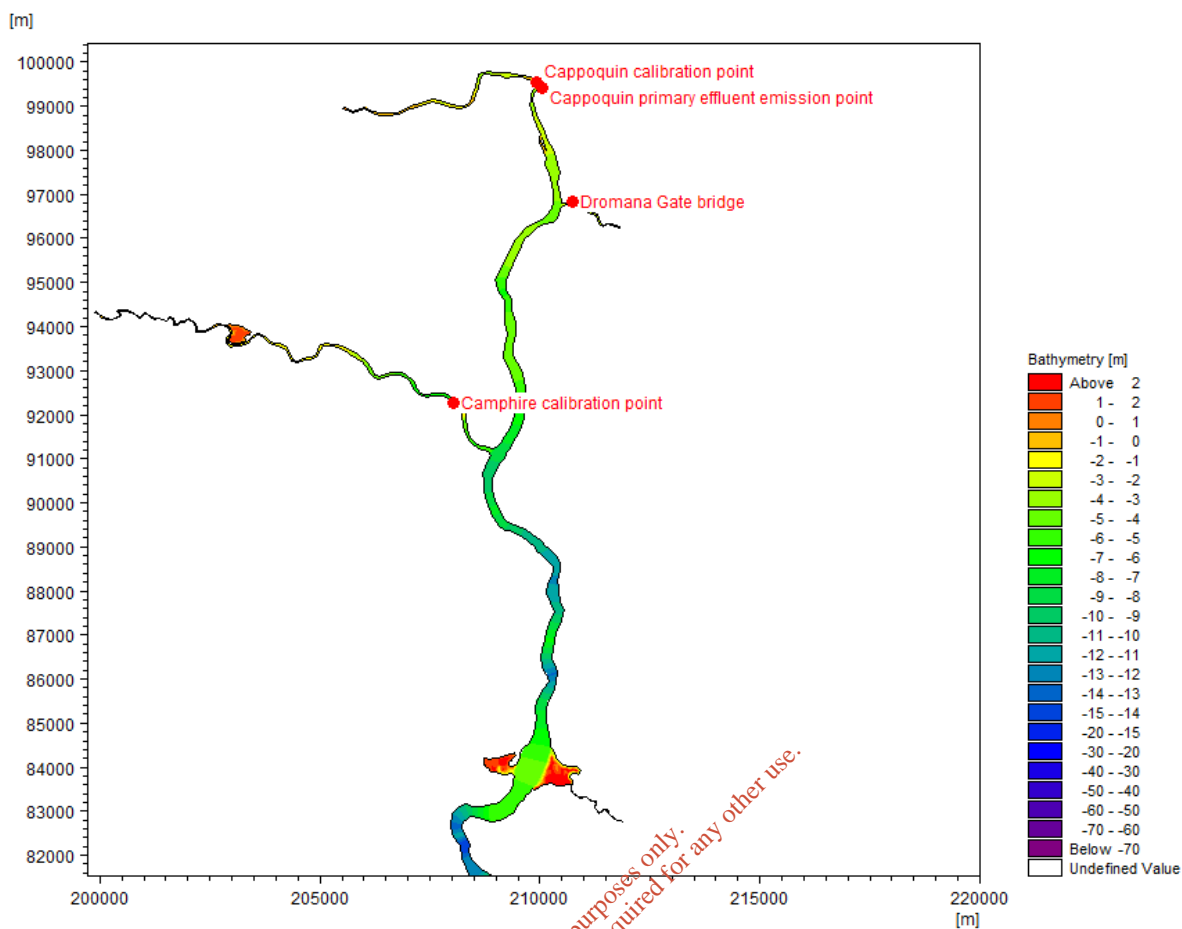
Appendix B Model bathymetry



App Figure B-1. Plot of the bathymetry showing the non-river sections of the model domain with and without the mesh structure.



App Figure B-2. Plot of the bathymetry and mesh showing the area around the Dunnes Park and proposed outfall locations.



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SECTION D – EXISTING ENVIRONMENT & IMPACT OF THE DISCHARGE(S)

Attachment D2: Appropriate Assessment

- Attachment D.2: AAS & NIS

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Irish Water Report

Natura Impact Statement as part of the Youghal WwTP
Discharge License Review D0139-02
December 2020

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Introduction

This report provides information to enable the EPA as competent authority to conduct a Stage 2 Appropriate Assessment (AA) in respect of the existing Waste Water Treatment Plant (WwTP) and agglomeration at Youghal, Co Cork, for the purposes of the European Union (Waste Water Discharge) Regulations 2007 to 2020. It considers whether the on-going operation of the plant and network, alone or in combination with other plans and projects, could adversely affect the integrity of European Site(s) in view of best scientific knowledge and the conservation objectives of the site(s). European Sites are those identified as sites of European Community importance designated as Special Areas of Conservation (SACs) under Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive") or as Special Protection Areas (SPAs) under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC (the "Birds Directive").

This report takes account of the guidance for AA published by the Environmental Protection Agency's (EPA) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*' (EPA, 2009); the Department of the Environment, Heritage and Local Government's guidelines '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009) and Circular L8/08 '*Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments*' (DoEHLG, 2008).

This assessment was completed by Kate Harrington MSc MCIEEM an aquatic ecology specialist who has 15 years' experience in undertaking ecological surveys and assessments in the freshwater and marine environment. Her experience includes undertaking Appropriate Assessments (Screening and NIS), Ecological Impact Assessments and water quality studies for a range of infrastructure projects. She completes and reviews ecological assessments for Irish Water projects and activities as well as contributing to the development of guidance and best-practice advice and training

This assessment was reviewed and approved by Dr Brian Deegan, who has a Masters Degree in Estuarine Ecology, a Doctorate (Ph.D.) in Freshwater Ecology and is a full member of the Chartered Institute of Ecology and Environmental Management. Brian has over 18 years of experience in the field of Ecological and Environmental Assessments. This experience includes Appropriate Assessment, Ecological Impact Assessment, Environmental Impact Assessment, Ecological Appraisals, Ecological Clerk of Works, Water Quality Assessments and Ecological Monitoring Programmes, for a wide range of both linear and site based infrastructure projects.

Legislative Context

The Habitats Directive provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are SACs designated under the Habitats Directive and SPAs designated under the Birds Directive.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Article 6(4) states:

If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Article 7 of the Habitats Directive provides that the provisions of Article 6(3) and 6(4) (among other provisions) are to apply to SPAs designated under the Birds Directive.

Article 6(3) provides for a two stage process. The first stage involves a screening for AA and the second stage arises where, having screened the application for the development, the competent authority determines that AA is required, in which case it must then carry out that AA. A competent authority does not have jurisdiction to grant development consent unless the AA provisions are correctly applied.

The Habitats and Birds Directives are transposed in Ireland under the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (2011 Regulations). In relation to the assessments to be carried out under the Habitats Directive, the provisions of Regulation 42 of the 2011 Regulations require "a screening for AA of a... project for which an application for consent is received". Following that screening, if the relevant public authority determines that an AA is required, then a Natura Impact Statement [NIS] must be submitted and "a public authority shall give consent for a... project, only after having determined that the... project shall not adversely affect the integrity of a European site".

Methodology

Guidance Followed

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this NIS has had regard to the following guidance:

- Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007). Environmental Protection Agency, (EPA, 2009).
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government, (DoEHLG, 2010).
- Circular L8/08 – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Department of Environment, Heritage and Local Government, (DoEHLG, 2008).
- Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg, (EC, 2000).
- Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg, (EC, 2018).
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001).
- Guidance document on Article 6(4) of the ‘Habitats Directive’ 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg, (EC, 2007).
- Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg (EC, 2006).
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).
- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012).

- EPA Guidance for Irish Water on Requests for Alterations to a Wastewater Discharge Licence or Certificate of Authorisation” (Revised March 2019).

Stages Involved in the Appropriate Assessment Process

Stage 1: Screening / Test of Significance

This process identifies whether the WwTP and agglomeration discharges are directly connected to or necessary for the management of a European Site(s); and identifies whether the discharges are likely to have significant impacts upon a European Site(s) either alone or in combination with other projects or plans.

In essence, upon conducting a Stage 1 Screening, the competent authority is required to determine whether or not it can be excluded, on the basis of objective scientific information, that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

The output from this stage is a determination for each European Site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

Stage 2: Appropriate Assessment

This stage considers the impact of the WwTP and agglomeration discharges on the integrity of a European Site(s), either alone or in combination with other projects or plans, with respect to (1) the site's conservation objectives; and (2) the site's structure and function and its overall integrity. The potential impacts of the scheme are examined with respect to the attributes and targets which define the favourable conservation condition of each qualifying interest in the SAC, and the extent, if any, to which meeting those targets could be affected. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts may be carried out at Stage 2.

To assist the competent authority to carry out the Stage 2 AA, the developer must prepare a Natura Impact Statement (NIS). This document must include sufficient information for the EPA to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a European site cannot be excluded, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European Site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or all alternatives would result in negative impacts to the integrity of the European sites then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment Where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

Field Walkover Surveys

Field walkover surveys were undertaken on 27th January 2020 around a low spring tide (0.38m) to identify the potential for qualifying species and habitats in the surrounding environs of the agglomeration discharges in the vicinity of Youghal. The field surveys and reporting were completed by the report authors.

Marine Modelling Study

Water quality modelling (AECOM, 2020) was undertaken following IW technical standards (Irish Water Marine Modelling Technical Standard, Version 2, December 2019). The model utilised for this study was developed using the MIKE by DHI suite of models. The model is a 3-dimensional model (MIKE3) and uses the advection-dispersion module to simulate the transport and decay of the different parameters. The model examined the impact of the primary discharge at Dunn's Point, considering current and future discharge scenarios.

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Screening for AA

Screening for Appropriate Assessment was undertaken by the EPA on 6th April 2020. The EPA determined that an Appropriate Assessment of the existing discharges from the Youghal Agglomeration was required due to the potential adverse impact on the qualifying interests of the Blackwater River (Cork/Waterford) SAC (002170), Ballymacoda (Clonpriest and Pillmore) SAC (000077), Blackwater Estuary SPA (004028), Ballymacoda Bay SPA (004023), and Helvick Head to Ballyquin SPA (004192). This determination was based on the following:

1. The proximity of the discharges to Blackwater River (Cork/Waterford) SAC, Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater Estuary SPA, Ballymacoda Bay SPA and Helvick Head to Ballyquin SPA.
2. The presence of water-dependent habitats and species associated with the Blackwater River (Cork/Waterford) SAC and the presence of water-dependent habitats associated with the Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater Estuary SPA and Ballymacoda Bay SPA.
3. The potential for bird species associated with Helvick Head to Ballyquin SPA, Ballymacoda Bay SPA and Blackwater Estuary SPA to forage in close proximity to the discharges.
4. The volume of the discharges from the agglomeration

Therefore, applying the Precautionary Principle and in accordance with Article 6(3) of the Habitats Directive, the EPA determined that the WwTP discharges at Youghal must be brought forward for a Stage 2 Appropriate Assessment.

Description of the Project

Irish Water has progressed the Youghal Main Drainage Scheme to satisfy the requirements of Schedule C.1 of the current WWDL. The Scheme was granted planning permission (in the form of an Urban District Council scheme) in 2002 by An Bord Pleanála (Atkins McCarthy, 2001). Further to planning approval a discharge licence was granted by the EPA in 2012, and a foreshore licence for relevant works was granted in 2013. The early-stage assessments completed for the Scheme identified a preferred discharge point at Ferry Point into Youghal estuary (SW001) which was then specified as the primary discharge point in the licence in anticipation of the completion of the Scheme.

The following works for the Scheme were completed by December 2017:

- The upgrade of the existing drainage network and pumping stations;
- Construction of a new pumping station at Green Park;
- Construction of the WwTP.

Irish Water no longer proposes to proceed with the construction of the Ferry Point Outfall. Irish Water are applying to the Agency for consent to the use of Dunn's Park as the permanent primary discharge point (SW000: 210513E 078480N).

The WwTP is located approximately 1.3km north of the town centre, in an area called the Mudlands. The plant has been designed and built to allow for expansion for anticipated future growth. The current plant has a biological treatment capacity of 16,000 population equivalents (PE). The treatment process comprises the following:

- Inlet works providing screening, grit removal, and FOG removal;
- A screened stormwater overflow (2 storm tanks);
- Four Sequence Batch Reactor (SBR) tanks for BOD removal and Nitrification;
- Balance tank for treated wastewater;
- Final effluent pumps;
- Sludge treatment facilities include a picket fence thickener, a sludge dewatering system and a sludge storage tank;
- UV treatment of the final effluent.

As per the 'EPA Guidance for Irish Water on Requests for Alterations to a Waste Water Discharge Licence or Certificate of Authorisation' (Revised March 2019), Irish Water is seeking a revision to the current licence to accommodate the following:

- to consent to the use of the existing outfall at Dunn's Park (SW000) as the permanent Primary discharge location
- the authorisation of all storm water and emergency overflows.

The continued use of the current primary discharge at Dunn's Park outfall, together with all other existing Youghal agglomeration overflow discharges, are the "Project/Activity" under consideration in this NIS. The discharges from the WwTP and network are listed in the table below.

Table 1.0: Youghal Agglomeration Discharges

Reference	Type	Discharge Location	Discharge Co-ordinates		Description
			Easting	Northing	
Existing – to be decommissioned					
SW000	Primary Discharge (Current)	Lower Blackwater Estuary/Youghal Harbour	210513	078480	Dunn's Park - Operating as primary discharge until such time as new outfall is constructed and commissioned
Existing – Storm Water Overflows & Emergency Overflows to be retained					
SW011	Storm Water Overflow	Lower Blackwater Estuary/Youghal Harbour	210513	078480	Gravity overflow from Dunn's Park Pumping station. (Currently listed as SW000 in the licence.) Screened to 6mm and discharging to the existing sea outfall.
SW002	Storm Water Overflow	Lower Blackwater Estuary/Youghal Harbour	210996	077419	Gravity overflow from Greenpark Pumping Station to Paxe's lane Outfall. Screened to 6mm. Designed to operate in a 20 year storm event.
SW006	Storm Water Overflow	Lower Blackwater Estuary/Youghal Harbour	210971	077130	Gravity overflow from Greenpark Pumping Station to Green Park Outfall. Screened to 6mm.
SW005	Storm Water Overflow	Youghal Bay	210527	076075	Gravity overflow from Front Strand Pumping Station to Front Strand Outfall. Screened to 6mm.
SW007	Storm Water Overflow	Lower Blackwater Estuary/Youghal Harbour	210298	078444	This the only gravity overflow available for high flow overflow to Mudlands from the Dunn's Park Pumping station
SW008	Emergency Overflow	Lower Blackwater Estuary/Youghal Harbour	209687	079880	Overflow from Foxhole Pumping Station
SW010	Storm Water Overflow	Youghal Bay	209412	076168	Summerfield B Overflow. Designed to operate in a 20 year storm event.

The recommended Emission Limit Values for the current Primary Discharge (SW000) are:

Parameter	Units	Limit
cBOD	mg/l	25
COD	mg/l	125
Suspended Solids	mg/l	35
Total Nitrogen (as N)	mg/l	15
pH	-	6 – 9

All SWO's meet the DoEHLG SWO criteria in "Procedures and Criteria in relation to Storm Water Overflows".

Effluent data from 2019 and 2020 is presented in Table 2.0 together with the recommended ELV's. The primary discharge meets the Urban Wastewater Treatment Regulations 2001 (S.I. No. 254/2001) as amended, and the ELV's, for all relevant parameters with the exception of the 2 exceedances highlighted in bold for Suspended Solids. The agglomeration discharges to the Lower Blackwater Estuary Nutrient Sensitive Area, as per Schedule 1 of the Urban Waste Water Treatment (Amendment) Regulations 2010 (S.I. No. 48/2010), hence requiring limits to be set for Total Nitrogen.

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Table 2.0: Effluent Monitoring Data at Primary Discharge 2019-2020

Date	pH	Conductivity	BOD (UWWT)	COD (UWWT)	SS (UWWT)	Ammonia	Total Nitrogen (UWWT)	Total Phosphorus	TON
ELV's	6.0-9.0		25	125	35		15		
09/01/2019	7.8	4160	2.7	30	7	0.05	4.2	2.17	1.03
06/02/2019	7.5	4,620	2.5	32	6	0.8	4.7	1.32	1.47
06/03/2019	7.7	NT	4.3	34	9	0.2	4.3	0.94	1.96
03/04/2019	7.7	3870	13	73	43	0.4	3.29	2.78	1.73
01/05/2019	7.8	NT	3.9	10.5	7	9.9	15.7	0.72	3.45
22/06/2019		NT	NT	NT	52	NT	NT	NT	NT
06/06/2019	7.8	9540	7.6	72	27	7.5	12.1	1.38	0.25
03/07/2019	7.7	7,680	4.7	63	15	0.2	4.1	3.8	0.25
14/08/2019	7.5	4,520	3	45	17	0.2	6.3	2.35	1.47
11/09/2019	7.7	5,250	11	84	4	0.2	12.7	2.65	0.25
09/10/2019	7.7	NT	1.9	10.5	1.25	0.3	3.3	1.05	2.31
06/11/2019	7.9	2,330	0.5	10.5	4	0.5	4.1	1.15	2.39
04/12/2019	7.6	3680		48	31	0.8	5.8	1.54	1.84
11/12/2019	NT	NT	7.7	NT	NT	NT	NT	NT	NT
08/01/2020	7.5	2790	2.8	54	32	0.1	6.09	1.17	1.97
05/02/2020	7.5	3,007	7.1	31	10	1.7	3.83	0.23	0.25
04/03/2020	7.9	2720	2.4	29	5	1.8	4.7	1.45	1.93
20/05/2020	7.7	4530	2	30	5	3.4	8.4	2.18	1.48
03/06/2020	7.8	6260	2.3	33	5	0.8	4.93	2.26	0.62
15/07/2020	7.5	3200	4.4	56	4	2.3	5.55	0.21	
12/08/2020	7.7	4,920	2.7	45	7	0.7	4.44	2.58	1.16

*NT = Not Tested

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Description of the Receiving Environment and Monitoring Results

Water Quality

The primary discharge enters the transitional waterbody of the Lower Blackwater Estuary, a long waterbody extending from downstream of Cappoquin 23km south to the mouth of the estuary at Youghal Harbour. This waterbody is currently assigned Moderate Water Framework Directive (WFD) status with Moderate Biological status though with Good/High supporting chemistry conditions. The Moderate Biological Status is driven by Moderate Phytoplankton status or potential and Moderate Angiosperm status or potential. The waterbody has been determined to be 'At Risk' which is noted as being due to winter DIN (Dissolved Inorganic Nitrogen) levels. Youghal Harbour, which for the purposes of this study is defined as the area of the estuary south of the Youghal bypass bridge, accounts for the lower 1/5th of the estuary waterbody (Figure 1).

Outside of the harbour area, the coastal waterbody of Youghal Bay extends between the Ardmore and Ballymacoda headlands. This waterbody is also assigned Moderate WFD status, driven by Moderate DO (oxygenation) supporting chemistry conditions, and is determined to be 'At Risk'. As well as the Blackwater River, the Womanagh River enters this waterbody via Ballymacoda Bay.

The only pressure listed for both waterbodies is Agriculture. Youghal WwTP has not been identified as a pressure.

The EPA has applied the Trophic Status Assessment Scheme (TSAS) to nutrient and phytoplankton data from the Lower Blackwater Estuary (Table 3.0). The TSAS assessment scheme determines the trophic status of a waterbody, which can be Unpolluted, Intermediate, Potentially Eutrophic or Eutrophic. The assessment is summarised below and is based on most recent 3 year dataset up to and including 2019 which was provided to IW by EPA in April 2020. The overall trophic status is assigned based on a calculated score which captures components which fail threshold requirements and those at risk of failure (within 15% of thresholds). The trophic status of the Lower Blackwater Estuary is 'Intermediate' based on this most recent assessment due to failing the 90th percentile chlorophyll threshold and the 5th percentile DO threshold.

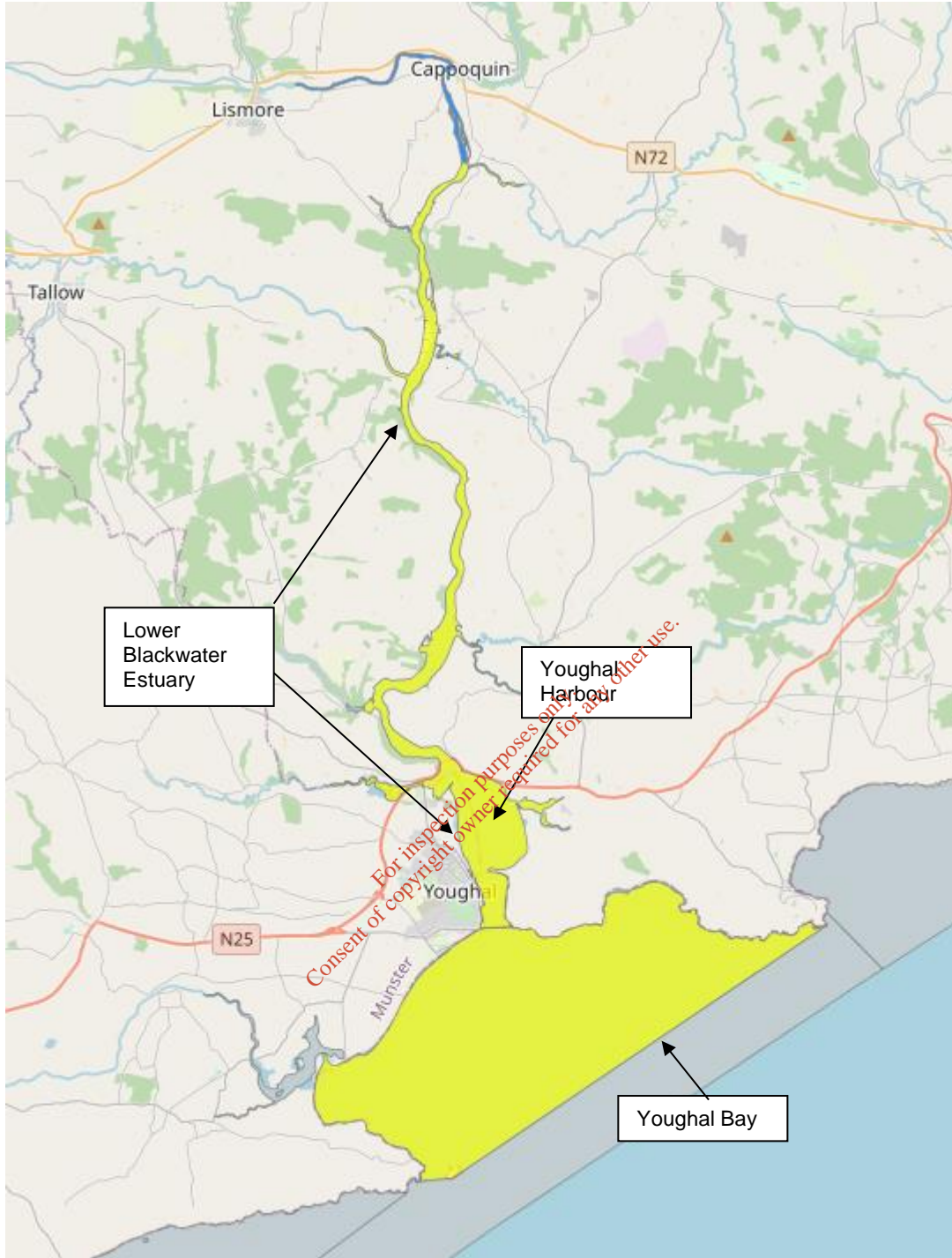


Figure 1: WFD Waterbodies

Table 3.0: EPA Trophic Status Assessment Scheme (TSAS) for Lower Blackwater Estuary

	TSAS Threshold	Concentration	Pass/Fail	TSAS Criteria	Score
Winter DIN	1.612	1.125	Pass	A Winter Nutrients	Pass
Winter MRP	60.000	33.000	Pass		
Summer DIN	0.761	0.637	Pass	A Summer Nutrients	Pass
Summer MRP	49	13.000	Pass		
Chloro. Median	12.2	8.000	Pass	B Chlorophyll/Algae	Fail
Chloro 90 percentile	24.4	25.000	Fail		
DO%sat 5 percentile	76	75.825	Fail	C DO	Fail
DO%sat 95 percentile	124	117.2	Pass		
BOD	4	2.300	Pass		
Opportunistic algae	0.6	0.680	Pass		

Ambient monitoring locations of relevance to the Youghal agglomeration are shown below in Figure 2 with data presented in Table 4.0. Stations ending 2001 (no. 1) and 2002 (no. 4) are used as the upstream and downstream monitoring points for the current (Dunn's Park) primary discharge point (SW000).

EPA/WFD Monitoring Locations in Youghal Harbour, upstream and downstream of the Youghal agglomeration are as follows:

1. TW38003144BR2001 Youghal Bridge - North of all emission points to the estuary associated with the Youghal agglomeration
2. TW31003144BR2012 BR220 - North of Dunn's Park (SW000) & South of Old Bridge / Youghal Landfill
3. TW31003144BR2013 BR230 - South of Paxe's Lane SWO/Coastguard Station (SW002)
4. TW38003144BR2002 - South of Green Park SWO (SW006)

The 2018-2020 monitoring data (Table 4.0) from these relevant monitoring points is in compliance with the transitional water EQS's for BOD and MRP as set out in the Surface Water Regulations, with High status conditions being met. The coastal water EQS's for DIN do not apply but as these can also be interpolated with salinity values they are set out below and indicate High status conditions are met.

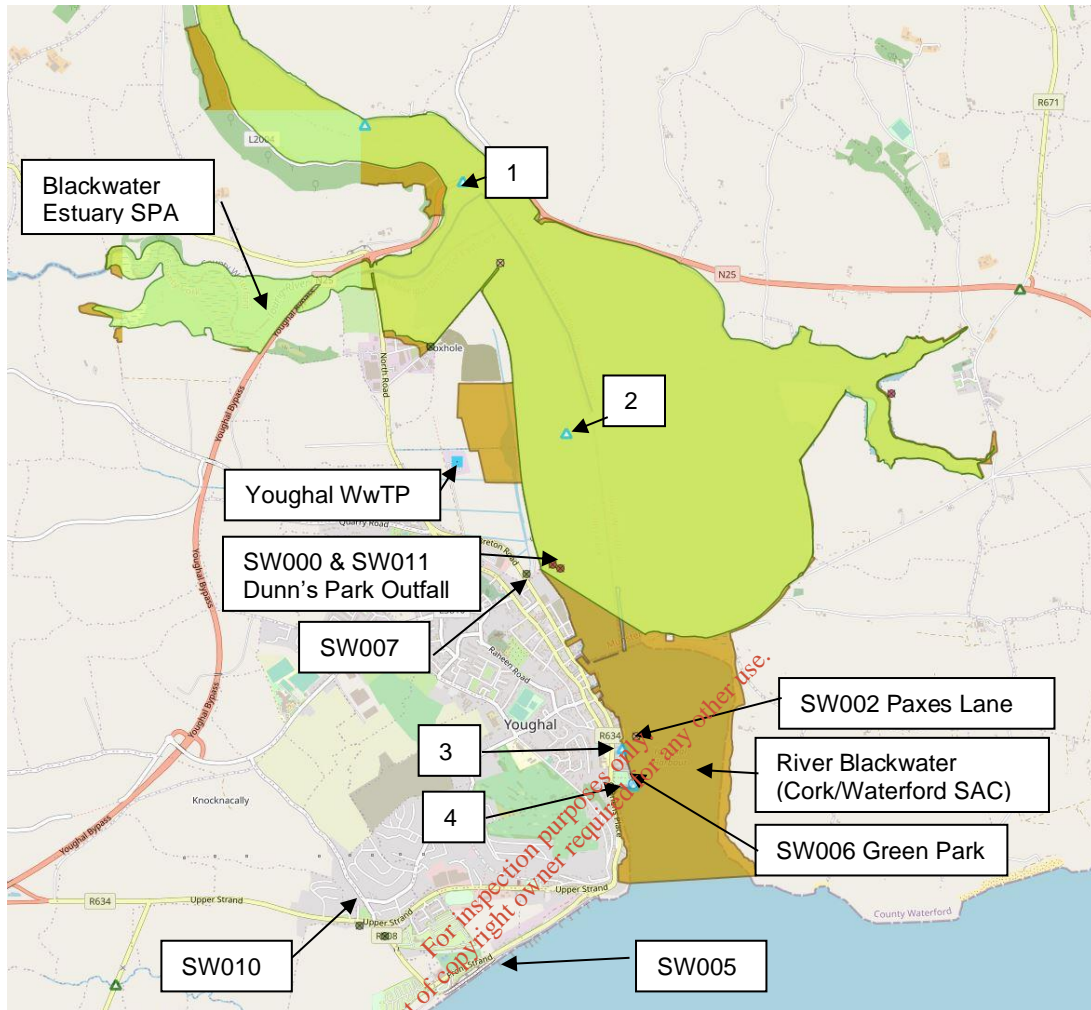


Figure 2: Youghal Discharges and European Sites

Table 4.0: EPA & IW 2018 - 2020 Monitoring Data Youghal Harbour

Date Surveyed	Sample ¹	Salinity	DO %	BOD	MRP ²	TON	TN	Ammonia	DIN	chl_a
SW Regs EQS			80-120 (high)	≤3.0 (high) ≤4.0 (good) ²	See below				See below	
TW38003144BR2001 u/s Ambient of TPEFF0500D0139SW001										
07/03/2018	G	NT	101.6	1	0.025	NT		0.063	NT	NT
06/06/2018	G	NT	103.5	1.1	0.01	NT		0.5	NT	NT
04/07/2018	G	NT	104.6	1.5	0.005	NT		0.15	NT	NT
17/10/2018	G	NT	98.6	1.6	0.03	NT		0.04	NT	NT
06/03/2019	G	NT	100.3	2.1	0.045	NT	3.1	0.053	NT	NT
06/06/2019	G	NT	97.2	1.2	0.02	NT	2.4	0.0175	NT	NT
14/08/2019	G	NT	90.1	1.8	0.06	0.13	2.16	0.18	0.31	NT
09/10/2019	G	NT	112	1.5	0.04	NT	0.99	0.069	NT	NT
04/03/2020	G	NT	102.6	1.6	0.02	NT	2.7	0.0175	NT	NT
03/06/2020	G	NT	96.7	2.5	0.005	NT	3.2	0.0175	NT	NT
12/08/2020	G	NT	104.1		0.01	NT	0.25	0.054	NT	1.6
TW31003144BR2012BR220 - d/s Old Bridge / Youghal Landfill										
20/06/2018	B	34.1	102	1.1	0.01	0.03		0.03	0.06	8.6
20/06/2018	S	34.1	102	0.5	0.0025	0.02		0.02	0.04	8.4
19/07/2018	S	34	114	0.5	0.0025	0.02		0.03	0.05	1.9
19/07/2018	B	34	113	0.5	0.0025	0.02		0.02	0.04	0.5
19/07/2018	S	33.1	116	1.2	0.0025	0.09		0.02	0.11	0.5
19/07/2018	B	33.8	113	0.5	0.0025	0.06		0.02	0.08	0.5
13/09/2018	S	34.3	86	0.5	0.01	0.062		0.033	0.095	1.5
13/09/2018	B	34.4	89	0.5	0.01	0.035		0.025	0.06	1.5
11/06/2019	C	34.3	96		0.008	0.005		0.014	0.019	1.4
11/07/2019	S	33.1	107	2.4	0.0025	0.005		0.029	0.034	9.8
11/07/2019	B	33.4	106	2.3	0.0025	0.005		0.02	0.025	9.6
11/07/2019	B	33.7	108		0.14	0.063		0.053	0.116	16
11/07/2019	S	33.3	112		0.0025	0.005		0.05	0.055	11
05/09/2019	B	32.4	94	0.5	0.013	0.14		0.03	0.17	1
05/09/2019	S	32.4	90	0.5	0.013	0.19		0.027	0.217	1
03/02/2020	S	30.2	95	0.5	0.024	0.9		0.039		1
03/02/2020	B	33	96	0.5	0.027	0.16		0.047		2.4
25/06/2020	C	20.4		0.5	0.025	0.91		0.041		4.7
TW31003144BR2013 BR230 - Coastguard										
20/06/2018	S	32.7	104	0.5	0.0025	0.09		0.02	0.11	4.8
20/06/2018	B	34.1	101		0.0025	0.02		0.02	0.04	7.3

Date Surveyed	Sample ¹	Salinity	DO %	BOD	MRP ²	TON	TN	Ammonia	DIN	chl_a
SW Regs EQS			80-120 (high)	≤3.0 (high) ≤4.0 (good) ²	See below				See below	
19/07/2018	B	34		0.5	0.0025	0.01		0.02	0.03	1.9
19/07/2018	S		114	0.5	0.0025	0.02		0.02	0.04	1.9
13/09/2018	B	33.2	86	0.5	0.01	0.099		0.026	0.125	1.6
13/09/2018	S	32.4	86	0.5	0.014	0.11		0.04	0.15	1.9
11/06/2019	C	34.3	96		0.0059	0.005		0.015	0.02	6.3
11/07/2019	S	33.7	108	2.2	0.0025	0.005		0.025	0.03	9.8
11/07/2019	B	33.7	105	2	0.0025	0.005		0.019	0.024	7
05/09/2019	S	32.9	90	0.5	0.014	0.16		0.03	0.19	1
05/09/2019	B	33	91	0.5	0.011	0.074		0.029	0.103	2.6
03/02/2020	S	33	95		0.037	0.2		0.059		1.2
03/02/2020	B	33.2	95	0.5	0.025	0.15		0.06		1.9
25/06/2020	S	23.1	99		0.021	1.1		0.036		3.1
25/06/2020	B	29.2	106		0.015	0.47		0.032		1.8
TW38003144BR2002 Youghal D/S										
07/03/2018	G		101.9	0.5	0.019			0.026		
06/06/2018	G		112	0.5	0.005			0.44		
04/07/2018	G		103.7	1.4	0.005			0.16		
17/10/2018	G		97.3	1.5	0.02			0.05		
06/03/2019	G		100.2	1.6	0.05		9.9	0.05		
06/06/2019	G		100.8	1.5	0.02		1.8	0.056		
14/08/2019	G		83.2	1.8	0.04		2.03	0.13		
09/10/2019	G		108	1.2	0.03		0.84	0.0175		
04/03/2020	G		102	1.5	0.02		1.9	0.0175		
03/06/2020	G		99	2.5	0.005		1.5	0.0175		
12/08/2020	G		109.2		0.02		0.25	0.102		1.3
Median		33.25			0.01				0.0575	
High/Good EQS ³		33.25			0.02561				0.2115	
Good/mode rate EQS ³		33.25			0.0412				0.362	
WFD Indicative quality					HIGH				HIGH	

Note 1: Sample type. G = Grab. S= surface sample. B= bottom sample. C= composite sample, equal volume surface and bottom.

Note 2: 95%ile value for transitional waters.

Note 3: Boundary based on measured salinity (linearly interpolated)

*NT = Not Tested

Site Survey Results

All discharge locations were visited by IW Ecologists during low spring tide conditions in January 2020. The primary discharge (SW000) at Dunn's Park, an SWO from Dunn's Park Pumping Station (SW011), and SWO's at Paxe's Lane (SW002) and Green Park (SW006) enter Youghal Harbour directly into sand/mudflat habitat. The Dunn's Park and Paxe's lane outfalls are submerged, while the Green Park outfall lies at the low water mark. Dunn's Park Pumping Station SWO enters a tidally influenced land drain just upstream of the estuary (SW007). Two further SWO's discharge directly or indirectly via the surface water network to the coastal waters of Youghal Bay - SW005 enters Front Strand directly via a submerged outfall, with SW010 entering land drains which reach this coastal waterbody through the surface water network. There was no evidence of pollution observed in the vicinity of any outfall. The only bird species observed were mixed flocks of gulls which were present throughout the surveyed area. Photographs are provided below.



Photo 1 View South of Youghal Estuary from Foxhole



Photo 2 Dunn's Park Outfall SW000 & SW011



Photo 3 Dunn's Park SW007



Photo 4 Greens Park SW006



Photo 5 Paxes Lane SW002



Photo 6 Front Strand in vicinity of SW005

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Water Quality Modelling

Water quality modelling (AECOM, 2020) was undertaken following IW technical standards (Irish Water Marine Modelling Technical Standard, Version 2, December 2019). The model examined the impact of the primary discharge at Dunn's Point, considering a number of scenarios:

- Existing Baseline using the existing influent loading, current WwTP performance and existing outfall at Dunn's Park, for both summer and winter conditions (scenarios 3 and 4)
- Future Scenario using WwTP Capacity loading of 16,000 PE, ELV-compliant WwTP performance and existing outfall at Dunn's Park, for both summer and winter conditions (scenarios 5 and 6)

The spatial extent of the overall plume has been assessed in terms of the width of the estuary on the surface and not the cross-sectional area. The estuary is approximately 1800 m wide at the location of the Dunn's Park outfall.

The model captures all inputs to the catchment arising from upstream pressures.

The model's key findings are described below.

- The modelled indicative quality for all WFD/TSAS parameters and scenarios is High except for winter scenarios 4 and 6.
- The modelled indicative quality for Youghal Harbour in the winter scenarios is High and Good with the area of Good extending up the river and with no appreciable difference between scenarios 4 and 6.
- The modelled indicative quality for Youghal Bay is High for all winter scenarios apart from a small area to the west of the estuary mouth.
- There are no discernable mixing zones for all nutrient WFD/TSAS parameters. In the interest of clarity, the mixing zone is defined as the immediate area at a discharge point, within which the EQS is not met. While plumes are indicated for certain future scenarios, the modelled concentrations within the plumes meet the EQS for Good status.
- There is a limited mixing zone (based on the achievement of Excellent bathing water standards) for bacteriological parameters in the winter scenarios 4 and 6.

The study concludes that the none of the scenarios modelled indicate a degradation of the overall water quality of any of the receiving waterbodies, nor any degradation of the indicative quality of any WFD supporting quality element for any of the water bodies. Furthermore there are no modelled mixing zones where there are localised breaches in EQS's for key nutrient parameters. The model predicts no negative impacts on the WFD protected areas including designated bathing waters and designated shellfish areas.

In conclusion, the model demonstrates that the existing level of treatment at Youghal WwTP and the existing primary discharge location at Dunn's Park are sufficient to support the achievement of WFD objectives for receiving waters under current and future loading scenarios.

The detailed findings of the Marine Modelling Study are set out in the Marine Modelling Study Report included as Attachment D.1 to the Waste Water Discharge Licence Review Application.

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Assessment of impacts on European sites

The European sites which have been determined as requiring AA, are described and all the potential impacts resulting from the Youghal WwTP and agglomeration discharges are discussed in relation to the conservation objectives of these designated sites.

The Youghal WwTP and agglomeration is not directly connected with or necessary to the management of any European Site for nature conservation.

Description of the European Sites

The European Sites identified by the EPA during its Screening assessment are considered below. A description of the sites is provided, and the qualifying interests are examined in turn using a source-pathway-receptor approach to determine whether they have any potential to be impacted by the discharges from the Youghal agglomeration.

Blackwater River (Cork/Waterford) SAC (002170)¹

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentraglin and Awnaskirtaun. The portions of the Blackwater and its tributaries that fall within this SAC flow through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Nearby towns include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The Blackwater rises in boggy land in east Kerry, where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeragh Mountains before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Araglin valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

¹ Extracted from NPWS Site Synopsis Version Date 09.02.2016

Wet woodlands are found where river embankments have broken down and channel edges are subject to daily inundation. This is particularly evident in the steep-sided valley of the River Bride, between Cappoquin and Youghal. A small stand of Yew (*Taxus baccata*) woodland occurs within the site. This is on a limestone ridge at Dromana, near Villierstown. Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the level of the surrounding fields. The water rises and falls in these holes depending on the water table and several different communities have developed on the acidic or neutral sediments. Floating river vegetation is found along much of the freshwater stretches within the site. The grasslands adjacent to the rivers of the site are generally heavily improved, although liable to flooding in many places. The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech and a few conifers, and sometimes of the invasive species *Rhododendron ponticum* and Cherry Laurel (*Prunus laurocerasus*). In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. The oak wood community in the Lismore and Glenmore valleys is of the classic upland type, in which some Rowan (*Sorbus aucuparia*) and Downy Birch occur. Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore, Ash and Horse-chestnut (*Aesculus hippocastanum*). Willow, oak and Rowan occurs, with abundant Great Wood-rush in the ground flora. The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

The estuary and the habitats within and associated with it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The main expanses occur at the southern end of the site, with the best examples at Kinsalebeg in Co. Waterford, and between Youghal and the main bridge north of it across the river in Co. Cork. The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well developed and diverse flora. The site supports several Red Data Book plant species, i.e. Starved Wood-sedge (*Carex depauperata*), Killarney Fern (*Trichomanes speciosum*), Pennyroyal (*Mentha pulegium*), Bird's-nest Orchid (*Neottia nidus-avis*), Golden Dock (*Rumex maritimus*) and Bird Cherry (*Prunus padus*). The site is also important for the presence of several E.U. Habitats Directive Annex II animal species, including Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*L. fluviatilis*), Twaite Shad (*Alosa fallax fallax*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Salmon (*Salmo salar*). The Awbeg supports a population of White-clawed Crayfish (*Austropotamobius pallipes*).

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

Description of the Conservation Interests of the SAC

Annex I Habitats:

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Perennial vegetation of stony banks [1220]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]

All these habitats are examined below with regard to potential connectivity to the Youghal agglomeration discharges.

Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]: Old sessile oak woods is an entirely terrestrial habitat and there is no pathway for effects from the Youghal agglomeration discharges as the receiving waters do not interact with woodland habitat in any way. This habitat is therefore not considered further in the impact assessment.

Estuaries [1130] & Mudflats and sandflats not covered by seawater at low tide [1140]: The primary discharge point enters in the area classed as both Estuaries habitat and Tidal Mudflats and Sandflats' habitat. The outfall lies at the transition from '*Intertidal estuarine sandy mud community complex*' and '*Sand and mixed sediment with polychaetes community complex*' marine habitats. At a national level, marine pollution from a range of sources (residential, recreational, agriculture, aquaculture) is identified as a pressure for these two habitat types (NPWS, 2019a). In particular, nutrient enrichment of enclosed bays has been highlighted as an issue, resulting from nutrient sources relating to agriculture, forestry and wastewater discharges. The overall national assessment of conservation status for both Estuaries and Tidal Mudflats and Sandflats is Inadequate (*Deteriorating*). Due to the potential for direct impacts to these habitats, they must be considered further in the impact assessment.

Salicornia and other annuals colonising mud and sand [1310]; Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]; & Mediterranean salt meadows (*Juncetalia maritimi*) [1410]: Saltmarshes are stands of vegetation that occur along sheltered coasts, mainly on mud or sand, and are flooded periodically by the sea. They are restricted to the area between mid neap tide level and high water spring tide level. NPWS (2012a) surveyed the saltmarsh habitats (Atlantic salt meadows, Mediterranean salt meadows and Salicornia mud habitats) at one sub-site in Kinsalebeg (on the Waterford side of the estuary), with further 'potential' saltmarsh

identified in the Tourig estuary and other marginal areas of the Blackwater estuary north of Youghal. Key pressures identified in NPWS (2019a) related to grazing, recreational use and hydrological/coastline modifications. The overall national assessment of conservation status for both salt meadow habitats is Inadequate (*Deteriorating*), while *Saliornia* mud habitat is Favourable (*Stable*). While interaction with the waters of the Blackwater estuary is limited to high tide conditions, the conservation objectives for these habitats, together with the information on water quality need to be reviewed further in the impact assessment.

Perennial vegetation of stony banks [1220]: Perennial vegetation of stony banks is vegetation that is found at or above the mean high water spring tide mark on shingle beaches (i.e., beaches composed of cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures. There is one large area of shingle at Ferrypoint, on the Waterford side of the estuary, where it forms a stable spit with a well developed vegetation cover. The spit is composed of small stones and cobbles. At the Ferrypoint sub-site there are clear zonations from the mobile substrate at the front of the spit to the more stabilised cobble at the rear of the spit. The vegetated shingle is associated with a *Festuca*-dominated grassland and lagoon. NPWS (2019a) identify pressures/threats related to physical disturbance of these habitats and invasive species. The vegetation associated with this habitat is terrestrial in nature though salt tolerant. Interaction with the waters of the Blackwater estuary is considered so limited, being confined to particularly high spring tides or occasional overtopping from storm waves or spray, as to present no risk to this habitat, and no pathway for effects is identified, therefore this habitat is not considered further in the impact assessment.

Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0]: NPWS (2012b) note alluvial woodland is extensive in the lower reaches of the Blackwater that are subject to tidal influence, although there are no areas of this woodland identified in the immediate vicinity of Youghal Harbour. The main pressures/threats noted for this habitat relate to invasive species, clear-cutting and problematic native species. The overall national assessment of conservation status for this habitat is Bad (*Deteriorating*). Due to the potential for interaction with the waters of the Blackwater estuary, the conservation objectives for this habitat, together with the information on water quality need to be reviewed further in the impact assessment.

Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260]: With regard to 'Vegetation of flowing waters' no high conservation value sub-types are known to occur in the SAC and NPWS (2012c) note further survey is required to determine whether any such habitats are present. No further subsequent information regarding specific surveys or conservation assessments describing this habitat or its sub-types were identified. The typical species associated with this habitat are associated with freshwater and would not be expected to occur in Youghal Harbour, however NPWS link the rare/threatened and protected plant opposite-leaved pondweed (*Groenlandia densa*), which is known to occur in the tidal reaches of SAC, to this habitat, and set conservation objectives for its

protection. This species is known to be abundant in the tidal stretches of the river around Cappoquin. Pressures/threats identified nationally for this habitat (NPWS, 2019a) include urban waste water discharges (excluding SWO's) as well as other pollution pressures (run-off, agriculture, forestry, industry). The overall national assessment of conservation status for this habitat is Inadequate (*Deteriorating*). Due to the potential for interaction with the waters of the Blackwater estuary, the conservation objectives for this habitat, together with the information on water quality need to be reviewed further in the impact assessment.

Annex II Species:

- *Margaritifera* (Freshwater Pearl Mussel) [1029]
- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Alosa fallax* (Twaité Shad) [1103]
- *Salmo salar* (Salmon) [1106]
- *Lutra* (Otter) [1355]
- *Trichomanes speciosum* (Killarney Fern) [1421]

Freshwater Pearl Mussel

The freshwater pearl mussel is known from the main Blackwater River, two tributaries (Owentaraglin and Allow) and the Licky River, which discharges to the Upper Blackwater Estuary. The distribution of, and suitable habitat for, freshwater pearl mussel within the SAC is identified in the conservation objectives mapping (NPWS, 2012c). Their distribution is noted to extend upstream from Lismore, and upstream of tidal influences in the Licky. Their mapped habitat is a combination of 1) the area of habitat adult and juvenile mussels can occupy and 2) the area of spawning and nursery habitats the host fish, which carry the juvenile freshwater pearl mussel 'glochidia' in their gills, can occupy. While there is no potential direct connection to freshwater pearl mussel habitat, which lies beyond the reaches of the tidal waters into which the Youghal agglomeration discharges, the potential for water quality impacts to host salmonid species and consequent indirect effects must be considered.

White-clawed crayfish

White-clawed crayfish are a species which are confined to freshwater reaches of rivers. Within the Blackwater River system, white-clawed crayfish is present only on the Awbeg River upstream of the tidal section of this river. Based on their location in an upstream tributary, and the lack of migratory movements in their life-cycle, there is no possibility that this species could interact with the estuarine receiving waters of the Youghal agglomeration discharges. Consequently there is no pathway for effects to this qualifying interest, and therefore this species is not considered further in the impact assessment.

Lamprey Species

Of the three lamprey species listed as qualifying interests of this SAC, only sea lamprey and river lamprey have the potential to occur in the vicinity of Youghal. Sea lamprey *Petromyzon marinus* and River lamprey *Lampetra fluviatilis* are anadromous species, spending part of their life cycle in the marine environment and returning to natal watercourses to spawn. Adult fish can migrate long distances into freshwater but artificial barriers to passage can result in spawning

being confined to downstream of these barriers (NPWS, 2019b). Spawning of river lampreys starts when the water temperature reaches 10–11°C, usually in March and April (Morris & Maitland 1987). The sea lamprey usually spawns in late May or June, when the water temperature reaches at least 15°C (Maitland, 2003). Aside from migration barriers climate change-related rainfall increases, agricultural fertilizer use, land drainage and fish harvesting are recognised as pressures/threats (NPWS, 2019b). The NPWS (2019b) overall assessment of the conservation status of sea lamprey is Bad (*Stable*). River lamprey is evaluated as being of 'Unknown' conservation status nationally due to limited data (NPWS, 2019b). A study by King & Linnane (2004) did not find adult lamprey in the Blackwater estuary, however lamprey are found throughout the upstream catchment.

The brook lamprey *Lampetra planeri* (1096) is the smallest of the three lamprey species native to Ireland and it is the only one of the three species to spend all its life in freshwater (Maitland, 2003). It therefore has no potential to occur in the estuarine waters of the Blackwater estuary, and hence this species is not considered further in the impact assessment.

Sea and River lamprey may migrate through the Blackwater estuary, and are therefore considered further with regards to the potential impacts of the Youghal agglomeration discharges.

Twaite Shad

Twaite Shad are one of the rarest fish species which breed in Irish freshwaters. Shad have an anadromous life cycle and have been recorded in the lower reaches of the River Blackwater near Clashmore (King & Linnane, 2004). The shad captured in the Blackwater were young and considered indicative of spawning within the estuary (King & Linnane, 2004).

Key pressures to this species identified (NPWS, 2019b) include agricultural fertilizer use, hydropower, shipping infrastructure, fishing/harvesting and invasive alien species. Overall, the conservation status of Twaite shad is considered Bad (*Stable*) (NPWS, 2019b). This species may occur in the vicinity of the Youghal agglomeration discharges, and the conservation objectives for this species, together with the information on water quality need to be reviewed further in the impact assessment.

Atlantic Salmon

The Atlantic salmon *Salmo salar* is an anadromous species using rivers to reproduce and as nursery areas during their juvenile phase (NPWS, 2019b). Salmon are present throughout the Blackwater catchment (NPWS, 2019b). The species is dependent on good water quality requiring clean (Q4) water for spawning and early life stages. Aside from water pollution, other pressures/threats noted relate to physical alteration of waterbodies, marine aquaculture, hydropower and abstractions (NPWS 2019b). Atlantic salmon are evaluated as being of overall Inadequate (*Stable*) conservation status nationally. This species may occur in the vicinity of the Youghal agglomeration discharges on its migration through the estuary, and the conservation objectives for this species, together with the information on water quality need to be reviewed further in the impact assessment.

Otter

Otter is widespread in the SAC (NPWS, 2012c; NPWS, 2019b; Reid et al, 2019). Otters have two basic requirements: aquatic prey and safe refuges where they can rest. This species is

dependent on fish stocks which are ultimately dependent on water quality. While no otter signs (e.g. spraints, feeding remains, paths/slides) were recorded along the surveyed stretch of the estuary in Youghal Harbour, there are records of otter from within the estuary area (NBDC, 2020)². No pressures/threats for this species are identified nationally and the overall national assessment of the conservation status of otter is Favourable (*Improving*) (NPWS, 2019b). The conservation objectives for this species, together with the information on water quality need to be reviewed further in the impact assessment.

Killarney Fern

This rare plant is found in rock gullies, crevices or caves within shaded terrestrial woodland habitat. There is no potential for the receiving waters of the Blackwater Estuary to interact with these terrestrial/freshwater valley woodland habitats. There is no pathway for effects to this qualifying interest, and therefore this species is not considered further in the impact assessment.

Ballymacoda (Clonpriest and Pillmore) SAC (000077)³

This coastal site stretches north-east from Ballymacoda to within about 6 km of Youghal, Co. Cork. Though moderate in size, it has a good diversity of coastal habitats, including several listed on Annex I of the E.U. Habitats Directive.

The site comprises the estuary of the Womanagh River, a substantial river which drains a large agricultural catchment. Part of the tidal section of the river is included in the site and on the seaward side the boundary extends to the low tide mark. The inner part of the estuary is well sheltered by a stabilised sandy peninsula (Ring peninsula). Intertidal mudflats and sandflats, which form part of the overall estuarine habitat, are well represented. The sediment types vary from muds to muddy sands in the inner part, to fine rippled sands in the outer exposed part. In the more sheltered areas the intertidal flats are colonised by mats of green algae (mostly *Enteromorpha* spp.), with brown seaweeds occurring on the rocky shores of the shingle spits.

The main channel is flanked by saltmarshes and wet fields, much of the latter being improved for agriculture. The saltmarshes are mainly classified as Atlantic salt meadows, with such species as Sea Purslane (*Halimione portulacoides*), Lax-flowered Sea Lavender (*Limonium humile*) and Sea Milkwort (*Glaux maritima*). A large area of Mediterranean salt meadows is found on the island at Clonpriest East. This saltmarsh is well-established and has a well-developed topography with a highly representative vegetation cover. A similar community is also found in the established saltmarsh along the west side of The Duck. A rarer sub-type of Mediterranean salt meadow with Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) as an indicator species is present at this site. This is a very notable population of this rare species, which is listed on the Flora (Protection) Order, 2015 and is also listed in the Red Data book.

Ballymacoda is a fine example of an estuarine complex, with intertidal flats well represented. The site is of high conservation importance because several of the habitats present are listed on Annex I of the E.U. Habitats Directive. However, there is also considerable ornithological interest;

² <https://maps.biodiversityireland.ie/Map>

³ Extracted from NPWS site synopsis dated 10.12.2015

Ballymacoda is one of the most important bird sites in the country and supports a higher number of waders than any other Co. Cork estuary of its size. It also contains important numbers of Golden Plover and Bar-tailed Godwit, two E.U. Birds Directive Annex I species, an internationally important population of Black-tailed Godwit, and nationally important numbers of a further 13 bird species.

Description of the Conservation Interests of the SAC

Annex I Habitats:

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

Ballymacoda SAC is located 4.2km to the southwest of the entrance to Youhgal Harbour, with the outer areas of the SAC located within the Youghal Bay coastal waterbody, with which the waters from the Lower Blackwater Estuary and Youghal Harbour mix. NPWS (2015a) identify that the mudflat and sandflats habitat occurs throughout the SAC with the outer coastal areas dominated by '*Sand with polychaetes and bivalves*' community complex, and the inner transitional areas by '*Sandy mud with *Hediste diversicolor* and *Tubificoides benedii**' community. The estuaries and saltmarsh habitats (Atlantic salt meadows, Mediterranean salt meadows and Salicornia habitats) associated with the SAC occur within the inner transitional waterbody of the SAC. The national conservation status and threats/pressures of significance for these habitats have been noted in the section above on the Blackwater (Cork/Waterford) SAC. Water quality interactions with the Youhgal Bay coastal waterbody cannot be precluded and therefore these qualifying interests require further consideration with regard to the potential water quality impacts of the Youghal agglomeration discharges.

Blackwater Estuary SPA (004028)⁴

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Wigeon, Golden Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew and Redshank. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. The Blackwater Estuary is of high ornithological importance for wintering waterfowl, providing good quality feeding areas for an excellent diversity of waterfowl species. At high tide, the birds roost along the shoreline and salt marsh fringe, especially in the Kinsalebeg area. The site supports an internationally important population of Blacktailed Godwit (620) and has a further seven species with nationally important populations: Wigeon (953), Golden Plover (2,628), Lapwing (3,054), Dunlin (1,807), Bar-tailed Godwit (161), Curlew (1,007) and Redshank (520) - all figures are mean peaks for the five

⁴ Extracted from NPWS Site Synopsis Dated 07.07.2014

winters 1995/96 to 1999/2000. Other species which occur include Light-bellied Brent Goose (19), Shelduck (123), Teal (407), Mallard (105), Shoveler (21), Red-breasted Merganser (7), Cormorant (43), Little Egret (12), Grey Heron (17), Oystercatcher (401), Ringed Plover (28), Grey Plover (49), Knot (43), Greenshank (25) and Turnstone (52). The site is also notable for the large concentrations of gulls that occur in autumn and winter, including Lesser Black-backed Gull (390), Black-headed Gull (345), Common Gull (253), Great Black-backed Gull (227) and Herring Gull (64). The Blackwater Estuary SPA is an internationally important wetland site on account of the population of Black-tailed Godwit it supports. It is also of high importance in a national context, with seven species having populations which exceed the thresholds for national importance. The occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these species are listed on Annex I of the E.U. Birds Directive. The Blackwater Estuary is also a Ramsar Convention site.

Description of the Conservation Interests of the SPA

- Wigeon (*Anas penelope*) [A050]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Dunlin (*Calidris alpina*) [A149]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Bar-tailed Godwit (*Limosa lapponica*) [A157]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Wetland and Waterbirds [A999]

With regard to the conservation condition of the birds in the site (NPWS, 2012d); 3 species are currently considered as Highly Unfavourable (Wigeon, Dunlin and Bar-tailed Godwit); 1 species is currently considered as Unfavourable (Curlew); 2 species are currently considered as Intermediate (Unfavourable) (Golden Plover & Lapwing); and 2 species are currently considered as Favourable (Black-tailed Godwit & Redshank). All wader species utilise intertidal mudflats and sandflats and have a wide prey/food range. The dabbling duck species Wigeon additionally uses shallow subtidal and saltmarsh areas and has narrower prey/food requirements.

Mean iWeBS data for the period 2008/09 – 2017/18⁵ indicates that Wigeon, Curlew and Redshank maintain on average numbers of national importance, with black-tailed godwit maintaining on average numbers of international importance. The numbers and trends of other birds species are highly variable with notable declines relative to 2008/2009 for Golden Plover, Lapwing and Dunlin.

These qualifying interests and their supporting wetland habitat are all found in the Blackwater estuary, and therefore potential water quality impacts from the Youghal agglomeration require further consideration.

⁵ <https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/>

Ballymacoda Bay SPA (004023)

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Wigeon, Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull and Lesser Black-backed Gull. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. Ballymacoda Bay is of high ornithological importance for supporting an excellent diversity and large number of wintering waterbirds – it is of international importance because it regularly supports an assemblage of over 20,000 birds. The site provides both feeding and roosting areas for the birds. Furthermore, both Golden Plover (10,920) and Black-tailed Godwit (765) occur here in internationally important numbers (all counts given are mean peaks for the five year period 1995/96- 1999/2000). A further eleven species of waders and ducks occur here in nationally important numbers, i.e. Wigeon (907), Teal (887), Ringed Plover (153), Grey Plover (535), Lapwing (4,063), Sanderling (98), Dunlin (3,192), Bar-tailed Godwit (581), Curlew (1,145), Redshank (357) and Turnstone (137). The site is also notable for supporting nationally important populations of some gull species in autumn and winter: Black-headed Gull (1,560), Common Gull (1,120) and Lesser Black-backed Gull (5,051). A total of 107 species were recorded from the site between 1971 and 1988. Ballymacoda Bay SPA is one of the most important sites in the country for wintering waterfowl. It qualifies for international importance on the basis of regularly exceeding 20,000 wintering birds, but also for its Golden Plover and Black-tailed Godwit populations. In addition, it supports nationally important populations of a further fourteen species. Two of the species which occur, Golden Plover and Bartailed Godwit, are listed on Annex I of the E.U. Birds Directive. Ballymacoda Bay is also a Ramsar Convention site.

Description of the Conservation Interests of the SPA

- Wigeon (*Anas penelope*) [A050]
- Teal (*Anas crecca*) [A052]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Grey Plover (*Pluvialis squatarola*) [A141]
- Lapwing (*Vanellus vanellus*) [A142]
- Sanderling (*Calidris alba*) [A144]
- Dunlin (*Calidris alpina*) [A149]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Bar-tailed Godwit (*Limosa lapponica*) [A157]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Turnstone (*Arenaria interpres*) [A169]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Common Gull (*Larus canus*) [A182]
- Lesser Black-backed Gull (*Larus fuscus*) [A183]
- Wetland and Waterbirds [A999]

NPWS (2014) identify that 6 species are currently considered as Highly Unfavourable (Lapwing, Dunlin, Curlew, Black-headed Gull, Common Gull and Lesser Black-backed Gull); 1 species is currently considered as Unfavourable (Golden Plover); 3 species are currently considered as Intermediate Unfavourable (Wigeon, Ringed Plover and Grey Plover); and 6 species are currently considered as Favourable (Teal, Sanderling, Black-tailed Godwit, Bar-tailed Godwit, Redshank and Turnstone). The mean iWeBS data for the period 2008/09 – 2017/18⁶ indicates that Golden Plover, Dunlin, Black-tailed Godwit and Bar-tailed Godwit maintain on average numbers of national importance, with no species associated with this SPA maintaining numbers of international importance. Counts of other birds species have been highly variable in recent years.

All species feed in the intertidal mud and sand flats, with the gulls additionally feeding in the sheltered and shallow subtidal areas of the inner estuary and outer bay. With the exception of Wigeon all species have wide foraging/prey requirements. The possibility that supporting habitats could be at risk from any potential water quality impacts arising from the Youghal agglomeration requires consideration. The possibility that populations may forage away from their key grounds and travel to the Blackwater Estuary is also considered. Species with high site fidelity (Ringer Plover, Grey Plover, Sanderling, Dunlin, Black-tailed Godwit, Curlew and Turnstone) are not expected to mix with populations in the Blackwater estuary, however other species have moderate or weak site fidelity and may frequent that site.

Helvick Head to Ballyquin SPA (004192)⁷

Helvick Head to Ballyquin SPA is a linear site situated on the south-west coast of Co. Waterford. It includes the sea cliffs and land adjacent to the cliff edge between Helvick Head in the east and Ballyquin townland in the south-west. The high water mark forms the seaward boundary, except around Helvick Head where the adjacent sea area to a distance of 500 m from the cliff base is included. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Chough, Peregrine, Cormorant, Herring Gull and Kittiwake. The site supports a nationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive; 11 breeding pairs were recorded from the site in the 1992 survey and 11 pairs in the 2002/03 survey. The low heath and agricultural farmland on the cliff tops provides good foraging habitat for this species. The site is also of importance for its Peregrine population (5 pairs in 2002). In addition, the site has important breeding seabird populations, centered around Helvick Head. Nationally important populations of Cormorant (65 pairs), Herring Gull (117 pairs) and Kittiwake (1,037 pairs) occur, as well as smaller populations of other breeding seabirds: Razorbill (28 pairs), Fulmar (135 pairs), Shag (6 pairs), Guillemot (664 pairs), Great Black-backed Gull (8 pairs) and Black Guillemot (10 individuals) – all seabird data from 1999. Raven breed on the cliffs and there is a cliff-nesting colony of House Martins. Other species which breed within the site include Rock Pipit and Stonechat. The seabird colony at Helvick Head has been monitored at intervals since the Operation Seafarer project in 1969/70. In addition, more detailed population studies have been carried out on the Kittiwake colony. The Helvick Head to Ballyquin SPA is an important site for Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive. It

⁶ <https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/>

⁷ Extracted from NPWS Site Synopsis Dated 20.01.2015

also supports a range of breeding seabirds, including populations of Cormorant, Herring Gull and Kittiwake of national importance.

Description of the Conservation Interests of the SPA

- Cormorant (*Phalacrocorax carbo*) [A017]
- Peregrine (*Falco peregrinus*) [A103]
- Herring Gull (*Larus argentatus*) [A184]
- Kittiwake (*Rissa tridactyla*) [A188]
- Chough (*Pyrrhocorax pyrrhocorax*) [A346]

The SPA is designated for breeding seabirds. Any link to the Blackwater Estuary would be via potential water quality impacts to prey species. This is not relevant to Chough which feed on coastal grasslands. Cormorant and Kittiwake feed on fish, Herring Gull are omnivores and scavengers, while Peregrine feed on other birds. The possibility that any potential water quality impacts associated with the Youghal agglomeration could impact upon prey species therefore requires consideration.

Conservation Objectives of the SAC's

The conservation objectives for qualifying interests of the relevant SAC's that could potentially be impacted by the discharge are detailed below. In summary these are as follows:

Blackwater River (Cork/Waterford) SAC –

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0]
- *Margaritifera* (Freshwater Pearl Mussel) [1029]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Alosa fallax* (Twaiite Shad) [1103]
- *Salmo salar* (Salmon) [1106]
- *Lutra* (Otter) [1355]

Ballymacoda (Clonpriest and Pillmore) SAC -

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

Article 6 of the Habitats Directive states that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's conservation objectives.

The importance of a site designated under the Habitats Directive is defined by its qualifying features or interests. Qualifying interests for any Natura 2000 site are listed on a *pro forma*, called the Natura 2000 standard data form, which forms the basis of the rationale behind designation, and informs the Conservation Management Plan for targeted management and monitoring of key species and habitats.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The attributes and targets of the detailed conservation objectives for the relevant qualifying interests of the SAC's are presented below.

River Blackwater (Cork/Waterford) SAC

Site specific conservation objectives are available for this SAC (NPWS, 2012c) and are described below.

Estuaries

To maintain the favourable conservation condition of Estuaries in River Blackwater (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Permanent habitat area stable or increasing subject to natural processes.
- Attribute: Community Extent;
Target: Maintain the extent of the *Mytilus edulis*-dominated community, subject to natural processes.
- Attribute: Community Structure – *Mytilus edulis* density;

Target: Conserve the high quality of the *Mytilus edulis* -dominated community, subject to natural processes.

Attribute: Community Distribution;

Target: Conserve the following community types in a natural condition – Intertidal estuarine sandy mud community complex; Subtidal estuarine fine sand with *Bathyporeia* spp. community complex; Sand and mixed sediment with polychaetes and crustaceans community complex; Coarse sediment community complex.

Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in River Blackwater (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Permanent habitat area stable or increasing subject to natural processes.
- Attribute: Community Extent;
Target: Maintain the extent of the *Zostera*-dominated community and the *Mytilus edulis*-dominated community, subject to natural processes.
- Attribute: Community Structure – *Zostera* shoot density;
Target: Conserve the high quality of the *Zostera*-dominated community, subject to natural processes.
- Attribute: Community Structure – *Mytilus edulis* density;
Target: Conserve the high quality of the *Mytilus edulis* -dominated community, subject to natural processes.
- Attribute: Community Distribution;
Target: Conserve the following community types in a natural condition – Intertidal estuarine sandy mud community complex and Sand and mixed sediment with polychaetes and crustacean community complex.

***Salicornia* and other annuals colonising mud and sand**

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in River Blackwater (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Area stable or increasing subject to natural processes, including erosion and succession.
- Attribute: Habitat Distribution;
Target: No decline, or change in habitat distribution, subject to natural processes.
- Attribute: Physical structure-sediment supply;
Target: Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.
- Attribute: Physical structure – creeks and pans;
Target: Maintain creek and pan structure, subject to natural processes including erosion and succession.
- Attribute: Physical structure-flooding regime;
Target: Maintain natural tidal regime.
- Attribute: Vegetation structure - zonation;

Target: Maintain the range of coastal habitats including transition zones, subject to natural processes including erosion and succession.

- Attribute: Vegetation structure – vegetation height;
Target: Maintain structural vegetation within sward.
- Attribute: Vegetation structure – vegetation cover;
Target: Maintain more than 90% of area outside creeks vegetated.
- Attribute: Vegetation composition – typical species and sub-communities;
Target: Maintain the presence of species-poor communities listed in Saltmarsh Monitoring Project report.
- Attribute: Vegetation structure – negative indicator species – *Spartina anglica*;
Target: No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Atlantic Salt Meadows

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: The permanent habitat area is stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped Kinsalebeg 2.27ha.
- Attribute: Habitat Distribution;
Target: No decline or change in habitat distribution, subject to natural processes.
- Attribute: Physical structure (Sediment supply) – Physical Barriers;
Target: Maintain the natural circulation of sediments and organic matter without any physical obstructions.
- Attribute: Physical structure (Creeks & Pans);
Target: Maintain/Restore creek and pan structure, subject to natural processes, including erosion and succession.
- Attribute: Physical structure – flooding regime;
Target: Maintain natural tidal regime.
- Attribute: Vegetation structure – Zonation;
Target: Maintain range of coastal habitat including transitional zones, subject to natural processes including erosion and succession.
- Attribute: Vegetation structure – Vegetation height;
Target: Maintain structural vegetation within sward.
- Attribute: Vegetation structure – Vegetation cover;
Target: Maintain more than 90% of area outside creeks vegetated.
- Attribute: Vegetation composition – Typical species and sub-communities;
Target: Maintain range of sub-communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
- Attribute: Vegetation composition – Negative Indicator species – *Spartina anglica*;
Target: No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Mediterranean Salt Meadows

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the Blackwater River (Cork/Waterford) SAC,, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: The permanent habitat area is stable or increasing subject to natural processes including erosion and succession. For sub-site mapped Kinsalebeg 1.36ha.
- Attribute: Habitat Distribution;
Target: No decline or change in habitat distribution, subject to natural processes.
- Attribute: Physical structure (Sediment supply)– Physical Barriers;
Target: Maintain the natural circulation of sediments and organic matter without any physical obstructions.
- Attribute: Physical structure (Creeks & Pans);
Target: Maintain/Restore creek and pan structure, subject to natural processes, including erosion and succession.
- Attribute: Physical structure – flooding regime;
Target: Maintain natural tidal regime.
- Attribute: Vegetation structure – Zonation;
Target: Maintain range of coastal habitat including transitional zones, subject to natural processes including erosion and succession.
- Attribute: Vegetation structure – Vegetation height;
Target: Maintain structural vegetation within sward.
- Attribute: Vegetation structure – Vegetation cover;
Target: Maintain more than 90% of area outside creeks vegetated.
- Attribute: Vegetation composition – Typical species and sub-communities;
Target: Maintain range of sub-communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
- Attribute: Vegetation composition – Negative Indicator species – *Spartina anglica*;
Target: No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Vegetation of Flowing Waters

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat distribution;
Target: No decline, subject to natural processes.
- Attribute: Habitat Area;
Target: Area stable or increasing, subject to natural processes.
- Attribute: Hydrological regime - river flow,
Target: Maintain appropriate hydrological regimes.
- Attribute: Hydrological regime – tidal influence;
Target: Maintain natural tidal regime
- Attribute: Substratum composition - particle size range;

Target: The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (typically sands, gravels and cobbles).

- Attribute: Water quality - nutrients;

Target: The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition.

- Attribute: Vegetation composition - typical species;

Target: Typical species of the relevant habitat sub-type should be present and in good condition.

- Attribute: Floodplain connectivity – area;

Target: The area of active floodplain at and upstream of the habitat should be maintained.

Alluvial forests

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Area stable or increasing subject to natural processes, at least 19.2ha for sites surveyed.
- Attribute: Habitat Distribution;
Target: No decline.
- Attribute: Woodland size;
Target: Area stable or increasing. Where topographically possible, “large”, woods at least 25ha in size and “small” woods at least 3ha in size.
- Attribute: Woodland structure – cover and height;
Target: Diverse structure with a relatively closed canopy containing mature trees, subcanopy later with semi-mature trees and shrubs, and well-developed herb layer.
- Attribute: Woodland structure – community diversity and extent;
Target: Maintain diversity and extent of community types.
- Attribute: Woodland structure – natural regeneration;
Target: Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy.
- Attribute: Hydrological regime – flooding depth/height of water table;
Target: Appropriate hydrological regime necessary for maintenance of alluvial vegetation.
- Attribute: Woodland structure – dead wood
Target: At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)..
- Attribute: Woodland structure – veteran trees;
Target: No decline.
- Attribute: Woodland structure – indicators of local distinctiveness;
Target: No decline.
- Attribute: Vegetation composition – native tree cover;
Target: No decline. Native tree cover not less than 95%
- Attribute: Vegetation composition - typical species;

Target: A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa*), willows (*Salix* spp.), oak (*Quercus robur*) and ash (*Fraxinus excelsior*).

- Attribute: Vegetation composition – negative indicator species;
Target: Negative indicator species, particularly non-native invasive species, absent of under control.

Sea Lamprey

To restore the favourable conservation condition of Sea Lamprey in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: Greater than 75% of main stem length of rivers accessible from estuary.
- Attribute: Population structure of juveniles;
Target: At least three age/size groups present.
- Attribute: Juvenile density in fine sediment;
Target: Mean catchment juvenile density of brook/river lamprey at least 1/m².
- Attribute: Extent and distribution of spawning habitat;
Target: No decline in extent and distribution of spawning beds.
- Attribute: Availability of juvenile habitat;
Target: More than 50% of sample sites positive.

River Lamprey

To maintain the favourable conservation condition of River Lamprey in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: Access to all water courses down to first order streams.
- Attribute: Population structure of juveniles;
Target: At least three age/size groups of brook/river lamprey present.
- Attribute: Juvenile density in fine sediment;
Target: Mean catchment juvenile density of brook/river lamprey at least 2/m².
- Attribute: Extent and distribution of spawning habitat;
Target: No decline in extent and distribution of spawning beds.
- Attribute: Availability of juvenile habitat;
Target: More than 50% of sample sites positive.

Atlantic Salmon

To maintain the favourable conservation condition of Atlantic Salmon in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: 100% of river channels down to second order accessible from estuary.
- Attribute: Adult spawning fish;
Target: Conservation limit (CL) for each system consistently exceeded.
- Attribute: Salmon fry abundance;
Target: Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5min sampling.
- Attribute: Out-migrating smolt abundance;
Target: No significant decline.

- Attribute: Number and distribution of redds;
Target: No decline in number and distribution of spawning redds due to anthropogenic causes.
- Attribute: Water quality;
Target: At least Q4 at all sites sampled by EPA.

Freshwater Peal Mussel

To restore the favourable conservation condition of the Freshwater Pearl Mussel in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: Maintain at 161km.
- Attribute: Population size;
Target: Restore to 35,000 adult mussels.
- Attribute: Population structure - recruitment;
Target: Restore to at least 20% of the population no more than 65mm in length, and at least 5% of population no more than 30mm in length.
- Attribute: Population structure – adult mortality;
Target: No more than 5% decline from previous number of live adults counted, dead shells less than 1% of the adult population and scattered in distribution.
- Attribute: Habitat extent;
Target: Restore suitable habitat in more than 35km and any additional stretches necessary for salmonid spawning.
- Attribute: Water quality – macroinvertebrate and phytobenthos (diatoms);
Target: Restore water quality-macroinvertebrate EQR greater than 0.90 phytobenthos EQR greater than 0.93.
- Attribute: Substratum quality – filamentous algae (macroalgae), macrophytes (rooted higher plants);
Target: Restore substratum quality – filamentous algae absent or trace (<5%) macrophytes absent or trace (<5%).
- Attribute: Substratum quality - sediment;
Target: Restore substratum quality - stable cobble and gravel substrate with very little fine material, no artificially elevated levels of fine sediment.
- Attribute: Substratum quality – oxygen availability;
Target: Restore no more than 20% decline from water column to 5cm depth in substrate.
- Attribute: Hydrological regime -flow variability;
Target: Restore appropriate hydrological regimes.
- Attribute: Host fish;
Target: Maintain sufficient juvenile salmonids to host glochidial larvae.

Twaite Shad

To restore the favourable conservation condition of Twaite Shad in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: Greater than 75% of main stem length of rivers accessible from estuary.
- Attribute: Population structure;

- Target: More than one age class present.
- Attribute: Extent and distribution of spawning habitat;
Target: No decline in extent and distribution of spawning habitats.
- Attribute: Water Quality – Oxygen Levels;
Target: No lower than 5mg/l.
- Attribute: Spawning habitat quality - Filamentous algae, macrophytes, sediment;
- Target: Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth.

Otter

To *restore* the favourable conservation condition of Otter in the Blackwater River (Cork/Waterford) SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: No significant decline.
- Attribute: Extent of terrestrial habitat;
Target: No significant decline. Area mapped and calculated as 1103ha above high water mark, 1165.7ha along river banks/around ponds.
- Attribute: Extent of marine habitat;
Target: No significant decline. Area mapped and calculated as 647.2ha.
- Attribute: Extent of freshwater (river) habitat;
Target: No significant decline. Length mapped and calculated as 599.54ha.
- Attribute: Extent of freshwater (lake) habitat;
Target: No significant decline. Area mapped and calculated as 25.06ha.
- Attribute: Couching sites and holts;
Target: No significant decline.
- Attribute: Fish biomass available;
Target: No significant decline.
- Attribute: Barriers to connectivity;
Target: No significant increase.

Ballymacoda (Clonpriest and Pillmore) SAC

Site specific conservation objectives are available for this SAC (NPWS, 2015a) and are described below.

Estuaries

To maintain the favourable conservation condition of Estuaries in Ballymacoda (Clonpriest and Pillmore) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Permanent habitat area stable or increasing subject to natural processes.
- Attribute: Community Distribution;
Target: Conserve the following community types in a natural condition – Sandy mud with Hediste diversicolor and Tubificoides benedii community; Sand with polychaetes and bivalves community complex.

Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Ballymacoda (Clonpriest and Pillmore) SAC, which is defined by the following list of attributes and targets::

- Attribute: Habitat Area;
Target: Permanent habitat area stable or increasing subject to natural processes.
- Attribute: Community Distribution;
Target: Conserve the following community types in a natural condition – Sandy mud with *Hediste diversicolor* and *Tubificoides benedii* community; Sand with polychaetes and bivalves community complex.

Salicornia and other annuals colonising mud and sand

To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Ballymacoda (Clonpriest and Pillmore) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;
Target: Area stable or increasing subject to natural processes, including erosion and succession. For sub-sites mapped Ballymacoda 1.57ha.
- Attribute: Habitat Distribution;
Target: No decline, or change in habitat distribution, subject to natural processes.
- Attribute: Physical structure-sediment supply;
Target: Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.
- Attribute: Physical structure – creeks and pans;
Target: Maintain creek and pan structure, subject to natural processes including erosion and succession.
- Attribute: Physical structure-flooding regime;
Target: Maintain natural tidal regime.
- Attribute: Vegetation structure - zonation;
Target: Maintain the range of coastal habitats including transition zones, subject to natural processes including erosion and succession.
- Attribute: Vegetation structure – vegetation height;
Target: Maintain structural vegetation within sward.
- Attribute: Vegetation structure – vegetation cover;
Target: Maintain more than 90% of area outside creeks vegetated.
- Attribute: Vegetation composition – typical species and sub-communities;
Target: Maintain the presence of species-poor communities listed in Saltmarsh Monitoring Project report.
- Attribute: Vegetation structure – negative indicator species – *Spartina anglica*;
Target: No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Atlantic Salt Meadows

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Ballymacoda (Clonpriest and Pillmore) SAC, which is defined by the following list of attributes and targets:

- Attribute: Habitat Area;

Target: The permanent habitat area is stable or increasing subject to natural processes including erosion and succession. For sub-site mapped Ballymacoda 28.3ha.

- Attribute: Habitat Distribution;
Target: No decline or change in habitat distribution, subject to natural processes.
- Attribute: Physical structure (Sediment supply)– Physical Barriers;
Target: Maintain the natural circulation of sediments and organic matter without any physical obstructions.
- Attribute: Physical structure (Creeks & Pans);
Target: Maintain/Restore creek and pan structure, subject to natural processes, including erosion and succession.
- Attribute: Physical structure – flooding regime;
Target: Maintain natural tidal regime.
- Attribute: Vegetation structure – Zonation;
Target: Maintain range of coastal habitat including transitional zones, subject to natural processes including erosion and succession.
- Attribute: Vegetation structure – Vegetation height;
Target: Maintain structural vegetation within sward.
- Attribute: Vegetation structure – Vegetation cover;
Target: Maintain more than 90% of area outside creeks vegetated.
- Attribute: Vegetation composition – Typical species and sub-communities;
Target: Maintain range of sub-communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
- Attribute: Vegetation composition – Negative Indicator species – *Spartina anglica*;
Target: No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Conservation Objectives of the SPA's

The conservation objectives for qualifying interests of the relevant SPA's that could potentially be impacted by the discharges are detailed below.

Blackwater Estuary SPA

Site specific conservation objectives are available for this SPA (NPWS, 2012e) and are described below.

For all qualifying interests:

To maintain the favourable conservation condition of the QI's in Blackwater Estuary SPA, which is defined by the following list of attributes and targets:

- Attribute: Population trend;
Target: Long term population trend stable or increasing.
- Attribute: Distribution
Target: There should be no significant decrease in the range, timing or intensity of use of areas by the QI, other than that occurring from natural patterns of variation.

To maintain the favourable conservation condition of the wetland habitat in Blackwater Estuary

SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

- Attribute: Wetland habitat;
Target: The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 871ha, other than that occurring from natural patterns of variation.

Ballymacoda Bay SPA

Site specific conservation objectives are available for this SPA (NPWS, 2015b) and are described below.

For all qualifying interests:

To maintain the favourable conservation condition of the QI's in Ballymacoda Bay SPA, which is defined by the following list of attributes and targets:

- Attribute: Population trend;
Target: Long term population trend stable or increasing.
- Attribute: Distribution
Target: There should be no significant decrease in the range, timing or intensity of use of areas by the QI, other than that occurring from natural patterns of variation.

To maintain the favourable conservation condition of the wetland habitat in Ballymacoda Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

- Attribute: Wetland habitat;
Target: The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 602ha, other than that occurring from natural patterns of variation.

Helvick Head to Ballyquin SPA

Generic conservation objectives only are available for this SPA (NPWS, 2020) which define the following conservation objective:

- To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

Impact Prediction

The potential impacts on water quality from the primary discharge and SWO's, considering current and future discharge loading scenarios at Dunn's Park, alone and cumulatively with other catchment pressures are discussed below. The potential for water quality impacts to give rise to significant effects on the qualifying interests of the relevant SAC's and SPA's is then considered.

Impacts on water quality

The water quality in the Lower Blackwater Estuary, which receives inputs of treated wastewater from Youghal WwTP and intermittent compliant diluted overflow discharges, maintains Good/High status requirements for relevant nutrient parameters, based on both modelled and monitored data, demonstrating that the discharges from the Youghal agglomeration are not currently, and will not in the future, impact on the receiving water quality. In spite of this, the waterbody has been assigned Moderate WFD status and is Intermediate in terms of trophic status. The Moderate WFD status is driven by Moderate Phytoplankton status and Moderate Angiosperm status.

Angiosperm status relates to an assessment of the condition of saltmarshes, and the Lower Blackwater Estuary saltmarsh is Moderate due to future prospects relating to the invasion of *Spartina anglica* (Brophy et al, 2019). With regards to Phytoplankton blooms, eutrophication processes are controlled by complex interactions between many biological (grazing and growth rates), chemical (nutrient limitation) and physical (mixing and advection) factors, and the combinations of these factors are unique to any given estuary (Ni Longphuirt & Stengel, 2016).

The catchment assessment for the Blackwater catchment (EPA, 2018) identified that the Lower Blackwater Estuary and Youghal Bay waterbodies are being impacted by excess nutrients, leading to problems with phytoplankton and macroalgae, respectively. Load apportionment modelling indicates that urban waste water contributes <5% of the N load and that agriculture contributes 90%. The estuary is understood to be river dominated (O'Boyle et al, 2015) and so inputs of nutrients from the catchment is the main driver the nutrient dynamics in the estuary, as compared to other estuaries that are primarily influenced by marine sources of nutrients. That said, the Youghal Harbour section of the Lower Blackwater Estuary will be the area most influenced by marine waters owing to its location.

Phytoplankton growth in the estuary is currently understood to be limited by Phosphorus and light levels, with a potential shift towards Nitrogen limitation in the summer months when salinity increases (O'Boyle et al, 2015). Past improvements in trophic status in the Lower Blackwater have been attributed to success in reducing Phosphorous loadings from the riverine catchment, with consequent reductions in algal growth (O'Boyle et al, 2015). Ni Longphuirt et al (2015) identified that while decreasing fertilizer application rates in the Blackwater catchment have resulted in reductions in Phosphorus concentrations in the Blackwater estuary, the less significant reduction in Nitrogen inputs have not translated to any reduction in Nitrogen concentrations in the estuary (i.e. there is a decoupling between Nitrogen loads and catchment responses). It has been highlighted that further reductions in agricultural losses of nitrogen will be required to address the balance of inputting nutrients and improve ecological status in the estuary (EPA,2018).

While the Moderate status does not align with the water quality (chemistry) within the estuary, which meets Good/High standards status, it is manifesting in the Phytoplankton concentrations indicative of algal blooms in the wider estuary waterbody. Aside from the concentrations of nutrients, it appears that the relative balance of N:P in an estuary can trigger complex nutrient driven reactions (Ni Longphuirt et al, 2015). Phytoplankton and Macroalgal quality indicators can become elevated due to processes triggered by the balance between Nitrogen and Phosphorous

levels relating to the relative inputs of freshwater and seawater, biogeochemical processes (e.g. release of nutrient pools from sediments) within the estuary, as well as other factors such as light, temperature and hydrological processes.

The Lower Blackwater Estuary is an extensive waterbody extending north towards Cappoquin. Ni Longphuirt et al (2015) note that conditions are more compatible with phytoplankton growth in the upper estuary due to a longer residence time and increased light availability which would be more compatible with phytoplankton growth. In the more coastal Youghal Harbour they note that the dilution of riverine nutrient loadings by the low Nitrogen and Phosphorous concentrations found in marine waters dominate the nutrient cycling and greatly reduce the primary production in this area in comparison to upstream tidal reaches.

The water quality modelling undertaken for the Youghal primary discharge takes into account any additional pressures through the use of background data which captures the impacts arising in the entire Blackwater catchment. The catchment characterisation report identifies the main water quality pressures as follows:

- Significant pressures have been identified through the initial characterisation process in 86 surface water bodies, 55 of which have multiple pressures.
- The significant pressure affecting the greatest number of river water bodies is agriculture, followed by forestry, hydromorphological pressures, urban waste water, other pressures (unknown and waste), industry, diffuse urban, mines and quarries, and domestic waste water).
- The significant pressure affecting the greatest number of TraC (Transitional and Coastal) water bodies is agriculture.

The contribution of Youghal WwTP in the context of upstream riverine pressures has been subject to detailed modelling and monitoring. The results of the model, together with monitoring data, demonstrate that the Youghal discharges do not affect the concentrations or balance of nutrients in the estuary and as a result the treated effluent is not hindering the maintenance of Good/High water quality status, or contributing to risks of phytoplankton or macroalgal blooms.

Adverse effects on Annex I Habitats

The discharges are directly into 'tidal mudflats and sandflats' and 'estuaries' habitat. The NPWS mapping was confirmed by IW surveys in these areas in 2016 (Figure 3.0) though these were primarily aimed at establishing the location of mussel beds. The conservation objectives for tidal mudflats and sandflats is to conserve the marine communities in a natural condition, and there are specific objectives set for mussel and zostera habitat. As is evident from Figure 3.0 compared with the findings of the modelling report, the plumes of dispersing effluent do not result in formal mixing zones (within which nutrient EQS's are exceeded) for any modelled scenario, and these plumes do not interact with mussel or zostera habitat. There are limited mixing zones (defined as the areas where 'Excellent' bathing status is not met) as a result of the dispersing coliform parameter plumes for winter scenarios 4 and 6, however compared with Figure 3.0 these mixing zones do not interact with mussel habitat. Furthermore the conservation condition of these habitats within the SAC is currently Favourable demonstrating that even in the context of the past untreated discharges favourable conservation condition was maintained.

The Saltmarsh/Salicornia habitats and Alluvial forest habitat within the River Blackwater (Cork/Waterford) SAC do not have any prescribed water quality objectives, though there could be indirect relationships between water quality conditions and other objectives (e.g. extent of the habitat). None of these habitats occur within or near the discharge plumes. As good/high water quality conditions are being maintained with the treated discharge, there is no potential for adverse effects to these habitats.

The conservation objectives for 'Vegetation of flowing waters' include an objective to maintain the concentration of nutrients in the water column low enough to prevent changes in species composition or habitat condition. Opposite-leaved pondweed habitat, the sub-type potentially occurring within the estuary, is typically found in canals, drains and slow-flowing rivers, though has been found growing in tidal reaches of the River Blackwater and River Slaney. It tends to characterise sites of intermediate fertility (Hill et al, 1999). As good/high water quality conditions are being maintained with the treated discharge, there is no potential for adverse effects to this habitat.

The Annex I habitats of Ballymacoda Bay SAC are far removed from the Youghal agglomeration discharges. Water quality modelling demonstrates that there are no effective mixing zones for nutrient parameters, with the supporting conditions for the transitional estuary waterbody WFD status and the coastal waterbody WFD status of Youghal Bay met throughout these waterbodies. As good/high water quality conditions are being maintained with the treated discharge, there is no potential for adverse effects to these habitats.

Adverse effects on Annex II Species

Sea and River lamprey have no prescribed conservation objectives relating to water quality, though there could be indirect relationships between water quality conditions and other objectives (e.g. juvenile density, extent of spawning habitat). Salmon require Q4 status to be maintained in freshwater, while there is no prescribed water quality objectives for the transitional or marine waters through which they migrate. For lamprey and salmon however, any significant pollution event in the estuarine or marine environment could act as a chemical barrier to migration or interfere with salmon and lamprey spawning habitat. Ammonia must also be considered as it is known to pose the most risk to salmon the marine environment, particularly in its unionized form. There are no standards set in Ireland for Ammonia or unionized ammonia in marine waters, however based on a comprehensive review by Johnson et al (2007) the UK proposed a standard of < 0.021 mg/l and other jurisdictions have determined that in the absence of sufficient data to identify marine standards the more protective freshwater criteria should apply (Meays, 2009). The modelling study for Youghal demonstrated that unionized Ammonia concentrations are predicted to be <0.001mg/l, well below the UK standard, while Total Ammonia is below 0.05mg/l which is below the freshwater High status EQS.

While these species may spend time in the estuary in the vicinity of the Youghal discharges, the water quality modelling demonstrates that as conditions in the estuarine waters within Youghal Harbour will not be significantly affected by the discharge, and as overflows are compliant, there

is no potential for pollution events to arise, and consequently for any adverse effects to these species.

Freshwater pearl mussel are considered due to the life-cycle dependence on salmonids on which the juvenile mussels rely as hosts, with an indirect link to the conservation objectives relating freshwater pearl mussel population structure. As demonstrated above there are no predicted adverse effects to salmon (or similarly other salmonid species) and therefore the supporting conditions for freshwater pearl mussel will not be adversely affected.

The conservation objectives for Twaite shad specify that oxygen levels must be <5mg/l and spawning gravels must be free of fine sediments, macroalgae and rooted macrophytes. The 5mg/l limit is based on research by Maas et al (2008), who found that poor DO conditions near the tidal limit of estuaries can interfere with upstream and downstream migration to and from spawning beds. NPWS mapping (NPWS, 2012c; Figure 3.0) indicates that coarse sediment habitat is present within the estuary, though it is unknown whether this habitat could be used for spawning, with spawning only recorded further upstream at Clashmore. While the TSAS assessment points to DO conditions failing TSAS requirements for the waterbody as a whole, the data presented in Table 2.0 indicates that DO (% Saturation) conditions in Youghal Harbour meet the High status requirements in the Surface Water Regulations. Furthermore as the water quality modelling demonstrates that conditions in the estuarine waters within Youghal Harbour will not be significantly affected by the discharge, and overflows are compliant, there is no potential for any adverse effects to this species.

Otter have no prescribed conservation objectives relating to water quality, though there could be indirect relationships between water quality conditions and other objectives (e.g. fish biomass, extent of freshwater/marine habitat). While they may forage throughout the estuary in the vicinity of the Youghal discharges, the water quality modelling demonstrates that conditions in the estuarine waters within Youghal Harbour will not be significantly affected by the discharge, with no consequent effects for otter habitat or prey species. As good/high water quality conditions are being maintained with the treated discharge, and as overflows are compliant, there is no potential for any adverse effects to this species.

Significant effects on SPA Bird Species

There are no prescribed conservation objectives relating to water quality for the qualifying interests of the SPA's, though there could be indirect relationships between water quality conditions and other objectives (distribution, extent of wetland habitat). While the bird species associated with the 3 SPA's considered may roost and forage throughout the estuary in the vicinity of the Youghal discharges, the water quality modelling demonstrates that conditions in the estuarine waters within Youghal Harbour will not be significantly affected by the discharge, with no consequent effects for bird roost areas or foraging resources. As good/high water quality conditions are being maintained with the treated discharge, and overflows are compliant, there is no potential for any adverse effects to these species.

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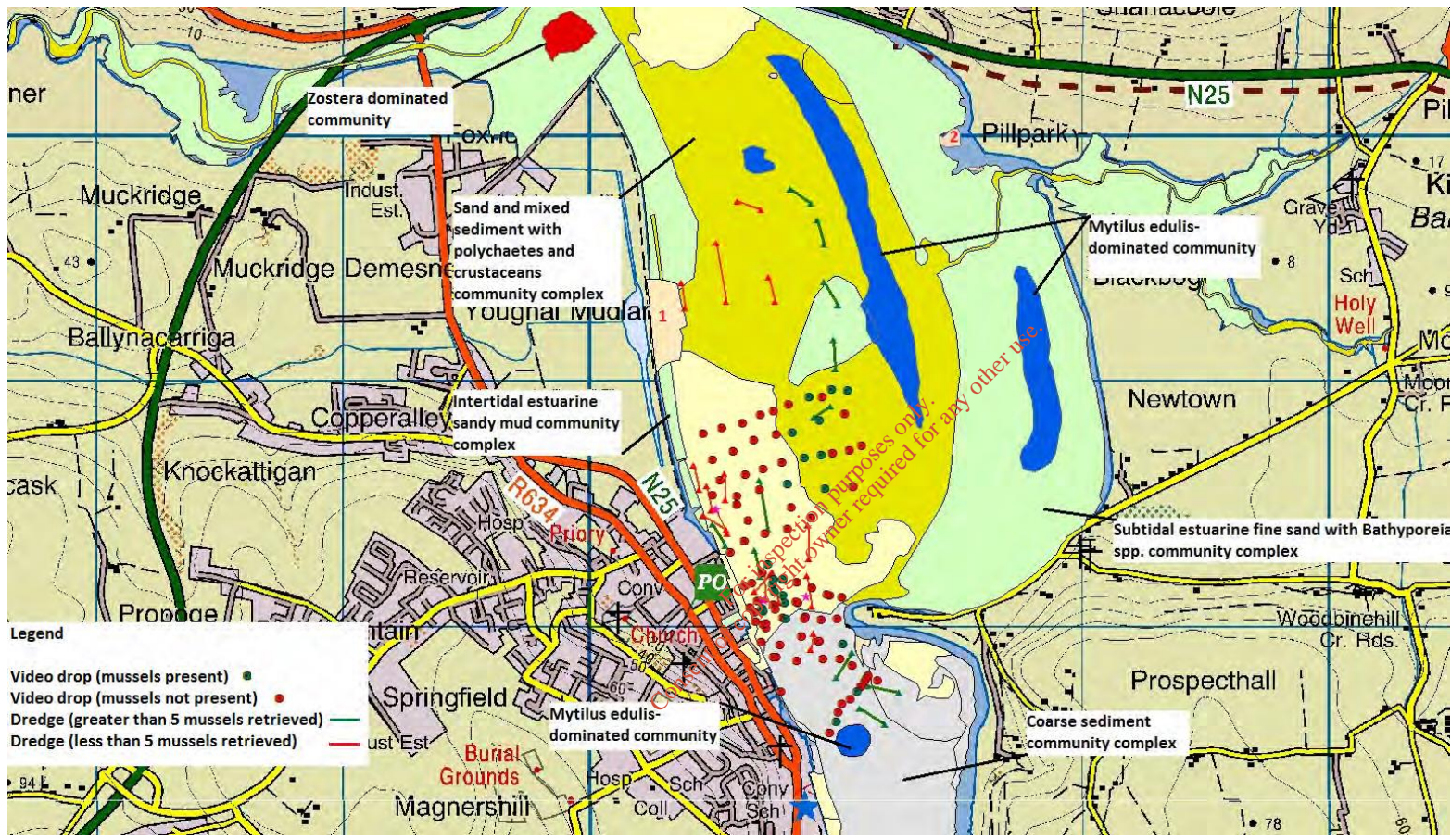


Figure 3.0 NPWS Community Mapping showing dredge and video points where mussels were recorded in a 2016 survey for Irish Water

Mitigation Measures

The assessment has concluded that the discharges (current or future loadings) from Youghal WwTP agglomeration do not have the potential to adversely affect the qualifying interests of the Blackwater River (Cork/Waterford) SAC, Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater Estuary SPA, Ballymacoda Bay SPA and Helvick Head to Ballyquin SPA. Consequently, there is no requirement for mitigation measures.

To ensure continued satisfactory operation of the Youghal plant in line with the discharge licence the authors recommend the following:

- Ensure that the capacity of the WwTP is not exceeded;
- Ensure all discharges continue to operate in compliance with the ELV's/relevant SWO guidelines; and
- Continue monitoring the effluent and receiving waters, on a consistent and regular basis.

NIS Conclusion Statement

This NIS has been prepared following the EPA (2009) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*'. The Department of the Environment, Heritage and Local Government guidance '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009) has also been taken into account. This NIS for the Waste Water Discharge Licence Review investigates the potential adverse effects on the aquatic qualifying interests of the Natura 2000 network arising from the plant discharge, in combination with other plans / projects affecting the aquatic environment. The assessment considers whether the discharge, alone or in combination with other projects or plans, will have adverse effects on the *integrity* of a European site, and includes consideration of any mitigation measures that may be necessary to avoid, reduce or offset negative effects. Its purpose is to assist the competent authority in carrying out its AA of the proposed licence review.

Based on the assessment herein it has been concluded that there will be no adverse effects on the integrity of Blackwater River (Cork/Waterford) SAC, Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater Estuary SPA, Ballymacoda Bay SPA and Helvick Head to Ballyquin SPA or any European Site, in view of these site's conservation objectives and that the conservation status of the Annex I habitats, Annex II species or Annex I bird species, will not be compromised by the WwTP and agglomeration discharges either directly, indirectly or cumulatively.

It is therefore concluded that the Youghal WwTP and agglomeration discharges, alone or in combination with other plans and / or projects will not give rise to adverse effects on the integrity of Blackwater River (Cork/Waterford) SAC, Ballymacoda (Clonpriest and Pillmore) SAC, Blackwater Estuary SPA, Ballymacoda Bay SPA and Helvick Head to Ballyquin SPA, or any European Site.

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