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Executive Summary

This report was prepared for South Dublin County Council in connection with the planning application for a data centre development and addresses the existing and proposed civil infrastructure, for the proposed development, located in Profile Park, Grange Castle Business Park, Lucan, Co. Dublin.

Vantage Data Centers Dub 11 Ltd. are applying for permission for development at this site on the New Nangor Road (R134), Dublin 22; and on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 on an overall site of 8.7 hectares.

The development will consist of the demolition of the two storey dwelling (207.35sqm) and associated outbuildings and farm structures (348.36sqm); and the construction of 1 no. two storey data center with plant at roof level and associated ancillary development that will have a gross floor area of 12,893sqm that will consist of the following:

- 1 no. two storey data center (Building 13) with a gross floor area of 12,893sqm. It will include 13 no. emergency back-up generators of which 12 will be double stacked and one will be single stacked within a compound to the south-western side of the data center with associated flues that each will be 22.316m in height and 7 no. hot-air exhaust cooling vents that each will be 20.016m in height;
- the data center will include data storage rooms, associated electrical and mechanical plant rooms, loading bays, maintenance and storage spaces, office administration areas, and plant including PV panels at roof level as well as a separate house generator that will provide emergency power to the admin and ancillary spaces. Each generator will include a diesel tank and there will be a refuelling area to serve the proposed emergency generators;
- The data center will have a primary parapet height of 14.246m above ground level, with plant and screen around plus a plant room above at roof level. The plant room has an overall height of 21.571m;
- Construction of an internal road network and circulation areas, with a staff entrance off Falcon Avenue to the east, as well as a secondary vehicular access for service and delivery vehicles only across a new bridge over the Baldonnel Stream from the permitted entrance as granted under SDCC Planning Ref. SD21A/0241 from the south-west, both from within Profile Park that contains an access from the New Nangor Road (R134);
- Provision of 60 no. car parking spaces (to include 12 EV spaces and 3 disabled spaces), and 34 no. cycle parking spaces;
- Signage (5.7sqm) at first floor level at the northern end of the eastern elevation of the data center building; and
- Ancillary site development works, will include footpaths, attenuation ponds that will include an amendment to the permitted attenuation pond as granted to the north of the Baldonnel Stream under SDCC Planning Ref. SD21A/0241, as well as green walls and green roof. The installation and connection to the underground foul and storm water drainage network, and installation of utility ducts and cables, that will include the drilling and laying of ducts and cables under the internal road network within Profile Park. Other ancillary site development works will include hard and soft landscaping that will include an amendment to the permitted landscaping as granted under SDCC Planning Ref. SD21A/0241, lighting, fencing, signage, services road, entrance gates, and sprinkler tanks.

The development will be accessed from Falcon Avenue from within the Profile Park Business Park that contains an access from the New Nangor Road (R134).

The site is bounded to the south by an estate road known as Falcon Avenue, to the north by Nangor Road (R134), to the east by existing greenfield and to the west by existing commercial units and greenfield.

The report should be read in conjunction with our engineering planning drawings, and deals with existing foul, surface water and water mains present within the surrounding area, and the proposals for the site with regards to these services.

The report also discusses the ground conditions present on the site, the current proposals for achieving the development plateau and sustainability measures incorporated with the development.

1 Introduction

The development will consist of the demolition of the two storey dwelling (207.35sqm) and associated outbuildings and farm structures (348.36sqm); and the construction of 1 no. two storey data center with plant at roof level and associated ancillary development that will have a gross floor area of 12,212sqm

The total subject site area extends to circa 9.36 acres (3.7ha) and is primarily a greenfield site. The site is bounded to the north by the New Nangor Road, to the south by Falcon Avenue and to the east by existing greenfield and to the west by existing commercial units and greenfield.

There are no known public sewer drainage pipes or water mains, presently located on the subject site.

This report has been prepared to outline the existing and proposed drainage, pollution control measures and water main infrastructure, in order to support the proposed development application.

The location of the site is indicated on the map extract below - Figure 1.

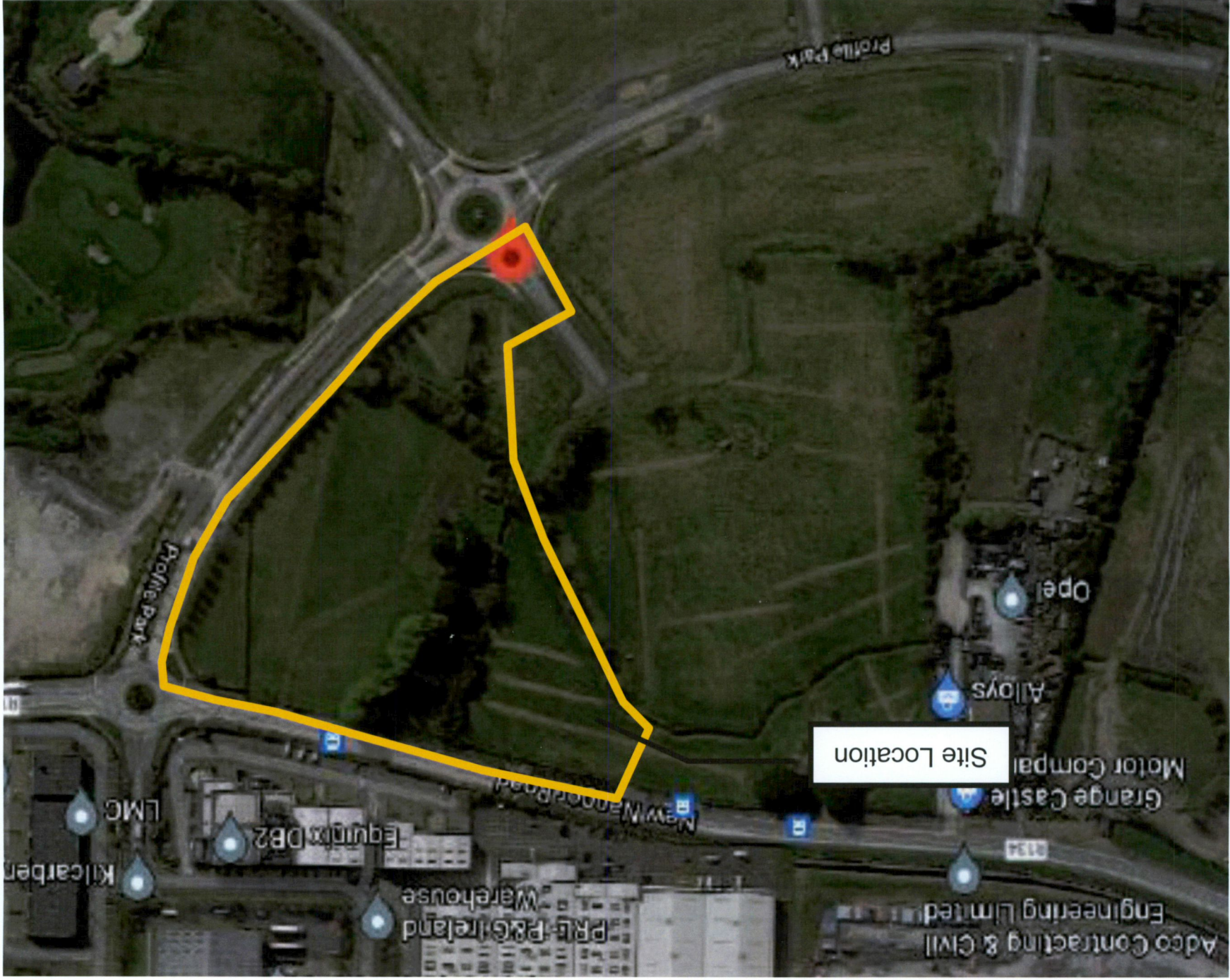


FIGURE 1 - Site Location (Source Google Maps)

2 Existing Drainage & Watermain Services

2.1 Existing Foul Drainage Networks

South Dublin County Council record drawings have identified a 225mm Ø mains network, located adjacent to the south-eastern boundary of the site & within Falcon Avenue. This line forms part of the reticulation network for Profile Park.

The existing foul sewer reticulation network has adequate capacity to cater for the proposed effluent discharge from the subject site and there are no known issues noted with the sewer reticulation network.

2.2 Existing Surface Water Drainage Networks

The topographical survey as carried out has identified an open channel / stream which runs along a portion of the western boundary, up to the north, prior to discharging to the west into a culverted system beneath Grange Castle Motor Company. This ditch network is referred to as Baldonnel Stream.

The Baldonnel Stream then runs in a westerly direction via a tributary into the Camac River.

The Baldonnel Stream has been identified as having capacity to accommodate the proposed restricted discharge from the subject site.

2.3 Existing Water Main Network

South Dublin County Council record drawings have identified an existing 6" (160mm) Ø main located along the south-eastern boundary of the property, within Falcon Avenue adjacent to the subject site. 1No. 160mm Ø capped connection with sluice valves, has been left off the aforementioned water main, in order to facilitate development of these lands.

There is also an existing 700mm Ø trunk water main running parallel to the New Nangor Road adjacent to the northern boundary of the subject site.

From discussions with the South Dublin County Council, it is understood that there is adequate capacity within the existing watermain network to supply the anticipated demand of the proposed development.

3 Proposed Site Drainage & Water Supply

3.1 Proposed Foul Water Drainage

It is proposed to discharge foul water from the proposed development, via a 225mm Ø gravity foul sewer outfall, laid from MH FWMH 2.1 and discharging into the existing 225mm Ø laid along Falcon Avenue, which then runs in a southerly direction.

The administration section of the building contains 6 No. WCs, with a predicted maximum number of daily staff being in the region of circa 48 people, over a 24hr period. Based on Irish Water's Code of Practice of 150ltr/hd/day, the peak wastewater flow will not be in excess of circa 0.083l/s (@1DWF) & a peak discharge of 0.498l/s (@6DWF).

The proposed network connects into FW MH CON, with an invert level of 71.54m, prior to the ultimate outfall discharging into the Profile Park reticulation network, - refer Drawing No. DB13-DR-UG-C127-V2-WS3-PIN Rev. V2.

All on-site foul sewers have been designed to be a minimum 225mm Ø diameter pipes, with gradients designed to achieve self-cleansing velocities.

A Confirmation of Feasibility has been received from Irish Water in respect of both the foul sewer and water supply – Ref. No. CDS22006869, refer Appendix D.

3.2 Proposed Surface Water Drainage

Storm water from the proposed development has been designed in accordance with the GDSDS and ensures that Best Management Practice has been incorporated into the design.

It should be noted that the subject site currently comprises a greenfield site and the proposed surface water measures are aimed at improving the general surface water management of the site, by introducing interceptors, attenuation measures and by restricting the ultimate discharge, etc.

Further to the above, the SDCC Sustainable Drainage Explanatory Design and Evaluation Guide has been taken into account, with sustainable measures being implemented as described below. In addition, the previous concrete pedestrianised footpath areas around the building to the west, north & east have now been replaced with permeable paving.

Storm water from the rear roof areas of the proposed building units, will be directed via rain water pipes into an on-site reticulation system. The outflow from this system will be connected into the surface water drainage network collecting run-off from the road areas and will be ultimately discharged into Attenuation Pond 1 - refer Drawing No. DB13-DR-UG-C127-V2-WS3-PIN Rev. V2.

The front roof areas of the buildings drain into the permeable paving sub-base, prior to the ultimate discharge into the ditch / stream to the west via Attenuation Pond 1.

Based on the contributing area for this current application, i.e. circa 14,300m² (1.43Ha), the total attenuation volume required has been calculated as being circa 1,084m³, which will be provided for as mentioned above, in 2 No. storage ponds & permeable paving - Refer Appendix B for Surface Water Calculations.

The following volumes have been provided for within the storage elements:-

- Attenuation Pond 1 provides a storage volume of 900m³
- Attenuation Pond 2 provides a storage volume of 70m³
- Permeable paving sub-base provides a storage volume of 114m³

It should be noted that Attenuation Pond 1 discharges directly into the aforementioned ditch / stream to the west. Attenuation Pond 2 outfalls into the existing 1400mm Ø network to the south. This network then runs north and connects into the aforementioned ditch / stream.

Storm water from all car park areas and access roads / delivery areas will be drained as follows:-

- A series of on-site gullies and channels draining into a separate system of below ground gravity storm water sewers
- Permeable Paving

Prior to discharging into the proposed ponds, the storm water from the car park and access roads, which is drained via the methods as described above, will be directed through an appropriately sized Conder Separators (or similar approved) petrol interceptor - refer Appendix A for Interceptor Details.

Site investigations have been carried out and the results have shown that the existing sub-soil would provide inadequate soil infiltration rates and thus it is not practical to install a soakaway system. The storm water drainage within the entire development has been designed to accommodate a 1:2 year storm frequency. The ponds and permeable paving sub-base areas have been designed to accommodate a 1:100 year storm event + 20% climate change.

The outflow from the proposed development, will be restricted by way of a Hydrobrake facility, which will limit the total discharge to 2.8l/s, which is the calculated QBAR greenfield run-off rate - refer Appendix B for Surface Water Calculations.

The surface water discharge for this application will incorporate the road areas, parking, service yard area and the roof water from the proposed data hall, which then ultimately feeds into the existing network as previously described. Refer Dwg. No. DB13-DR-SP-C130-V2-WS3-PIN Rev. V2 (External Works Layout), for a drawing indicating the various surface types of this application; all areas are hardstanding of various types, with the respective coefficients detailed below:-

- Access Road – Tarmac (2,395m²) / c = 0.80
- Data Hall Roof Area (6,384m²) / c = 1.00

- Yard Slab Area / Service Yard – Concrete (4,502m²) / c = 0.80
- Open Space / Landscaping (15,305m²) / c = 0.00
- Permeable Paving & Parking Areas (759m²) / c = 0.60
- Concrete Footpath (394m²) / c = 0.8

3.3 Proposed Water Mains

It is intended to serve the proposed development via connection off the aforementioned 160mm Ø PVC spur connection off the network, as located in Falcon Avenue - Refer Drawing No. DB13-DR-SF-C124-V2-WS3-PIN Rev. V2.

Hydrants will be installed in accordance with the Requirements of the Building Regulations and in accordance with the recommendations contained in the Technical Guidance Documents, Section B – Fire Safety, dated 2006, and these are detailed on our engineering drawings.

Water demand for the development has been based on Irish Water's criteria, i.e. 150 litres/hd/day = 7,200 litres/hd/day (based on 48 PE) = 0.083 litres/second.

Avg. Demand = 0.083 l/s x 1.25 = 0.104 litres/second

Peak Demand = 0.104 l/s x 5 = 0.520 litres/second

Water meters, sluice valves and hydrants, in line with Irish Water requirements and specifications, will be installed at the connections onto the aforementioned existing water mains, as required.

A Confirmation of Feasibility has been received from Irish Water in respect of both the foul sewer and water supply – Ref. No. CDS22006869, refer Appendix D.

3.4 Standard Drainage Details

All standard drainage details including manhole details, pipe bedding, channels, hydrants etc. have been included within the planning pack. Details of the types and construction methods will be agreed with the local authority prior to construction.

Drains generally will consist of PVC (to IS 123) or concrete spigot and socket pipes to (IS 6).

Drains shall be laid to comply with the Requirements of the Building Regulations 2016 and in accordance with the recommendations contained in the Technical Guidance Documents, Section H, Drainage & Waste Water Disposal.

Strict separation of surface water and foul sewerage will be imposed on the development. Drains will be laid out to minimise the risk of inadvertent connections of sinks, dishwashers etc. to the surface water system.

In order to minimise the risk of floating contamination of the surface water system, road gullies will be precast trapped gullies to BS5911:Part2:1982.

Concrete bed and surround to the pipe runs will be used where the cover to the pipes is less than 900mm, where the pipes are sufficiently close to the building, or where the pipe runs are below the ground floor slab.

All works are to be carried out in accordance with Irish Water's Code of Practice for Water Infrastructure, dated July 2020 : Document IW-CDS-5020-03 and any subsequent revisions thereof.

4
4.1
Surface & Groundwater Impacts
Construction Phase

Water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors – C532 CIRIA Report (Masters-Williams et al, 2001), which provides information on these issues.

Pollutants can commonly include suspended solids, oil, chemicals, cement, cleaning materials and paints. These can enter controlled waters in various ways:

- directly into a watercourse
- via drains or public sewers
- via otherwise dry ditches
- in old field drains
- by seepage into groundwater systems
- through excavations into underlying aquifers
- by disturbance of an already contaminated site

The proximity of the site to streams, aquifers and water abstractions; potential sources, pathways and impacts of pollution; and the historical uses of the site and nearby areas should be examined early in project planning and design, to ensure that suitable redesign and mitigation measures are undertaken as necessary. During construction, careful management and planning will help minimise water pollution. This may include adequate bunding of all oil tanks, wheel washers and dust suppression on haul roads, particular care to be taken near watercourses, and regular plant maintenance.

A contingency plan for pollution emergencies should also be developed and regularly updated, which would identify the actions to be taken in the event of a pollution incident.

The CIRIA document (2001), recommends that a contingency plan for pollution emergencies should address the following:

- containment measures
- emergency discharge routes
- list of appropriate equipment and clean-up materials
- maintenance schedule for equipment
- details of trained staff, location, and provision for 24-hour cover
- details of staff responsibilities
- notification procedures to inform the relevant environmental protection authority
- audit and review schedule

- telephone numbers of statutory water undertakers and local water company
- list of specialist pollution clean-up companies and their telephone numbers

4.2 Operational Phase

The sources of pollution that could potentially have an effect on surface or groundwater during the operational phase of the development will be oil and fuel leaks from parked cars, service vehicles, HGV delivery's etc. Hydrocarbon interceptors will be provided on storm water drainage sewers from car parking areas as required.

Storm water attenuation measures will be incorporated into the scheme as mentioned previously.

It is not anticipated that flooding of the site will occur, however, an independent Site Specific Flood Risk Assessment has been submitted as part of the planning submission pack.

4.3 Mitigation Measures

The construction management of the building project will incorporate protection measures to minimise as far as possible the risk of spillage that could lead to surface and groundwater contamination.

All appropriate methods will be utilised to ensure that surface water arising during the course of construction activities will contain minimum sediment, prior to the ultimate discharge to the proposed attenuation ponds and the existing stream.

Storm water attenuation measures will be incorporated into the scheme as mentioned previously. Hydrocarbon interceptors will be provided on storm water drainage sewers from service yard areas as necessary. Grease traps will be installed on foul sewers where necessary.

Best practice in design and construction will be employed for the installation of surface water and sanitary drainage.

5 Sustainability

5.1 Site Development

In order to minimize material export and import to the site and the impact of this on the surrounding road network, we are proposing to maintain existing on-site levels as far as is practical. Where this is not feasible, a terrain model has been produced, which will indicate the volumes of cut/fill material, based on the proposed levels and a levels balance will be struck across the site, thereby mitigating any import/export of material for site development.

5.2 Site Drainage

Storm water drainage proposals for the site have been designed in accordance with the GDSDS and incorporate on site storm water attenuation in order to limit discharge of storm water from the developed site to the equivalent Q-bar run-off rates.

The attenuation system proposed is in keeping with other similar developments within Grange Castle Business Park. The pond area not only provides flood storage, but also provides ecological benefits as well.

6 Conclusion

In conclusion, the proposed development of the site by the applicant, for use as a Data Centre development, is considered a suitable use of the site. Local infrastructure has the capacity to serve the proposed development.

The site will be developed in a sustainable manner, in order to minimise the impact of the development during construction and throughout the lifespan of the proposed development.

Accordingly, there are no reasons in relation to the drainage elements as to why this scheme should not be granted planning permission, and with this in mind, the Planning Authority is respectfully requested to recommend a grant of planning permission.

Condor Petrol Interceptor Details

Appendix A

Appendix B

Surface Water Calculations

Permeable Paving

Appendix C

Appendix D

IW Confirmation of Feasibility

CDS22006869

Technical Appendix 10.2: Site-Specific Flood Risk Assessment



KILGALLEN & PARTNERS

CONSULTING ENGINEERS

Vantage Data Centres Ltd.

**Proposed Industrial Development, DUB13, Profile
Park, Grangecastle, Co. Dublin**

Report on Site-Specific Flood Risk Assessment

| | | |
|----------------------------------|----------------------------|--|
| Vantage Data Centres Ltd. | Document Ref. No. | Kilgallen & Partners Consulting Engineers Well Road, Portlaoise Co. Laois |
| | 22050-R-SSFRA Issue PL1 | |

REVISION HISTORY

| | |
|----------------|--|
| Client | Vantage Data Centres Ltd. |
| Project | Proposed Industrial Development, DUB13, Profile Park, Grangecastle, Co. Dublin |
| Title | Report on Site-Specific Flood Risk Assessment |

| Date | Detail of Issue | Issue No. | Origin | Checked | Approved |
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1. INTRODUCTION

Vantage Data Centres Ltd. [‘the Applicant’] intends to apply to South Dublin County Council for planning permission for an industrial development [‘the proposed development’] on lands to the south of the New Nangor Road (R134), Dublin 22; and on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 on an overall site of 3.79hectares [‘the Site’].

The Applicant appointed Kilgallen and Partners Consulting Engineers to :

- carry out a Site-Specific Flood Risk Assessment [‘SSFRA’] for the proposed development in accordance with the ‘Planning System and Flood Risk Management – Guidelines for Planning Authorities’ [‘the Guidelines’];
- prepare a report presenting the findings of the SSFRA to support the application for planning permission;

This is the report referred to above.

2. PROCESS FOR SITE-SPECIFIC FLOOD RISK ASSESSMENT

The initial stage of the SSFRA comprises an assessment of available flood risk data to identify flood risk indicators in the Study Area. If the Site is identified to be at risk of flooding, the SSFRA will proceed to a detailed assessment.

2.1 Potential Sources of Flood Risk

Potential flood risk mechanisms are summarised in Table 2-1.

| Source | Mechanism |
|----------------|---|
| Fluvial: | Overtopping of Rivers and Streams |
| Pluvial: | The intensity of rainfall events is such that the ground cannot absorb rainfall run-off effectively or urban drainage systems cannot carry the run-off generated. |
| Groundwater: | Rising water table |
| Coastal: | Tidal levels and / or wave action |
| Infrastructure | Failure of flood protection or drainage infrastructure |

Table 2-1 Flood Risk Mechanisms

As an inland site upstream of tidal influences and possible wave action, the Site is not subject to coastal flood risk and so this mechanism does not need to be considered further in this assessment.

The assessment will therefore consider the following mechanisms:

- Fluvial;
- Fluvial;
- Pluvial;
- Groundwater;
- Drainage Infrastructure (considered under Section 9 – Residual Flood Risk)

2.2 Flood Risk Indicators

Indicators of flood risk are identified using available data, most of which is historically derived. Typically, this data is not prescriptive in relation to flood return periods and neither predictive nor inclusive of climate change analysis.

Flood risk indicators include:

- Records available on the OPW's National Flood Risk Website. As part of the National Flood Risk Management Policy, the OPW developed the www.floodinfo.ie web-based data set, which contains

information concerning historical flood data and displays related mapped information and provides tools to search for and display information about selected flood events;

- PFRA & CFRAM mapping produced under the CFRAM programme;
- The Strategic Flood Risk Assessment carried out to inform the making of the Local Area Plan;
- Geological Survey of Ireland (GSI) mapping - Hydrogeological mapping maintained by the GSI and made available through its website www.gsi.ie;
- Ordnance Survey mapping - Ordnance Survey maps include areas which are marked as being "Liable to Floods". Generally, these areas are only shown identified indicatively and suggest historical flooding, usually recurrent. In addition, the maps indicate areas of wet or hummocky ground, bog, marsh, springs, rises and wells as well as surface water features including rivers, streams, bridges, weirs and dams;
- Topographical survey information;
- Records of previous floods from other sources;
- Flood Studies, Reports and Flood Relief Schemes carried out in the vicinity of the Study Area;
- Site Walkover.

2.3 Identification of the Presence and Extent of Fluvial Flood Risk

Where the initial process of examining flood risk indicators demonstrates the existence of a risk of fluvial flooding, the study progresses to the next stage, which is a detailed flood risk assessment. This is based on field measurements and hydrological modelling and enables mapping of the zones of Flood Risk within the Site to be established.

In accordance with the Guidelines, flood risk zones are categorized as follows:

- Flood Zone A where the probability of flooding in any year is greater than 1% (i.e. Flood Zone in respect of a flood with a return period of 100years);
- Flood Zone B where the probability of flooding in any year is between 0.1% and 1% (i.e. Flood Zone in respect of a flood with a return period of between 100years and 1,000years);
- Flood Zone C where the probability of flooding in any year is less than 0.1% (i.e. Flood Zone in respect of a flood with a return period of greater than 1,000years).

2.4 Identification of the Presence and Extent of Pluvial Flood Risk

Where the initial process of examining flood risk indicators demonstrates the existence of a risk of pluvial flooding, the study progresses to the next stage, which is a detailed assessment to establish the extent of pluvial flood risk at the Site.

2.5 Identification of the Presence and Extent of Groundwater Flood Risk

Where the initial process of examining flood risk indicators demonstrates the existence of a risk of flooding from groundwater, the assessment progresses to the next stage, which is a detailed assessment to establish the extent of groundwater flood risk at the Site.

2.6 Assessment of Proposed Development

As described in the previous paragraphs, the first stages of the assessment process are concerned with identifying whether the Site is at risk of pluvial, fluvial or groundwater flooding and establishing the extent of any such flood risks.

The next steps in the assessment process are:

- Determination of the impact that any of the identified flood risks will have on the proposed Development;
- Determination of any impact that the Development itself might have in terms of increasing the level of flood risk elsewhere outside the Site;
- Identification of mitigation measures in respect of any such impacts and identification of any residual risks after those mitigation measures are put in place;
- Applying the Development Management Justification Test if appropriate;
- Providing a conclusion as to the appropriateness of the proposed development in terms of flood risk.

3. SITE DESCRIPTION

Figure 3-1 shows the Site in the context of its immediate surroundings and Figure 3-2 shows the main drainage features and site topography indicatively.

The Site is located in Profile Park Business Park. It is bounded:

- to the north by the R134 New Nangor Road;
- to the east by a distributor road [‘the Park Road’] through Profile Park;
- to the west and south by unused agricultural lands which are the site for a recently approved industrial development (PI Reg. Ref. No. SD21A/0241).

The Site is undeveloped and does not appear to be used for any purpose.

Main Drainage Features

The Baldonnell Stream [‘the Stream’] crosses under the Park Road and enters the Site close to its southern boundary. The Baldonnell Stream flows through the Site for approximately 45m and then exits the Site at its west boundary. 190m downstream of the Site the Stream flows through a short 600mm dia. culvert. 300m downstream of the Site, the Stream discharges to a long twin-pipe culvert.

There is no evidence of pluvial drainage entering the Site.

The vegetation is suggestive of poorly draining upper soils but there is no evidence of standing groundwater.

Topography

The Site can be described as relatively flat, with a general shallow fall from northeast to southwest.

Figure 3-1 Site Context

