



National Certificate of Authorisation Programme (NCAP)

Site Assessment Report A0103: Naul

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1 INTRODUCTION

Irish Water has engaged RPS to assist in the delivery of the National Certificate of Authorisation Programme (NCAP). The primary objectives of the NCAP are as follows;

- Ensure compliance with the requirements of the Waste Water Discharge Authorisation (WWDA) Certificate of Authorisation.
- Identify appropriate improvements to the waste water treatment plant, which are necessary to ensure all discharge(s) from the agglomeration contribute towards achieving at least good status in accordance with the European Communities Environmental Objectives (Surface Waters) Regulations 2009 and/or the European Communities Environmental Objectives (Groundwater) Regulations 2010.

1.1 SITE ASSESSMENT REPORTS

The initial stage of the NCAP will include the preparation of a Site Assessment Report (SAR) for each of the agglomerations included within the programme. The primary objective of the SAR will be to assess the impact of the discharges from each agglomeration on the receiving water for sites that discharge to surface waters and to receptors for sites that discharge to groundwater.

- Where a potential impact from the discharge was identified, the wastewater treatment plant (WWTP) was visited and where possible a Small Stream Risk Score (SSRS) was completed. The main objective of the SAR was to determine if further intervention was required and recommend the preparation of a site options report.
- Where no potential impact was identified, a questionnaire was circulated to the Local Authorities to review the accuracy of the original certificate documentation, comment on the 2017 Irish Water PE Estimate, confirm the presence of storm water overflows (SWOs) and confirm all process units were operational. The main objective of the SAR in these instances was to identify if further site investigations are required to determine if a site intervention is needed.

1.2 SITE ASSESSMENT SUMMARY

This report is the SAR for the **Naul** agglomeration, located in **Co. Dublin**. The agglomeration includes the following discharges:

- Primary discharge from Naul wastewater treatment plant to Devlin River.
- Stormwater discharge to Devlin River.

Table 1.1 – Site Assessment Summary

Parameter	Value
Agglomeration Name	Naul
Local Authority	Fingal
Certificate Number	A0103
Primary Discharge Receiving Waterbody	DELVIN_020
Fresh Water Pearl Mussel	No

Parameter	Value
Primary Discharge Receiving Water Body Type	River
Additional Agglomeration Discharges	1 x Stormwater Overflow
Level of Treatment at WWTP	Secondary Treatment
Destination of WWTP Sludge	Unknown
WAC Assessment	No Evidence of Impact
Effluent Data Availability	Full

The initial desktop study for the agglomeration discharge(s) concluded there was No Evidence of Impact from the Waste Assimilative Capacity Assessment. Therefore, the site was not visited as part of the NCAP Site Investigations. This report will review the current information available for the plant and determine if further investigations are required in order to determine if a site intervention may be required to ensure compliance with the certificate of authorisation.

1.3 REFERENCE DATA

The following reference data was used to complete this Site Assessment Report:

- Irish Water Asset Database for Wastewater Certificate Sites. Issued to RPS August 2017.
- Irish Water Effluent Average Effluent Results for 2014-2016. Issued to RPS August 2017.
- Irish Water Effluent Average Effluent Results for 2017. Issued to RPS August 2018.
- EPA Certificate of Authorisation Application and Supporting Documentation including Applicant and EPA correspondence. Accessed and downloaded online (<http://www.epa.ie/licensing/watwaste/wwda/>) August 2017.
- Irish Water Domestic Census Data for Certificate Sites. Issued to RPS March 2018.
- NCAP Unvisited Site Questionnaire. Completed by Fingal CC August 2018.
- Fingal CC 2017 Effluent Results. Issued to RPS June 2018.

2 DESIGN POPULATION & LOADINGS

The original agglomeration PE from the certificate application submitted in 2009 was estimated to be 347. The basis of this estimate is from a house count, the details of which are not provided.

The original certificate estimation is lower than the 2017 PE Estimate provided by Irish Water, based on updated census information which indicates an agglomeration PE of 594. A breakdown of the 2017 PE calculation is provided in **Appendix A**.

For the purpose of this site assessment a PE of 594 has been used as this represents the worst case scenario.

Table 2.1 – PE Estimates for Agglomeration

Parameter	Original Certificate	Irish Water 2017 Estimate	PE to Be Used for Assessment
Domestic PE	-	539	539
Non-Domestic PE	-	55	55
Total PE	347	594	594

The original certificate application indicates that the WWTP has design capacity of **400** PE.

Table 2.2 provides a summary of the capacity and headroom estimated to be available at the WWTP. A more detailed overview of the WWTP process units and capacities where available are provided in **Section 4**.

Table 2.2 – Treatment Capacity Overview

Parameter	Value
Status	Overloaded
Original Design Capacity (PE)	400
Current Estimated Treatment Capacity (PE)	400
Current Loading (PE)	594
Available Headroom	None

3 EFFLUENT DISCHARGE IMPACT TO RECEIVING WATERS

3.1 DESIGNATION OF RECEIVING WATERS

The Naul WWTP discharges to the DELVIN_020 River. The designation of the receiving waters is outlined in **Table 3.1**, below.

Table 3.1 – WFD Status of Receiving Waterbody

Designation
WFD Status – Moderate
WFD Risk Status – At risk
Fresh Water Pearl Mussel Designated Catchment: No
Available Dilution
95 th Percentile Flows – 37:1
Mean Flows – 183:1

3.2 ASSESSMENT OF IMPACT OF WWTP DISCHARGE

To assess the potential impact of the wastewater effluent discharge to the receiving waterbody a Waste Assimilative Capacity (WAC) calculation was completed to assess the waterbody’s capacity to receive the effluent discharge without causing significant deterioration to water quality as per the Water Framework Directive (WFD). The calculation inputs and outputs are summarised below. The detailed WAC Calculation can be found in **Appendix B**.

Table 3.2 – Summary of WAC Calculation Inputs and Outputs

Parameters Assessed	Calculation Inputs	Calculation Outputs
Biological Oxygen Demand	River/Stream flows (95%-ile and mean)	Two scenarios are assessed for the receiving waterbody: <ol style="list-style-type: none"> 1. The 95th percentile receiving waterbody flows with 95%-ile allowable downstream calculation 2. The mean receiving waterbody flows with mean allowable downstream calculation The following is outputted: <ol style="list-style-type: none"> a) Theoretical Allowable Effluent Discharge Limits (Table 3.3) b) Resultant Downstream Concentration in Receiving Water (Table 3.4) c) % of Waste Assimilative Capacity used by WWTP including allowance for upstream background concentrations (Table 3.4)
Ammonia	Effluent data	
Orthophosphate	Upstream nominal background data Allowable downstream concentration (95%-ile and mean)	

It has been assumed that the receiving waters will achieve good water status upstream of the discharge from the agglomeration. Therefore, the following notional background concentrations have been used for the receiving waterbody:

BOD: 0.260 mg/L	NH ₃ -N: 0.008 mg/L	Ortho-P: 0.005 mg/L
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The WAC calculation will determine which of the following three categories the discharge would fall into:

<u>No Evidence of Impact</u>	<u>Potential Impact</u>	<u>Higher Potential Impact</u>
All parameters are below 90% of the waste assimilative capacity	Indication that at least one parameter is over 90% of Waste Assimilative Capacity of the Receiving Waterbody	At least one parameter is in excess of 100% of the Waste Assimilative Capacity

3.2.1 Effluent Target and Level of Treatment Required for Certificate Sites

For NCAP sites, the proposed effluent target will be based on the allowable effluent concentration as determined by the Mean Flow scenario in the WAC Calculation. Where the effluent is discharged into a waterbody that has been identified as a Fresh Water Pearl Mussel sensitive catchment, the effluent concentration will be determined by the 95th percentile flow scenario.

A minimum of primary treatment is required regardless of the calculation outcome, with secondary treatment required as a minimum where the available dilution at the 95th percentile flows is less than 400:1.

3.2.2 WAC Assessment

The WAC calculation was completed using effluent data provided by Irish Water from 2014-2016. The data provided represented annual averages. Individual sample results were not available for analysis. For reference the number of data points used to complete the WAC calculation has also been provided.

Table 3.3 summarises the effluent data used to complete the WAC assessment and the theoretical allowable effluent concentration of the target parameters. As part of the NCAP assessment, the WAC calculations were completed for all agglomerations in Autumn 2017. Additional effluent data provided by Fingal County Council has also been included for comparison.

Table 3.3 – Analysis of Allowable Effluent Quality

Data Set	BOD (mg/l)	Ammonia (mg/l)	Ortho Phosphate (mg/l)
Effluent Data Used for WAC Calculation Average of 2014-2016 Results	3.3	4.1	1.7
Updated Effluent Results 2017 for Comparison (Single Result)	6	14.2	2.22
Available Data Points to Complete WAC Assessment (maximum 3)	2	2	2
Allowable Effluent Concentration (95 th percentile Flows)	88.8	5.0	2.7
Allowable Effluent Concentration (Mean Flows)	228.4	10.5	5.5

The calculated theoretical resultant concentrations in the receiving waterbody downstream of the WWTP are summarised in **Table 3.4**. This calculation is based on the average effluent data presented

in the **Table 3.3**. The waste assimilative capacity (%) has been calculated assuming notional upstream concentrations as outlined above.

Table 3.4 - Downstream Surface Water Quality and Waste Assimilative Capacity Used

Flow Scenario	Parameter	BOD	Ammonia	Ortho Phosphate
95 th Percentile Flows	Calculated Downstream Concentration in Receiving Waterbody After Wastewater Effluent Discharge (mg/l)	0.3	0.120	0.050
	Allowable Resultant Concentration in Receiving Waterbody after Discharge (mg/l)	2.6	0.14	0.075
	% of Available Waste Assimilative Capacity Used	4	82	64
Mean Flows	Calculated Downstream Concentration in Receiving Waterbody After Wastewater Effluent Discharge (mg/l)	0.280	0.030	0.010
	Allowable Resultant Concentration in Receiving Waterbody after Discharge (mg/l)	1.5	0.065	0.035
	% of Available Waste Assimilative Capacity Used	1	39	31
WAC Assessment Conclusion		No Evidence of Impact to Receiving Waterbody		

The conclusion of the WAC assessment is as follows:

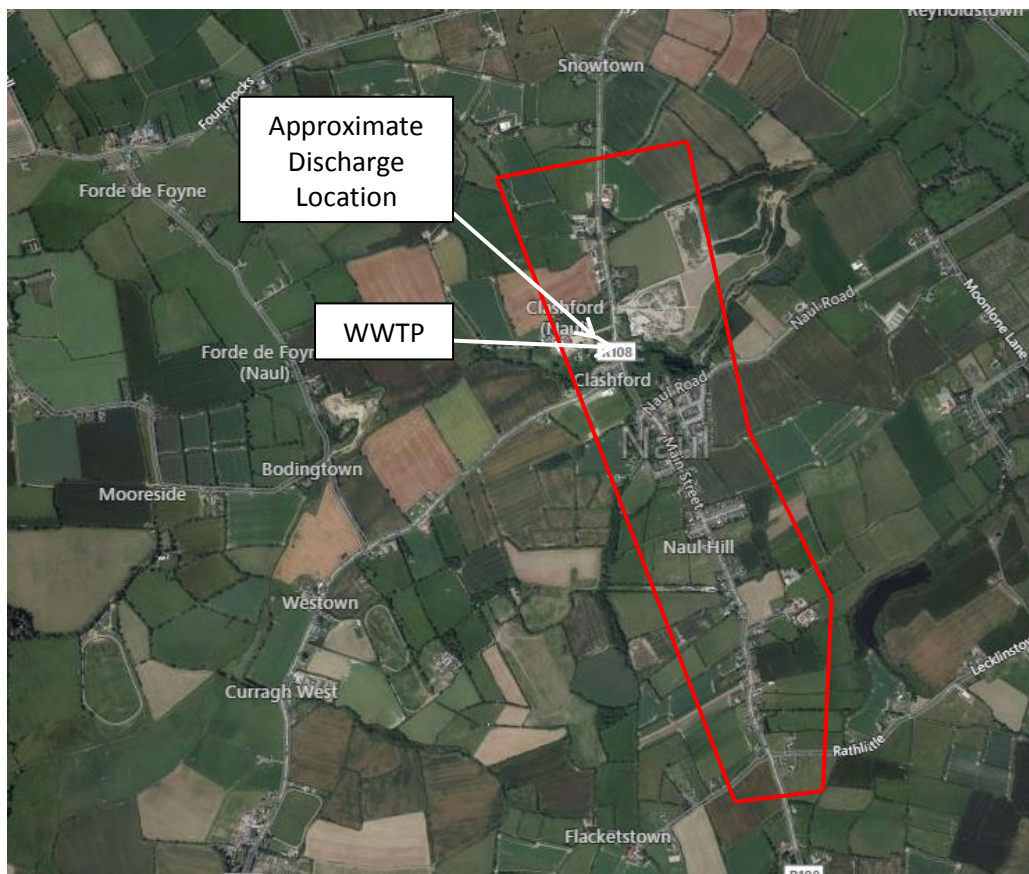
- The assessment indicates that there is No Evidence of the discharge having an impact on the receiving waterbody. This is attributed to the large assimilative capacity available in the receiving waterbody.
- The available dilution in the receiving waterbody at the 95th percentile flows is less than 400:1, a minimum of secondary treatment is required. Secondary treatment is currently provided.

4 WWTP SITE & PROCESS DESCRIPTION

4.1 OVERVIEW OF AGGLOMERATION AND SITE DESCRIPTION

The Naul agglomeration is located approximately 8km south west of Balbriggan. The Naul WWTP is located north of the village.

Figure 4.1 – Satellite View of Agglomeration¹



4.1.1 Network

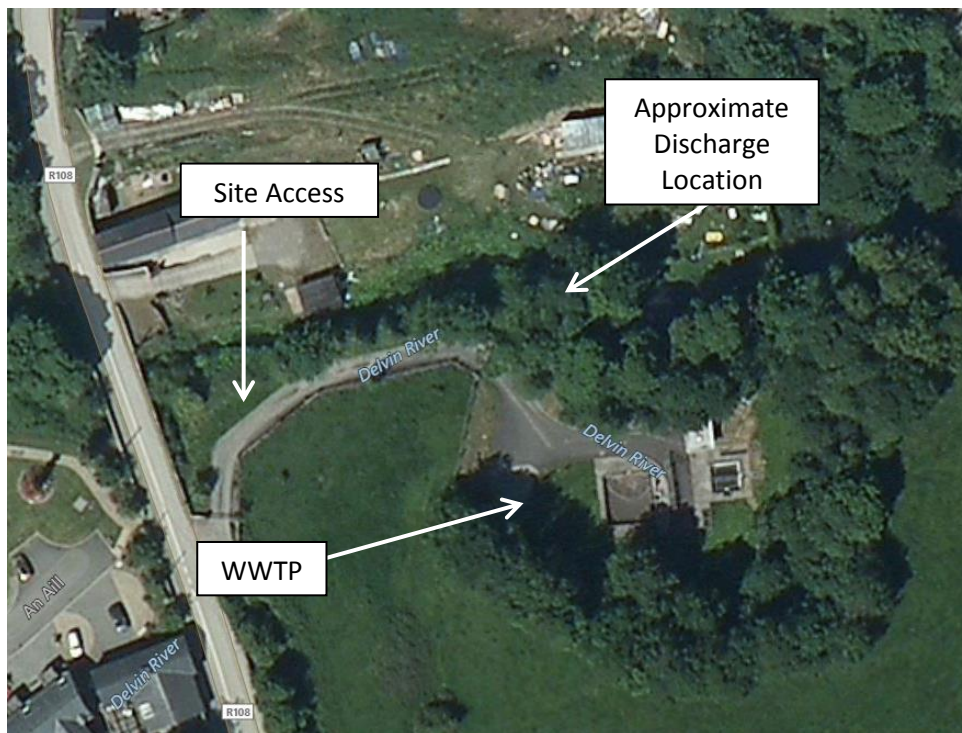
It is unknown whether the agglomeration is served by a combined or foul network. There is one pumping station located within the network. There are no Stormwater Overflows located within the network.

4.1.2 Wastewater Treatment Plant

The location of the WWTP is identified in **Figure 4.2**. There is one stormwater overflow located at the WWTP.

¹ Accessed on Bing Maps 07 November 2018.

Figure 4.2 – Satellite View of WWTP and Effluent Discharge Location²



The original site layout from the certificate application has been included for reference. This plan is provided in **Appendix C**. The WWTP drawing does not indicate the sludge holding tank or the inlet screen.

4.2 PROCESS DESCRIPTION

Details of the treatment process are summarised in **Table 4.1** below.

Table 4.1 – Process Unit Descriptions

Unit	Description	Outline Asset Information
Inlet to WWTP	Influent flows by gravity to the WWTP.	Unknown \emptyset
Preliminary/Screening & Stormwater Overflow	Screening is provided by an Auger Screen. A stormwater overflow is located on the inlet pipe prior to entering the aeration tank.	Unknown
Secondary Treatment	Main treatment carried out by an Aeration Tank and secondary settlement is provided by a Clarifier.	Unknown
Inter-Stage Pumping	RAS/WAS Pumps.	Unknown
Effluent Discharge	Effluent flows by gravity to the receiving waterbody.	Unknown
Sludge Storage	Sludge is stored in a Sludge Holding Tank.	Unknown

² Accessed on Bing Maps 07 November 2018.

4.3 OPERATIONAL RISK REVIEW

The NCAP Questionnaire for Unvisited Sites was completed by Fingal CC to facilitate completion of a basic operational risk review. This assessment is used to determine if there are any risks that require further on-site investigations by Irish Water to confirm if a Site Intervention is required. The operational risk review for Naul WWTP is presented in **Table 4.2** below.

The elements of the risk assessment are as follows:

- **Plant Capacity** – are the installed units capable of treatment the current agglomeration loading to the WWTP?
- **Overflows** – are the overflows in the agglomeration effective? This includes confirmation (where possible) that the overflows do not operate in dry weather and provide effective management of flow to treatment under all influent flows
- **Risks to Effluent Quality** – are there any known risks to effluent quality? This includes a review of available effluent data, process unit conditions and any general operational challenges that could or have impacted on treated effluent quality.
- **Desludging** – Confirm of the desludging frequency and identification of any challenges associated with desludging and on-site sludge storage
- **General Consideration** – Any additional considerations including sludge tanker access and any other identified operational issues

Table 4.2 – Operational Risk Review

Category	Comments
Plant Capacity	The plant is not believed to be capable of treating the current agglomeration loading. The plant is believed to be overloaded. Fingal CC indicated that additional houses and a nursing home are due to be connected to the plant which will add additional pressure on the plant capacity.
Overflows	There are no observations of discharge from an overflow during dry weather.
Risks to Effluent Quality	Fingal CC have identified that there are potential risks to effluent quality. Plant washout was identified as an issue.
Desludging	Desludging is completed over once a month.
General Considerations	There is suitable access for desludging and general operational requirements. No flooding risks have been identified.

There were no operational issues identified by Fingal CC in the questionnaire.

5 CONCLUSIONS & RECOMMENDATIONS

5.1 CONCLUSIONS

The following conclusions are presented from this Site Assessment Report:

Table 5.1 – Summary of Impact to Receiving Waterbody

Parameters Assessed	Traffic Light Risk	Conclusion
WAC Assessment		The WAC calculation indicates that there no impact to the receiving water body.
Effluent Data Availability		There is sufficient data available for the WAC calculation to be completed

Table 5.2 - Summary of Operational Risk Assessment

Element	Traffic Light Risk	Conclusion
Plant Capacity		The plant is believed to be overloaded. However, average effluent results for two year are good.
Overflows		There is no observation of discharge from an overflow in the network during dry weather.
Risks to Effluent Quality		Fingal CC have identified that there are potential risks to effluent quality. Plant washout was identified as an issue.
Desludging		Desludging is completed over once a month.
General Considerations		There is suitable access for desludging and general operational requirements. No flooding risks have been identified.

The risk has been assessed qualitatively based on the following criteria:

RED	AMBER	GREEN
IMPACT or RISK Confirmed	Impact or Risk Unconfirmed but suspected	No identified issues

5.2 RECOMMENDATIONS

No operational risks were identified that could risk the ability of the site to comply with the requirements of the Waste Water Discharge Authorisation (WWDA) Certificate of Authorisation. No site improvement works have been identified at this time.

Additional recommendations are as follows:

- A review of the agglomeration loadings, both domestic and non-domestic should be completed to confirm the current PE loading to the WWTP.
- Potential upgrade to Discharge Licence as PE is greater than 500.

- Once the PE loading is confirmed, IW should assess whether additional treatment is required to treat ammonia and Ortho phosphate to meet the required discharge standards. Plant is currently indicated as overloaded.
- Further investigation is required in order to determine the optimum solution for plant washout.



Appendix A

2017 Census Data PE Calculation

National Certificate of Authorisation Programme (NCAP)

Review of 2017 Census Data PE Estimates

Current and Future PE Forecasts

Agglomeration #	A0103
Name	Naul
County	Fingal

Review of Current Domestic PE (Connected and Non-Connected)

Total Number of Properties	223
Total Connected	182
Total Not Connected (with IAS)	18
Total Not Connected (no IAS)	0
Unknown Properties	6
Temporarily Absent	5
Holiday Homes	1
Other Vacant Dwellings	11

Occupancy per Property	2.85
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Current Connected PE	538.6
Current Unconnected PE	65.5
Vacant Dwellings PE	31.34

IAS = Individual or Appropriate System

Review of Commercial, Institutional and Industrial PE

Commerical PE	54
Hospital	0
Nursing Home	0
Net Education	0
Tourism	0
Other Institutions	0
Sub-Total Commerical and Non-Institutional	54

Non IPC (Section 16) Licensed PE	0
IPC Licensed PE	0
Sub Total Industrial	0

Current PE

Current Domestic PE	538.6
Current Commerical PE	54.5
Current Industrial PE	0
Current PE	594

The maximum value of either Net Education + Other Institutions or Tourism has been used.

Vacant dwellings are not included

Future Design PE Calculation

Growth Rate	0.63%
Headroom Allowance	10%

Population Growth Period	10	30
Future Domestic PE	573.5	650.2
Future Commerical PE	58.0	65.8
Sub-Total	631.5	716.0
Unconnected Properties PE	65.5	65.5
Other Vacant Dwellings PE	31.3	31.3
Total PE for Headroom Allowance	728.4	812.9
Total PE with Headroom Allowance	801.2	894.2
Industrial PE	0	0
Total Estimated PE	801.2	2520.0

Unconnected Properties included in Future Growth
Vacant dwellings included in Future Growth
Sum of Domestic, Commerical and Unconnected + Vacant

No growth accounted for in Industrial

Design PE	801	894
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Including for headroom allowance

Change Summary

No alterations have been made to estimated non-domestic PE loadings.

No alterations have been made to the estimated number of occupied domestic homes which are or are not connected to the WWTP.

No changes have been made to the estimated unoccupied and holiday homes in the agglomeration.



Appendix B

Waste Assimilative Capacity (WAC)
Assessment

Waste Assimilative Capacity (WAC) Calculation

WWTP Name	Naul	WAC Assessment	No Evidence of Impact
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Date Printed	06/11/2018	By:	CP
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Background Information

Agglomeration License	A0103	95% Flow (m3/s)	0.057
Local Authority	Fingal	95% Flow (m3/day)	4925
Name of River	DELVIN_020	Mean Flow (m3/s)	0.283
WFD Water Quality Designation	Moderate	Mean Flow (m3/day)	24451
		Data Source:	Not Documented

WWTP Flows

Population Equivalent	594	Dilution @ 95%ile flows	37.0
Effluent flow (m3/day)	133.7	Dilution @ median flows	183.0

Assessment of Theoretical Effluent Discharge Limits

Parameter	# Sample Results Available for WAC Calculation	Average Effluent Concentration (mg/l)*	Theoretical Allowable Discharge Limit (95%ile Flows)	Theoretical Allowable Discharge Limit (Mean Flows)
Carbonaceous BOD	2	3.30	88.80	228.40
Ammonia (NH ₃ -N)	2	4.10	5.00	10.50
Ortho Phosphate	2	1.70	2.70	5.50

Assessment of Impact to Receiving Waterbody

95th Percentile River Flows (using the 95th Percentile allowable Water Quality Limits)

Parameter	Upstream Background Concentration (mg/l)	Contribution from Effluent Discharge (mg/l)	Resultant Downstream Concentration (mg/l)	Allowable Concentration in Receiving Waterbody (95%ile mg/l)	% of Available WAC
Carbonaceous BOD	0.260	0.087	0.300	2.60	3.70%
Ammonia Nitrogen (NH ₃ -N)	0.008	0.108	0.120	0.14	82.00%
Ortho Phosphate (OP)	0.005	0.045	0.050	0.075	64.00%

Median River Flows (using the mean allowable Water Quality Limits)

Parameter	Upstream Background Concentration (mg/l)	Contribution from Effluent Discharge (mg/l)	Resultant Downstream Concentration (mg/l)	Allowable Concentration in Receiving Waterbody (Mean mg/l)	% of Available WAC
Carbonaceous BOD	0.260	0.018	0.280	1.500	1.00%
Ammonia Nitrogen (NH ₃ -N)	0.008	0.022	0.030	0.065	39.00%
Ortho Phosphate (OP)	0.005	0.009	0.010	0.035	31.00%

*if effluent results are not available typical effluent concentration from primary or secondary treatment has been assumed as follows

Effluent Averages By Level of Treatment for 2017 WAC Assessment			
Level of Treatment	BOD	NH ₃ -N	Ortho-P
Primary or No Treatment	156.14	26.7	4.37
Secondary	35.97	15.22	4.05
Tertiary	14.62	7.7	2.85

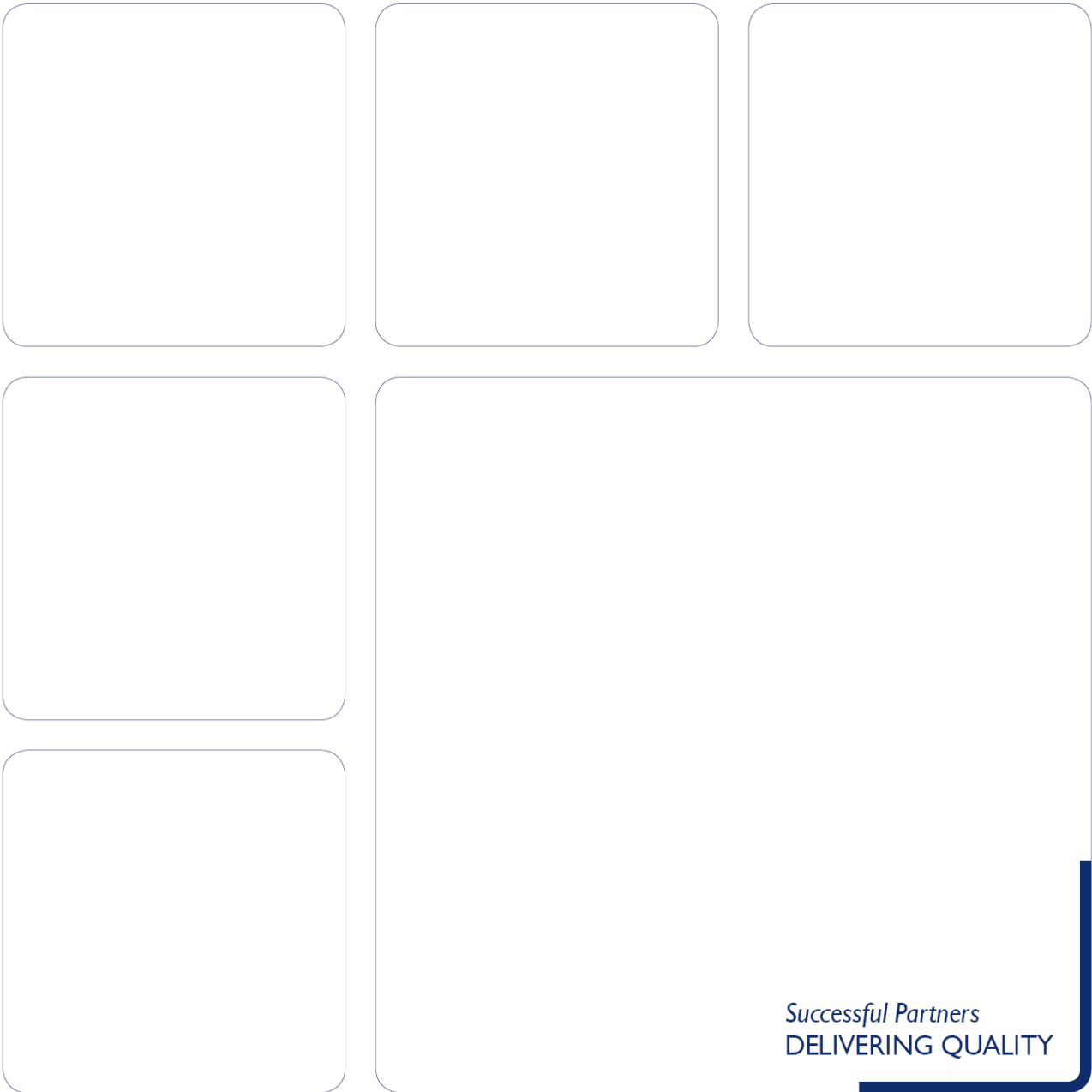
WFD Receptor Waterbody Allowable Concentration		
Parameter	Good Status	High Status
	95%ile mg/l	95%ile mg/l
Carbonaceous BOD	2.60	2.20
Ammonia (NH ₃ -N)	0.14	0.09
Ortho Phosphate	0.075	0.045
	Mean mg/l	Mean mg/l
Carbonaceous BOD	1.50	1.30
Ammonia (NH ₃ -N)	0.065	0.040
Ortho Phosphate	0.035	0.025

	Exceeding Allowable Concentration
	Within 90% of allowable concentration
	Less than 90% of allowable concentration



Appendix C

Site Layout





OUTFALL MANHOLE

E. 313230
N. 261146

OVERFLOW

E. 313212
N. 261140

Castle
(in ruins)

Naul Waste Water Treatment Plant

*For inspection purposes only.
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Grave Yard
Church

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68.6



COMHAIRLE CHONTAE FHINE GALL
FINGAL COUNTY COUNCIL

Water Services Dept.
Grove Road,
Blanchardstown,
DUBLIN 15.
Tel. 01-8905000

TITLE:

**Waste Water Discharge License Application
Naul - Agglomeration
Fingal - SW68 - Naul**

DRG. NO.

O/F-09-11-02

OS REF.

2649-A

SCALE

1/1000

DRAWN

EC

CHECKED BY :

FF

DATE

DEC 2009

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