Holywell Foul Pumping Station Relocation

Part 8 Planning Report

Fingal County Council

13 February 2017

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This document has 14 pages including the cover.

Document history

Job number: 5155181			**Document ref: DG001**			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	Part 8 Planning	GH / MG	AC / JN	GH	JN	10/02/17
Rev 1.1	Part 8 Planning Submission	GH / MG	AC / JN	GH	JN	13/02/17

Client signoff

Client	Fingal County Council
Project	Holywell Foul Pumping Station Relocation
Document title	Part 8 Planning Report
Job no.	5155181
Copy no.	
Document reference	DG001

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Introduction

This part 8 planning report outlines the engineering requirements for the proposed Holywell Foul Pumping Station Relocation at Holywell, Swords, Co. Dublin.

1. Introduction

This report outlines the preliminary assessment of the engineering requirements for the Proposed Holywell Foul Pumping Station relocation at Holywell, Swords, Co. Dublin. The proposed works will comprise of the construction of the foul pumping station including underground Wet Well, Valve Chamber, Emergency Overflow Chamber, 24 Hour Storage Tank, Inlet manhole, Meter chamber, overground Wet Kiosk, Control Kiosk, Vent Stack and associated works to allow for the diversion, construction and decommissioning of existing services, utilities and pumping station.

A site visit was carried out with Fingal County Council (FCC) on the 6th of February 2017 and a pre-planning meeting with FCC was held on the 8th of February 2017 to discuss the proposed pumping station. The intent of this Planning Report is to provide information to FCC planning department in support of the part 8 planning application and does not represent an exhaustive design of services.

The existing Holywell development comprises of approximately 1,188 mixed unit housing, local shopping centre and an Educate Together Primary School. Refer to figure 1-1 below for Site Location Map.

Figure 1-1 Site Location Map

2. Background

2.1. Existing Pumping Station & rising main

The existing underground pumping station is located along Holywell Way to the East of the Holywell development. The pumping station was designed and constructed to service the 3 phases of the Holywell Development. In its current location the existing pumping station is fed by gravity and pumps effluent via a 150mm dia rising main to the public foul drainage network along the R125. From the R125 the waste water discharges to the Swords Waste Water Treatment Plant located at Broadmeadow Estuary, Swords, Co. Dublin. The existing services located within the area of the existing pumping station are indicated on drawing C006.

During a review of the overall Holywell Development for the purpose of taking in charge, FCC determined that the existing foul pumping station which is located to the North of Holywell Way, was not installed in the position as indicated in the original planning compliance. The existing pumping station is located approximately 2m from the nearest property boundary, and only provides for approximately 6 hours emergency storage. Foul Pumping stations of this size should be located no closer than 15m to a property boundary in order to minimise the risk of odour, noise and vibration nuisance. Pumping stations should also include for the provision of 24 hour emergency storage in keeping with industry best practice.

The as constructed drawings provided by FCC indicate that the existing pumping station is constructed of cast in-situ concrete. The pumping station comprises of a wet well and valve chamber. The wet well is circa 5.3m deep with an inlet invert of 19.8mOD and a wet well invert of 18.1mOD which can cater for up to 3No. 50Hz pumps. Access to the wet well is via 4No. ductile iron covers of class D400 loading. The existing valve chamber also caters for a Mag flow meter DN150.

2.2. Existing Control Building

The as constructed drawings provided by FCC indicate that the existing control building associated with the pumping station is located adjacent to the pumping station. It is used to house telemetry and monitoring equipment for the pumping station and also allows for isolation of the pumps and electrical equipment during maintenance. The existing building is approximately 3m x 3m x 2.4m high with a vent stack of circa 5m high to the rear of the building.

3. Proposed Works

3.1. Scope of Works

FCC proposes to relocate the existing pumping station from its current location to an open space located to the North of Holywell Way and include an underground 24 hour emergency storage tank. The proposed works will comprise of the construction of the foul pumping station including underground Wet Well, Valve Chamber, Emergency Overflow Chamber, 24 Hour Storage Tank, Inlet manhole, meter chamber, over ground Wet Kiosk, Control Kiosk, Vent Stack and associated works to allow for the diversion, construction and decommissioning of existing services, utilities and pumping station. The proposed pumping station and associated tank are self-contained infrastructural items with no connection to surface water infrastructure know to be in the vicinity.

3.2. Pumping Station

The proposed pumping station including Wet Well, Valve Chamber, Emergency Overflow Chamber, 24 Hour Storage Tank as indicated on drawing C004 will be located underground with surface access covers to allow for maintenance and access to each of the chambers. 2No. Kiosks and a vent stack will be located at surface level as indicated on Section A on drawing C005. The proposed pumping station will be designed and constructed in accordance with Irish Water Code of Practice for Wastewater Infrastructure *'A design and construction guide for developers'* and *'Wastewater Infrastructure Standard Details'.*

The proposed access covers to the pumping station will be located greater than 15m from the nearest dwelling in accordance with the current Irish Water Code of Practice for Wastewater Infrastructure *'A design and construction guide for developers'*

It is noted that the proposed pumping station will not increase the waste water loading from the site to the receiving Swords Waste Water Treatment Plant located at Broadmeadow Estuary, Swords, Co. Dublin.

The proposed Kiosks will be similar to the Kiosk as indicated in figure 3-1. The Kiosk will be 1.2m high x 0.6m wide. It is proposed to reuse the existing control building and also allow for re-use / upgrade of the telemetry and monitor equipment within the control building.

Figure 3-1 Wet Kiosk and Control Kiosk

The proposed surface access covers that will be used for access to the Wet Well, Valve Chamber and 24 Hour Emergency Storage Tank. Each cover will be lockable and flush with the existing ground level. Refer to figure 3-2 below for image of access covers when opened for maintenance

Figure 3-2 Surface Access covers

To limit the amount of required hard standing area within the open space a trafficable reinforced grass road will be installed around the access covers as indicated on drawing C003. The reinforced grass road will allow for access of services vehicles, reduce the hard standing impermeable area required and maintain a visual appearance of grass within the open space. Refer to figure 3-3 below for image of reinforced grass road.

Figure 3-3 Reinforced Grass Road

3.3. 24 Hour Emergency Storage Tank

The proposed 639m^3 24 Hour Emergency Storage Tank will be located underground to the west of the proposed pumping station. The tank will not be visible from ground level and will be grassed over to provide continued use of the existing open space. In accordance with the Irish Water Code of Practice for Wastewater Infrastructure *'A design and construction guide for developers'* a pumping station servicing a development similar in size to Holywell is considered to be a class 3 pumping station. Irish Water requires that class 3 pumping stations have a 24 hour storage facility to allow for emergency in the event of pump failure. The volume of the tank is based upon the calculations below.

The estimated foul loading calculations are as follows;

Dwellings

Average day Demand per unit = 600 litres / unit / day*

Dry weather flow (DWF) = 600 x 1188 (units) / 1000 = 713 m^3 / day

713 / 24 = 29.7 m^3 / hour

** 600 litres / unit / day based on the average figure 3 person per unit (as per Irish Water Water & Sewerage Codes of Practice)*

Peak flow rate

6DWF = 29.7 m3 x 6 = 178.2 m^3 / hour

Infiltration allowance (10%)

178.2 m^3 / hour + 10% = 196.02 m^3 / hour

School

School loading = 300 PE (1 PE = 180 litres / day)

Dry weather flow (DWF) = 300 x 180 litres / 1000 = 54 m^3 / day

54 / 24 = 2.25 m^3 / hour

300 PE as indicated by Fingal County Council Drainage Department in school planning permission ref; F11A/0246

Peak flow rate

6DWF = 2.25 m^3 x 6 = 13.5 m^3 / hour

Infiltration allowance (10%)

13.5 m3 / hour + 10% = 14.85 m^3 / hour

Wet Well & Emergency Storage Design

Storage Capacity = Total inflow / hour by No. of pump starts / hour

Total Inflow = 196.02 m^3 + 14.85 m3 = 211 m^3

10 No. pump starts / hour = 211 m3 / 10 = 21.1 m^3

Wet Well storage capacity = 21.1m^3

4 Hour Wet Well Storage Capacity = 4 x DWF

DWF Inflow / hour = 29.7 m3 + 2.25 m3 = 31.95 m^3

Wet Well Storage = 31.95m^3 x 4 = **127.8m^3**

4 Hour Wet Well Storage required by Fingal County Council

20 Hour Emergency Storage requirement = 20 x Total DWF

Storage = 31.95 m^3 x 20 hours = **639 m^3**

20 Hour Emergency Storage required by Fingal County Council

3.4. Services Diversions

The proposed works will also include the diversion of the existing foul and storm drainage locally as indicated on drawing C007. A new rising main will also be constructed along the length of the proposed 24 Hour Storage Tank where it will connect back into the existing 150mm dia. rising main.

To the North of the proposed pumping station is an existing storm drainage culvert. The culvert is 3m x 1.5m precast concrete. The exact location of the culvert will be determined through detailed investigations on site prior to detailed design to determine the proximity and level of the culvert.

3.5. Utility Diversions

The proposed works are located close to existing underground ESB, Eircom and Watermain Utilities. A review of existing utilities has been carried out prior to the part 8 planning submission. It is proposed to carry out site investigation works in including GPR survey at detailed design stage to permit for the detailed mapping of all underground services.

3.6. Site Investigations

Site Investigations in the form of a detailed desktop review of relevant historical site investigations in the area has been undertaken. These are included in appendix A of this report. The Investigations were carried out during the construction of the M1 – Airport to Balbriggan bypass located directly to the East of the proposed site. The investigations indicate that the ground conditions are soft to firm between a depths of 1.8m to 4.2m. This would indicate suitable site conditions for the proposed works. It is proposed to carry full site investigation works prior to detailed design stage to allow for assessment of the ground conditions in the specific area of the proposed works.

3.7. Decommissioning of Existing Pumping Station

The Decommission of the existing pumping station will be carried out by suitably qualified contractors who are licensed with the EPA, local Authority and who have a current waste collection permit.

All sludge, pumps and fittings will be removed from the existing pumping station. The existing pumping station will be cleaned and backfilled with a suitable fill material to the underside of the tank cover slab.

The existing access covers will be removed and the area will be landscaped to a similar standard to the surrounding area.

4. Drawing List

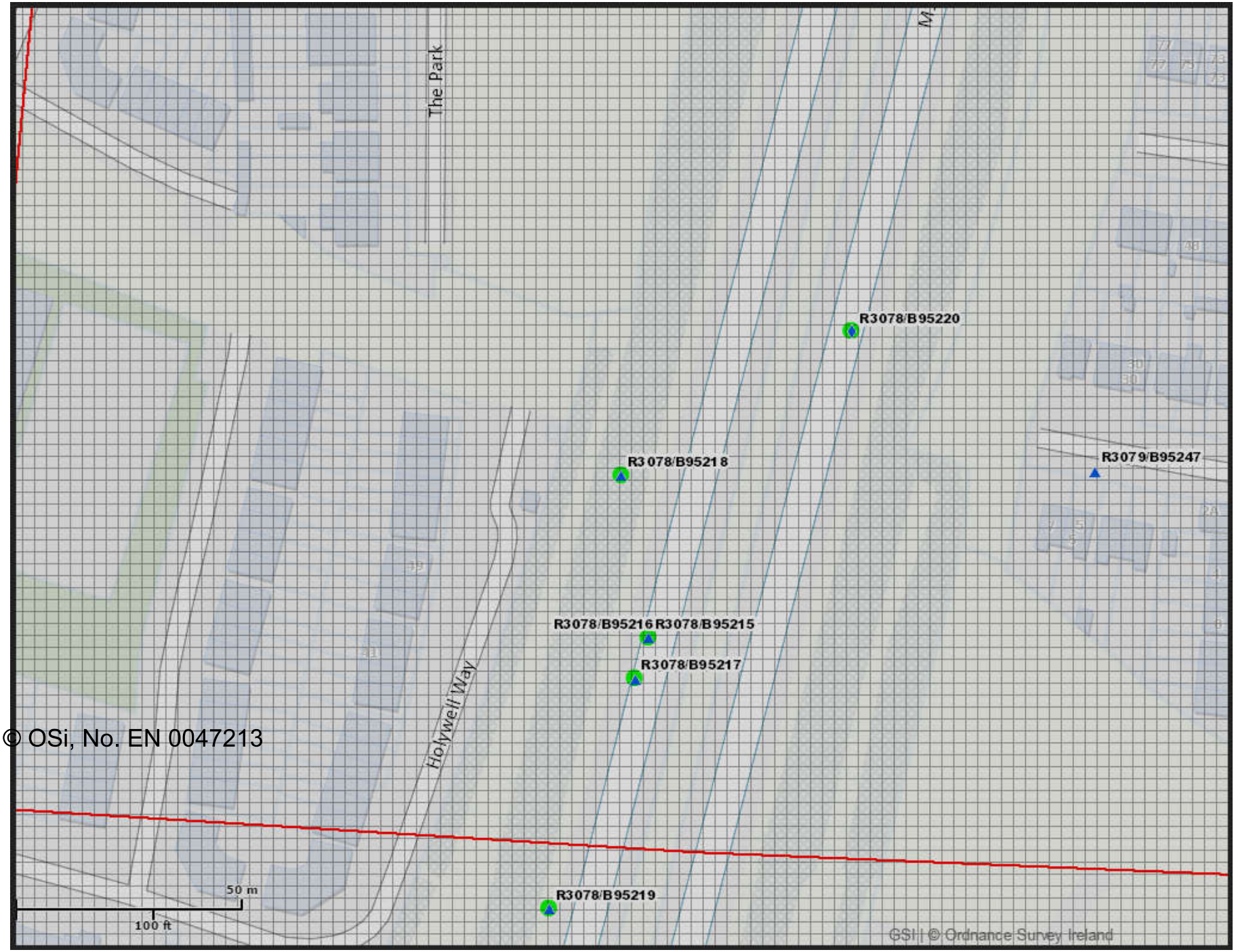
Table 4-1 Drawing List

Drawing Number	Drawing Title
5155181C001	Site Location Map
5155181C002	Site Layout Plan
5155181C003	Proposed Site Layout Plan @ 1:500
5155181C004	Proposed Site Layout Plan @ 1:250
5155181C005	Proposed Site Layout Plan @ 1:100
5155181C006	Proposed Pumping Station Site Layout
5155181C007	Section A
5155181C008	Existing Drainage Layout
5155181C009	Proposed Drainage Layout
5155181C010	Standard Construction Details – Sheet 1 of 3
5155181C011	Standard Construction Details – Sheet 2 of 3
5155181C012	Standard Construction Details – Sheet 3 of 3

Appendices

Appendix A.

A.1. Desktop Study of Site Investigation Records



Overview Map for GSI Report 3078: Northern motorway volume 1(A) - Airport to Balbriggan bypass M1
Swords/Balbriggan, Co. Dublin
Points Observed: 72

GSI REPORT 3078

Northern motorway volume 1(A) - Airport to Balbriggan bypass M1

LAYERS FOR BOREHOLE 95218 (Company Name: 91B)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9521801	0	.3				Top Soil	Top Soil
9521802	.3	.6	Soft to Firm	Grey Brown	Silty Sandy	Clay	Clay
9521803	.6	.9	Soft	Brown		Peat	Peat
9521804	.9	1.8	Soft	Grey	Very Silty	Clay	Clay
9521805	1.8	4.2	Soft to Firm	Grey	Clayey	Silt	Silt

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