The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

ENVIRONMENTAL IMPACT ASSESSMENT SCREENING REPORT FOR PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS AND TECHNOLOGY PARK

Report Prepared For
Colliers Properties LLC

Report Prepared By
Teri Hayes, Director AWN

Our Reference
TH/21/12378 ES01

Date of Issue
30 September 2021

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812
Directors: F Callaghan, C Dilworth,
T Donnelly, T Hayes, D Kelly, E Porter

Document History

Document Reference		Original Issue Date	
TH/21/12378 ES01		30 September 2021	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

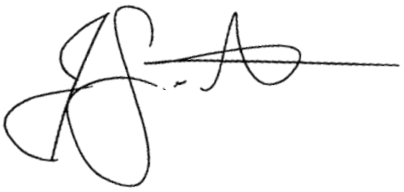
Details	Written by	Approved by
Signature		
Name	Teri Hayes	Jonathan Gauntlett
Title	Director AWN	Sen. Environmental Consultant
Date	30 September 2021	30 September 2021

TABLE OF CONTENTS

Page

LIST OF APPENDICES

1.0 INTRODUCTION

On behalf of Colliers Properties LLC (the Applicant), AWN Consulting Limited (AWN) has prepared the following Environmental Impact Assessment (EIA) Screening Report to accompany the planning application for a proposed datacentre development (the "Proposed Development") within Clonshaugh Business & Technology Park, Clonshaugh Dublin 17. The Proposed Development site is outlined in red on Figure 1.

The subject site is located within the IDA managed Clonshaugh Business and Technology Park which lies approximately 6.5km north of Dublin's city centre and 3km south of Dublin Airport and is accessed from the R104 Oscar Traynor Road to the East of the M1. The IDA Clonshaugh Business and Technology Park accommodates a range of technology and industrial type uses and is bounded by the M50/M1 to the west, the Santry River to the south with Oscar Traynor Road beyond, residential areas to east and the R139 to the north

The Proposed Development, for which a seven-year permission is sought, comprises redevelopment of a mostly brownfield site for two datacentres and associated infrastructure.

Figure 1. Proposed Development site (in red) (source: Google Maps)

The purpose of this report is twofold, to provide Dublin City Council (DCC) with the information required under Schedule 7A to demonstrate the likely effects on the environment, having regard to the criteria set out in Schedule 7 of the Planning and Development Regulations 2001, as amended. This information will enable DCC to undertake a screening determination in respect of the need for an Environmental

Impact Assessment Report (EIAR) for the Proposed Development. The second reason for this report is to document the studies undertaken by the Applicant, and the design team, which demonstrate there are no significant effects predicted as a result of the Proposed Development and the application can be determined by DCC without an EIAR having been submitted.

There is a mandatory requirement for an EIA Report to accompany a planning application for some types of development that meet or exceed the "thresholds"(Ref 2). In addition to the mandatory requirement, there is a case-by-case assessment necessary for sub-threshold developments as they may be likely to have significant effects on the environment. If a sub-threshold development is determined to be likely to have significant effect on the environment, then an EIA Report will be required.

The Proposed Development and component parts have been considered, as documented in Section 2, against the thresholds for mandatory EIA as outlined in Schedule 5, Part 2 Class 10 (a) to (m) (Ref 2). The most relevant project type in the context of the Proposed Development is Class 10 (a) and Class 10 (iv):

10. Infrastructure projects

(a) Industrial estate development projects, where the area would exceed 15 hectares.

(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

The Proposed Development site is c. 3.754 ha and therefore is outside the mandatory requirements for EIA and is a sub-threshold development. The development does not entail an extension or change to any existing EIA project (i.e., Class 13).

AWN Consulting, the design team, and specialist subconsultants have undertaken an assessment on the likelihood of significant effects on the environment from the Proposed Development. The assessment is documented in Section 3.0, 4.0. and 5.0 of this document and covers each aspect of the environment in accordance with guidance (Ref 3) including Population and Human Health; Biodiversity; Land, Soils, Geology, Hydrogeology, and Hydrology; Air Quality and Climate; Noise and Vibration; Landscape and Visual Impact; Cultural Heritage, and Archaeology; Traffic and Transportation; Material Assets, and Waste.

1.1 EIA SCREENING LEGISLATION AND GUIDANCE

The legislation and guidance listed below has informed this report and the EIA Screening methodology:

- European Union (Planning & Development) (Environmental Impact Assessment) Regulations 2018;
- Environmental Impact Assessment of Projects – Guidance on Screening. (2017). European Commission.
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report. (2017) European Commission.

- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems – Key Issues Consultation Paper (2017:DoHPCLG)
- Preparation of guidance documents for the implementation of EIA directive (Directive 2011/92/EU as amended by 2014/52/EU) – Annex I to the Final Report (COWI, Milieu; April 2017);
- European Union Environmental Impact Assessment (EIA) Directive 2011/92/EU as amended by 2014/52/EU
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. (August 2018). Department of Housing, Planning and Local Government.
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports. (Draft, August 2017). Environment Protection Agency.
- Advice Notes for preparing Environmental Impact Statements. (Draft, September 2015). Environment Protection Agency
- Planning and Development Act, 2000 (as amended)
- Planning and Development Regulations 2001 (as amended)
- Interpretation of definitions of project categories of Annex I and II of the EIA Directive. (2015) European Commission
- Guidance for Consent Authorities regarding Sub-threshold Development (2003; DoEHLG).
- Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021

The national requirements to provide an EIA with a planning application is outlined in *Planning and Development Act 2000 as amended* (the Act) and *Planning and Development Regulations, 2001 as amended* (the Regulations). In addition to the national legalisation there are requirements set out in the EU Directive (as referenced above); the EU Directive has been transposed into Irish Legislation.

There is a mandatory requirement for an EIA Report under Section 172(1)(a) of the Act to accompany a planning application for some types of projects which are equal to or exceeds a limit, quantity or "threshold" set for that class of development. The mandatory thresholds for an EIA Report are set out in Schedule 5 of the Regulations.

In addition to the mandatory requirement, there is a case-by-case assessment necessary for sub-threshold developments and a requirement under Section 172(1)(b) of the Act for an EIA to accompany a planning application for sub-threshold development which would be likely to have significant effects on the environment. In order to determine if a Project would be likely to have significant effects on the environment and if an EIA is required Schedule 7 of the Regulations sets out the relevant criteria to be considered by the Planning Authority.

Section 176A(2)(a) of the Act states that an application for screening for environmental impact assessment may be submitted to the Planning Authority. The scope of the information to be provided by the developer when an application for screening is made is set out in Section 176A(3) of the Act, Schedule 7A of the Regulations, and Annex IIA of the EU Directive.

The screening process followed in this report is in accordance with the EIA Directive 2011/92/EU of the European Parliament and of the Council as amended by 2014/52/EU and follows the format as per Section 3.2 of the Draft EPA Guidelines (August 2017)[1]. The potential for significant effects of the proposed Project has been

considered against Schedule 7 of the *Planning and Development Regulations, 2001 as amended*[2].

In producing this report due regard has been paid to other EIA guidance including the European Union's 2017 EIA *Guidance on Screening*[3] and *Guidance on the preparation of the Environmental Impact Assessment Report*[4] as well as the published *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessme*nt[5].

It is important for the Planning Authority to note that Article 27 of the EU Directive states that "*The screening procedure should ensure that an environmental impact assessment is only required for projects likely to have significant effects on the environment*". This screening exercise is used to establish whether the proposed Project is likely to have significant effects on the environment and if an EIA Report is required.

1.2 SCREENING METHODOLOGY

The key steps to screen for an EIA is set out in Section 3.2 of the EPA Guidelines (August 2017). This EIA Screening Report has been arranged to address the information as required by these steps. These steps are:

1. Is the development a type that that requires EIA?
2. Is it of a type that requires mandatory EIA?
3. Is it above the specified threshold?
4. Is it a type of project that could lead to effects? and/or
5. Is it a sensitive location? and/or
6. Could the effects be significant?

An assessment of the points 1 to 3 above has been made by AWN against the relevant legislation and thresholds set out in Schedule 5 of the Regulations, this evaluation has been documented in Section 2.0 of this report.

In order to address points 4 to 6 above, an evaluation of the characteristics of the project, the sensitivity of the location of the Proposed Development, and the potential for significant impacts has been made with regard to Schedule 7 of the Regulations. Schedule 7 of the Regulations sets out the criteria for the Planning Authority to determine whether a development would or would not be likely to have significant effects on the environment. The criteria is broadly set out under the three main headings:

- Characteristics of Proposed Development (Section 3.0)
- Location of Proposed Development (Section 4.0)
- Types and Characteristics of Potential Impacts (Section 5.0)

The Planning Authority must have regard to the Schedule 7 criteria in forming an opinion as to whether or not a development is likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location should be subject to EIA.

The information required to be submitted by the developer for the Planning Authority to make a determination on EIA Screening is set out in Schedule 7A of the Regulation, Section 176A(2)(a) of the Act, and Annex IIA of the EU Directive.

However, it is important to note that Schedule 7A states '*The compilation of the information at paragraphs 1 to 3 [*of Schedule 7A*] shall take into account, where relevant, the criteria set out in Schedule 7*.' The main body of this report (Sections 3.0, 4.0 and 5.0) will cover Schedule 7A fully, but it has been set out to present the information under the headings provided for in Schedule 7 in order to assist the Planning Authority in its screening assessment.

1.3 CONTRIBUTORS TO THE EIA SCREENING REPORT

The preparation and co-ordination of this screening report has been completed by AWN Consulting in conjunction with the project design team and developer.

Table 1. Contributors to this Report

Role	Contributor
Developer	Colliers Properties LLC
Architectural	MCA Architects
Planning	John Spain & Associates
Civil, Mechanical and Electrical Engineering, Traffic and Transportation	Clifton Scannell Emerson Associates
Population and Human Health; Land Soils, Geology, Hydrogeology, and Hydrology; Air Quality and Climate; Noise and Vibration; Material Assets and Waste management	AWN Consulting Limited
Landscape and Visual Impact	Brady Shipman Martin
Archaeology	CRDS
Biodiversity including Appropriate Assessment Screening	Moore Group

The various reports address a variety of environmental issues and assess the impact of the Proposed Development and demonstrate that, subject to implementation of the construction and design related mitigation measures recommended in this report, the Proposed Development will not have a significant impact on the environment. This EIA Screening Report should be read in conjunction with the plans and particulars submitted with the planning application.

2.0 SCREENING EVALUATION

2.1 IS THE DEVELOPMENT A PROJECT?

The first step in screening is to examine whether the proposal is a *project* as understood by the EU Directive. For the purposes of the EU Directive, 'project' means:

- the execution of construction works or of other installations or schemes, or
- other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources.

The EPA Guidance (2017) states that if a proposed project is not of a type covered by the Directive, there is no statutory requirement for it to be subject to environmental impact assessment. In determining if the proposed project is of a type covered by the

Directive it may be necessary to go beyond the general description of the project and to consider the component parts of the project and/or any processes arising from it.

If any such parts or processes are significant and, in their own right, fall within a class of development covered by the Directive, the proposed Project as a whole may fall within the requirements of the Directive.

Each element of the Proposed Development has been examined and the development clearly meets the definition of a Project as understood by the EU Directive.

2.2 IS THE DEVELOPMENT A PROJECT THAT REQUIRES A MANDATORY EIA?

The next step is to determine if the Proposed Development is of a project type that requires mandatory EIA; i.e. is the Proposed Development of a project type in which a thresholds do not exist. The types of projects to which thresholds do not apply are types that are considered to always be likely to have significant effects.

Ireland's type of projects for which an EIA is mandatory is set out in the Schedule 5 Part 1 and Part 2 of the Regulations. An EIA is deemed mandatory under Section 172 of the Act to accompany a planning application for development for the types of projects set out in Schedule 5. This list was developed from Annex I and Annex II of the EIA Directive.

There is no specific project type listed under Schedule 5, Part 1 or Part 2 of the Regulations for the Proposed Development.

In considering the wider context and the component parts of the project the Proposed Development would most appropriately fall under the project type *Schedule 5, Part 2, Class 10 Infrastructure Projects*. Class 10 is of a type that sets out project thresholds; therefore, the next screening step is to determine whether the project exceeds the specific project threshold.

2.3 IS THE PROJECT ABOVE THE THRESHOLD FOR EIA?

An EIAR is required to accompany an application for permission of a class set out in the Schedule 5 Part 1 and Part 2 of the Regulations which equals or exceeds, as the case may be, a limit, quantity or threshold set for that class of development. A development that does not exceed a limit, quantity or threshold set for that class of development in Schedule 5 of the Regulations is known as a 'sub-threshold development'.

The Proposed Development and component parts have been considered against the thresholds outlined in Schedule 5, Part 2 Class 10 (a) to (m). The most relevant project type in the context of the Proposed Development is Class 10 (a) and Class 10 (iv):

10. Infrastructure projects

(a) Industrial estate development projects, where the area would exceed 15 hectares.

(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

The total site area for the proposed works is 3.754 hectares. The site location is not within a business district but is within an industrial estate setting i.e. not within a district where the predominant uses are retail or office/commercial type users. The Proposed Development site is not equal to nor does it exceed the limit, quantity or threshold set out in Class 10(a) or Class 10(iv); therefore, an EIA is not mandatory.

2.4 CONCLUSION – SUB THRESHOLD DEVELOPMENT

The Proposed Development is '*of a type set out in Part 2 of Schedule 5 [in the Planning and Development Regulations, 2001 (as amended)] which does not equal or exceed, as the case may be, a quantity, area or other limit specified in that Schedule in respect of the relevant class of development*'. The development is outside the mandatory requirements for EIA, and is considered to be sub-threshold for the relevant project type.

An EIA Report is still required by Section 172 of the Act to accompany a planning application for sub-threshold development which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7.

However, where a Proposed Development is a sub-threshold development, the Applicant may make an application for a screening determination for EIA to the planning authority in whose area the development would be situated, under section 176A(2)(a) of the Act. Therefore, the final step in the screening process is to consider the need for an EIA on a discretionary basis.

Article 4(4) of Directive 2014/52/EU requires the developer to provide information on the characteristics of the project and its likely significant effects on the environment, to allow the competent authorities to make a determination on the requirement for an EIA.

The remainder of this report is to form the basis of the application made for sub-threshold screening for EIA under Section 176A(2)(a) and presents the information required by Schedule 7A to demonstrate the likely effects on the environment, having regard to the criteria set out in Schedule 7. The following Sections 3.0, 4.0 and 5.0 will provide information on the characteristics of the Proposed Development; the location and context, and its likely impact on the environment as well as a description of any features of the project and/or measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment. These sections present the information required under Schedule 7A of the Regulations, broadly set out in the structure Schedule 7 to ensure that each aspect for consideration is robustly addressed.

3.0 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

This section addresses the characteristics of the Proposed Development by describing the development in detail. This is to identify all areas of potential issues to explore further and assess for impacts.

3.1 SIZE AND DESIGN OF THE PROPOSED DEVELOPMENT

This EIA Screening Report should be read in conjunction with the plans and particulars submitted with the planning application. The overall site area is 3.754 ha.

The Proposed Development is presented in Figure 2 below.

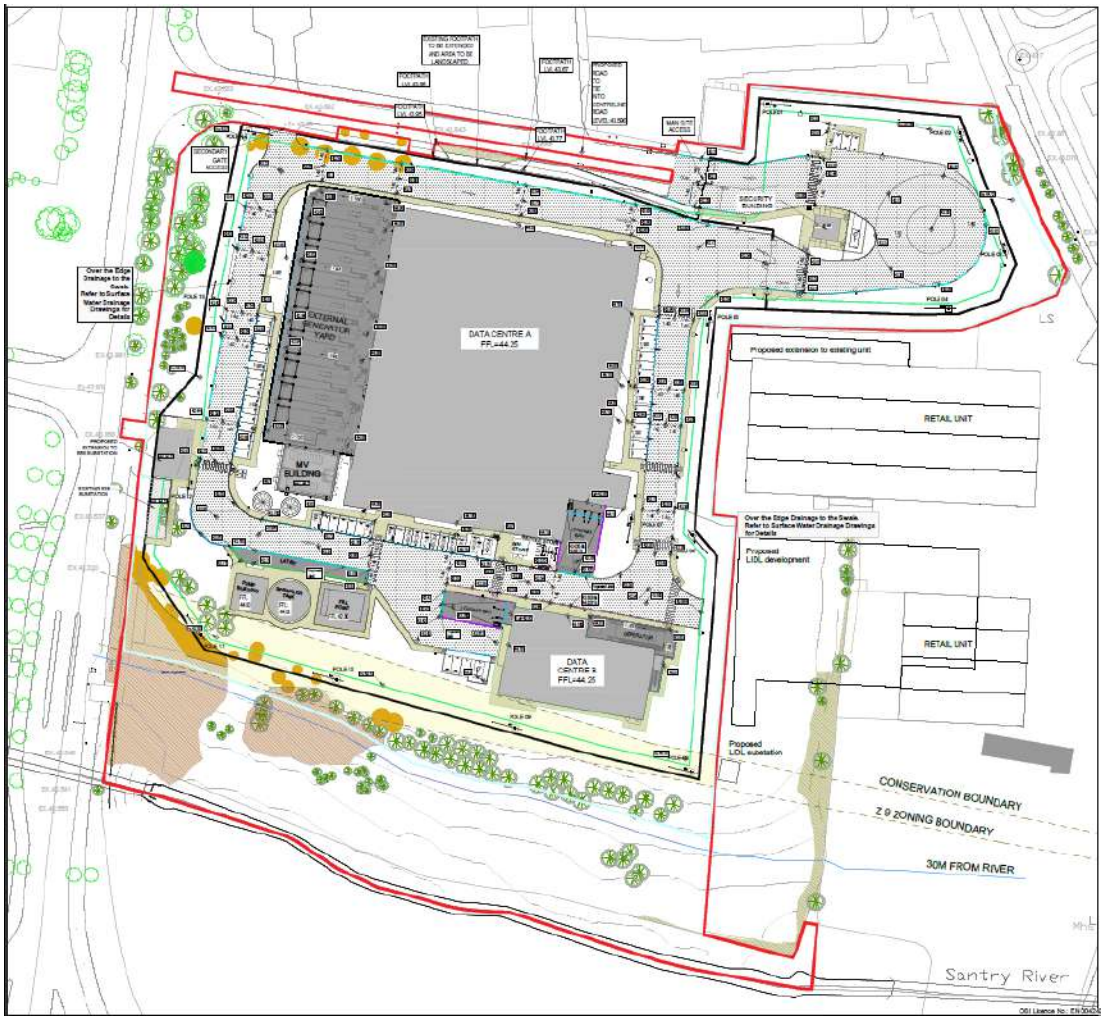


Figure 2. Proposed Development Layout (source: MCA)

The proposed development, for which a seven-year permission is sought, comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works including removal of existing site services and ESB pillar boxes (other buildings previously occupying the site were demolished under Reg. Ref.: 2229/19, a previously permitted data centre development, as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys (with Data Centre A also including two mezzanine levels), with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant and solar panels at roof level;
- Data Centre B (which will be ancillary to Data Centre A) will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level;
- Emergency generators and associated flues will be provided within compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;

- Ancillary structures including a sprinkler tank and pumphouse, security building, MV building, and provision of two additional MV substation rooms to the existing substation on site (c. 115 sq.m additional GFA), which was previously constructed under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking (58 no. spaces) and bicycle parking (24 no. spaces).airport
- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated and ancillary works including underground foul and storm water drainage network, and utility cables.

The Landscape Design Rationale prepared by Brady Shipman Martin (BSM) describes the landscape design, which forms an integral part of the overall design. The landscape design was developed to maximise the opportunity for green infrastructure and biodiversity to the local environment and surrounding context of the site. Special consideration was given to the south (Z9) area of the development. The objective through the design is to protect and enhance the existing landscape. A detailed planting specification of extra heavy to semi mature trees species planted in clusters to enhance the screening of the southern boundary of the site and protecting the parkland feel to the area. The south side of the proposed boundary fence will be softened with the specification of a native hedge running along the external edge of the fence, allowing for a 3m clear zone from the inside of the boundary fence to the internal security fence. The retention of the existing woodland in the south west corner of the Z9 area is an integral part of the design intent, enhancement through the specification of the indigenous grass species and native woodland whip planting brings this narrative into the internal site landscape. The landscape to the internal side of the development boundary is composed of native and indigenous planting, with a mix of native woodland and scrub whip planting to enhance the biodiversity and provide seasonal interest and food source for birds and invertebrates. Native locally sourced wild flower seed mixes will also be specified to enhance and develop the biodiversity across the site.

The various reports prepared by the specialist consultants are included in Appendices A – I and design team members are outlined within Section 1.3. These reports describe particular aspects of the scheme in further detail, and form part of the overall application.

The architectural design of the Proposed Development utilises high quality materials and reflects the existing pattern of development in the surrounding area. The external wall finishes will generally comprise colour coated proprietary profiled metal cladding panels on a steel frame structure, including modulated forms on the Data Centre buildings clad in a contrasting flat metal cladding panel, in order to break down their apparent mass and scale. The facade colour will comprise a number of muted cladding colours, and will include an extent of glazed facade and canopy announcing the building entrances. The façade to the first floor office and welfare areas in Data Centre A will include a proprietary powder coated aluminium curtain wall system with infill glazed window and opaque panels all set within a slightly projecting box in a contrasting feature cladding. The Proposed Development will be compatible with its surroundings and the pattern of development in the vicinity.

A detailed description of the architectural rationale and characteristics of the proposals is provided within the Design Statement prepared by MCA Architects, which accompanies the Application.

There will be a total of 12 diesel generators: Datacentre A will have 10 critical generators and one house generator and Datacentre B will have one generator. An iterative stack height assessment was undertaken to determine the minimum stack height required for dispersion purposes. It was found that a stack height of 25m for the 10 critical electrical room generators and one house generator was sufficient for dispersion of pollutants for Datacentre A, whilst a stack height of 16 m for the Datacentre B generator was found to be sufficient.The site has an existing substation and this will be extended as part of the Proposed Development to accommodate the operator's electrical equipment and client control features with safe access for maintenance and operations.

Full details on water and wastewater is provided in the Engineering Planning Report(4) (Drainage and Water Services) provided with planning. The proposed development's foul water demand (peak discharge of 0.26l/s and average discharge of 0.06 l/s is within the capacity of the existing public sewer. Disposal of foul water from the site is separated from that of surface water. To reduce both energy and water use, the operator utilises direct evaporative cooling system, which predominately utilises outside air to cool the facility. This means that for more than 95% of the year it will use no water to cool the facility. The average rate of water demand is 0.2l/s. For a small number of hours during the peak cooling season, adiabatic cooling is required. The adiabatic cooling will use rainwater as the primary supply and mains water as a back-up to provide cooling on peak cooling days. On the infrequent occasions when adiabatic cooling is required the peak rate of water demand is 70m^3/day or 1.2l/s. It is anticipated that the total annual industrial (cooling) water consumption will be 264 m^3. The proposed buildings are designed to harvest up to 90% of the annual cooling water requirements through rainwater harvesting, offsetting the water used from the mains supply. The business water demand will be 821 m^3 per annum excluding contribution of rainwater harvesting, total water usage of c. 1085m^3 per annum. Details of the pre-connection enquiry submitted to Irish Water is included within the Engineering Planning Report.

The Proposed Development's surface water drainage system was designed in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). Surface water attenuation is located in the northeast corner of the site comprising a closed Stormtech ™ attenuation system (or similar). Rainwater harvesting will be provided as part of the scheme to reduce water consumption.

There is an existing 225mm diameter pipe located in the centre of the existing IDA Business Park Estate Road which runs along the northern boundary of the site. This 225mm diameter pipe connects to a 900mm diameter pipe which flows in a southerly direction towards the Santry River in the verge of the main entrance road to the Clonshaugh Business and Technology Park. The invert levels of existing manhole is 41.00m OD which is 2.5m deep.

3.2 CUMULATION WITH OTHER EXISTING OR PERMITTED DEVELOPMENT

This section outlines the potential cumulation with other existing or permitted development. As part of the assessment of the impact of the Proposed Development, account has been taken of any relevant developments that are currently permitted, or under construction and substantial projects for which planning has been submitted within the surrounding areas, as well as existing local land uses.

The lands are primarily zoned Z4 (District Centre) with partial zoning in Z6 (Employment/Enterprise) and Z9 (Amenity/open space network/green network). As

outlined in the Planning Report(Ref5) prepared by John Spain and Associates which accompanies the planning application for the Proposed Development, the acceptability of data centre development on this site, and under the Z4 and Z6 zoning is demonstrated by the planning history and is consistent with surrounding business park

development. The Z4 zoning is residual based on the previously permitted significant mixed-use development at this location. The southern area of the site is subject to a Z9 zoning objective and is a conservation area. The development will not encroach on this area and will maintain the Z9 lands free of development. The development will maintain the setback of 30 m from the Santry River, and will seek to protect and enhance the appearance of the area.

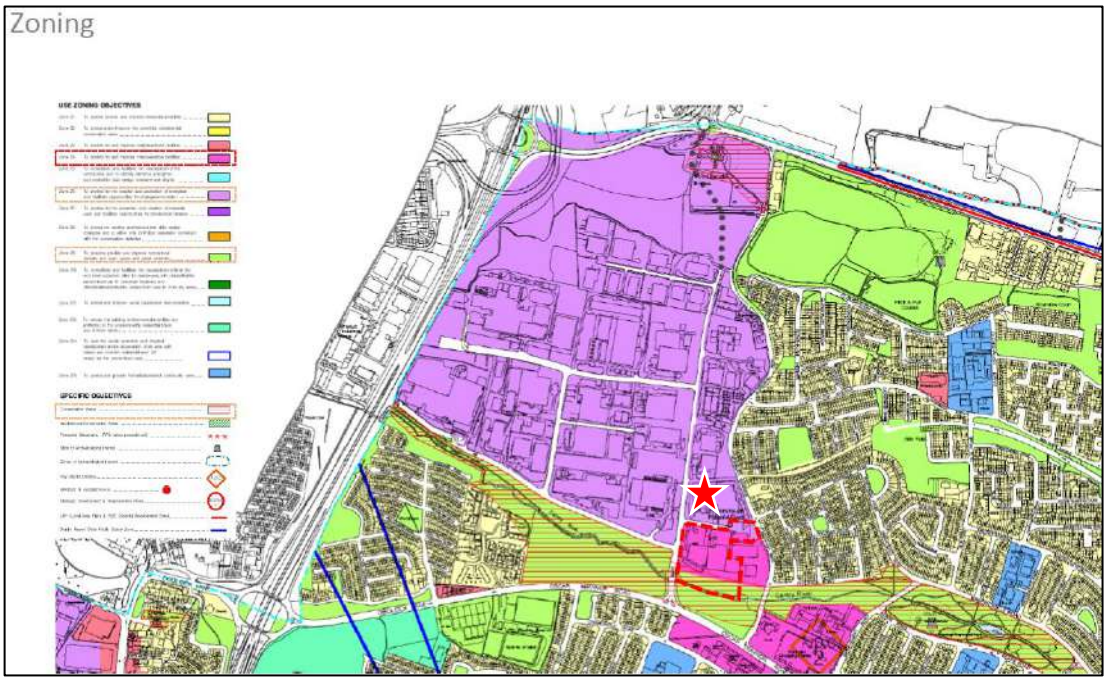


Figure 4 Site Zoning (Source: DCC County Development Plan 2016-2022)

The Dublin City Council and Fingal County Council online planning search systems were consulted to generate a list of applications granted permission within the previous 5 years. Appendix A documents the relevant planning history within the vicinity (2 km) of the subject site.

It is important to note that each project shown which has been permitted is subject to an EIA and/or planning conditions which include appropriate mitigation measures to minimise environmental impacts. Any new large-scale development proposed in the surrounding area would be accompanied by an EIA, or EIA Screening as appropriate and the take mitigation plan taken into consideration in the development of this site.

Each environmental discipline who has contributed to this report has considered relevant permitted or proposed projects and assessed the potential for cumulative impact due to these projects. This is further discussed in section 5.10.

3.3 NATURE OF ANY ASSOCIATED DEMOLITION WORKS

There is one remaining building for demolition. This is a two-storey building c. 2,400sqm. The building is post 1990 which indicates a low likelihood of use of asbestos. However, an asbestos survey will be undertaken prior to demolition works.

3.4 USE OF NATURAL RESOURCES (LAND, SOIL, WATER, BIODIVERSITY)

This section describes the Proposed Development in terms of the use of natural resources, in particular land, soil, water, biodiversity. The Proposed Development will consume minimal amounts of natural resources during construction and operation.

Land and Soil

The subject site is well suited for the Proposed Development, which is permissible under the zoning of the lands. The area proposed for development within the site has previously been developed and is surrounded by established industrial uses. Land associated with the Santry River corridor will not be impacted by the Proposed Development and further addition of trees will in fact enhance landscape and biodiversity in this area. As such there is no loss of greenfield, amenity or agricultural land.

There will be a requirement for deliveries of imported engineering fill, and other construction materials. Other construction activities will include site storage of cement and concrete materials and fuels for construction vehicles.

For further detail on the physical characteristics of the Proposed Development please refer to the architectural and engineering drawings, design statement and the landscape drawings which accompany this planning application.

Water consumption and wastewater requirement.

As outlined in the Engineering Report(4) provided with planning:

The existing water infrastructure within the area has been confirmed to have adequate capacity to cater for the Proposed Development.

The proposed sites foul water demand (peak discharge of 0.26l/s and average discharge of 0.06 l/s) is sufficient for the 150mm diameter proposed foul water pipe to tie into the existing 150 mm diameter foul water pipe located to the west of the site. The disposal of foul water from the site is separated from that of surface water.

Investigations into the impacts on biodiversity including species and habitats has been undertaken by the Moore Group. The Appropriate Assessment (AA) Screening report and Ecological Impact Assessment[6] (EcIA) are included in Appendix B.

Ger O' Donoghue (Moore Group Ecologist) undertook site surveys on July 29th and August 11th to identify the habitats and species within the site and surrounds. The desk review and field survey is documented as part of the EcIA.

The nearest European sites to the Proposed Development are coastal sites of Dublin and Baldoyle Bays and the Malahide Estuary, including North Dublin Bay SAC, situated 4.33km to the southeast, and South Dublin Bay and River Tolka Estuary, 3.88km to the south. The Proposed Development is located within the hydrological catchment of the Santry River which flows along the southern perimeter of the site.

There were no rare or protected habitats or species recorded on the site and there were no records of invasive species. The habitats under the footprint of the Proposed Development are of low local ecological value. The Proposed Development site

observes a minimum buffer zone of no development within 30m of the Santry River negating the potential for any accidental discharges during construction to the Santry River. The redline for the development runs along the Santry river. Discharges during operation are to public sewers. Stormwater discharge is treated through stormwater interceptors prior to discharge from the site. Best practice measures are included in the design and CEMP to negate any off site impact on birds and bats.

The Proposed Development is therefore considered to have an imperceptible impact on existing biodiversity resources.

Waste Management

Waste materials will be generated from the demolition of the existing warehouse style building and hardstanding areas on site, as well as from the excavation of the building foundations.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific Construction and Demolition Waste Management Plan (C&D WMP) contained within Appendix G of this document. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the Proposed Development. The reuse, recycling / recovery and disposal rates have been estimated using the EPA National Waste Reports and these are summarised in below. Tables 2 and 3 provide information regarding demolition and construction waste, respectively.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	64.8	0	0.0	85	55.1	15	9.7
Concrete, Bricks, Tiles, Ceramics	367.2	30	110.2	65	238.7	5	18.4
Plasterboard	28.8	30	8.6	60	17.3	10	2.9
Asphalts	7.2	0	0.0	25	1.8	75	5.4
Metals	108.0	5	5.4	80	86.4	15	16.2
Slate	57.6	0	0.0	85	49.0	15	8.6
Timber	86.4	10	8.6	60	51.8	30	25.9
Asbestos	1.0	0	0.0	0	0.0	100	1.0
Total	**721.0**		**132.8**		**500.0**		**88.1**

Table 2. *Estimated off-site Reuse, Recycle and Disposal Rates for Demolition Waste*

Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations and underground services. The development engineers (Clifton Scannell Emerson Associates Consulting Engineers) have estimated that 32,000m^3 of

material will need to be excavated as part of the development of this project[4]. It is currently envisaged that there will be a limited opportunity for reuse of excavated material onsite and all material will be required to be removed offsite. This material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

If the material that requires removal from Site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011). For more information in relation to the envisaged management of by-products, refer to the C&D WMP (Appendix G).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP (Appendix G). The C&D WMP provides waste management measures and an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 3.

Table 3. Estimated off-site Reuse, Recycle and Disposal Rates for Construction Waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	281.4	10	28.1	80	225.1	10	28.1
Timber	238.7	40	95.5	55	131.3	5	11.9
Plasterboard	85.3	30	25.6	60	51.2	10	8.5
Metals	68.2	5	3.4	90	61.4	5	3.4
Concrete	51.2	30	15.3	65	33.3	5	2.6
Other	127.9	20	25.6	60	76.7	20	25.6
Total	852.6		193.5		578.9		80.1

Operational Phase

The Proposed Development will give rise to a variety of waste streams during the operational phase, i.e. when the project is completed, and fully operational. The majority of waste will be generated from packaging for equipment deliveries to the facility which is likely to be at its peak in the early months of operation. Waste will also be generated from the occupants of the building during operations. These waste types will mainly be non-hazardous.

The following waste management measures will be implemented during the operational phase:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Dry Mixed Recyclables;
    - Organic food/green waste;
    - Mixed Non-Recyclable Waste;
    - Batteries (non-hazardous and hazardous);
    - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
    - Timber Pallets;
    - Metal shelving (and from time to time other bulky wastes); and
    - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.).
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly labelled with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

All waste contractors collecting waste from the site must hold a valid collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO) and waste will only be brought to suitably registered/permitted/licenced facilities. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

These measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

3.5 POLLUTION AND NUISANCES

There are potential short-term nuisances such as dust, noise, as well as the potential for pollution of groundwater or storm drains associated with demolition, excavations and construction. An outline Construction Environmental Management Plan (CEMP) (7) has been prepared by CSEA. In advance of work starting on site, the works contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The CEMP will set out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the Contractor.

The CEMP includes mitigation measures to ensure that pollution and nuisances arising from demolition, site clearance and construction activities are prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the Proposed Development.

This CEMP will be maintained by the contractors during the construction phases and covers all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

3.6 RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

Landslides, Seismic Activity and Volcanic Activity

The Geological Survey Ireland (GSI) landslide database[i] was consulted and the nearest landslide to the Proposed Development was 11 km to the east of the site in a very different geological environment, referred to as the Diswellstown 1990 event which occurred on 24 December 1999. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. Currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed development was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~50 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the Proposed Development site. There are no active volcanoes in Ireland so there is no risk from volcanic activity.

Flooding/Sea Level Rise

The potential risk of flooding on the site was reviewed with regard to incidences of historical, regional and local flooding relevant to the area of the subject site. A Flood Risk Assessment has been prepared by CSEA (6) and is included with the planning application documentation for the Proposed Development. Resources on flooding aspects for the subject area were reviewed and included the following:

- Catchment Flood Risk Assessment and Management (CFRAM).
- Review of Historic Flood Events Office of Public Works (OPW) on-line database (floodinfo.ie).
- Fingal Development Plan Strategic Flood Risk Assessment 2017-2023.

A review of available information has identified no flood hazards at the Proposed Development site; therefore, in accordance with Flood Risk Management (FRM) Guidelines the site is located within Flood Zone C, where the probability of flooding is low. Low Probability flood events have an indicative 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1%. The Proposed Development is considered '*Appropriate'* for Flood Zone C. Some of the greenfield area (which is not proposed for development) to the south of the site (i.e. the immediate vicinity of the Santry River) are within 1% and 10% AEP fluvial extent and therefore within Flood Zone A.

According to OPW information the site is at risk of pluvial flooding (i.e rainwater ponding on site rather than fluvial flooding which is a result of river flooding). However, the design of the surface water drainage network and attenuation storage are considered to be sufficient measures to provide protection to the development from the potential pluvial flooding risk.

Major Accidents/Hazards

The subject site is located c. 3 kilometres from Dublin Airport, which is situated to the northwest of the subject site. The site is located outside the public safety zones associated with the Airport. Due to the distance of the development from the airport and based on the overall scale and height of the proposed development, along with the modest extent of solar panels proposed at roof level, it is considered that the proposals would not give rise to a requirement for further assessment of impact on Airport operations. This is confirmed in the Glint and Glare Assessment which is provided with this planning submission.

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

The Proposed Development will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for generators and the amounts proposed do not exceed the relevant thresholds of the Seveso Directive. The Proposed Development site is not located within the consultation distance of any COMAH establishment that is notified to the HSA.

The Proposed Development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (S.I. 299 of 2007, S.I. 445 of 2012, S.I. 36 of 2016) as amended and associated regulations.

Minor Accidents/Leaks

There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction. However, the implementation of the mitigation measures as set out in the Appendices included with this report and in the CEMP will ensure that the residual effect on the environment is imperceptible.

3.7 RISKS TO HUMAN HEALTH

The characteristics of the Proposed Development, in terms of the risks to human health have been considered in this assessment. The primary potential impacts of the Proposed Development on human health would be increase in air pollution, noise, or pollution of groundwater/drainage as a result of the Proposed Development. Visual impact and traffic are also potential but perhaps lesser significant impacts (based on the location of the Proposed Development within a highly developed area).

The location of the Proposed Development is within a previously developed site located in a predominantly commercial and industrial area within an IDA Business park. The nearest residential locations are the properties to the east along the Clonshaugh road and to the southwest along the Oscar Traynor road. An undeveloped green area runs along the Santry River to the South of the proposed development. The Proposed Development footprint will not impact on the Santry River corridor and amenity area.

The Geological Survey of Ireland data shows that the site does not lie within a drinking water protection area. The area is serviced by mains water supply therefore it is unlikely that any wells are used for potable water supply. There are no watercourses on the site and no open water connection to the Santry River. As such the only pathway for contamination of a water resource would be through the stormwater drainage system. The proposed mitigation measures outlined in the CEMP will ensure that there are no impacts on groundwater or the stormwater drainage system. The Proposed Development will include an appropriately designed stormwater network including two hydrocarbon interceptors that will ensure any risk from diesel spills through the carparks or unloading areas is minimised. Wastewater from the Proposed Development will connect to mains supplies and will not have a potential impact on local amenities or the local population. As outlined within the Engineering Report [(4)] there is an Irish Water agreement in place.

The CEMP will incorporate best practice construction methodologies for the control of dust generation, traffic, and noise, as well as the management of impacts on groundwater or storm drainage system during the construction phase. Any impacts associated with dust generation, traffic, and noise will be short term.

The potential impacts on human health as a result of the generation of Noise and Air Emissions are considered to be negligible and have been assessed through a detailed Noise Impact Assessment. Air Quality Impact Assessment and Traffic Impact Assessment as detailed further in Appendix C, D and E respectively.

4.0 LOCATION AND CONTEXT OF THE PROPOSED DEVELOPMENT

4.1 EXISTING AND APPROVED LAND USE

The Proposed Development site is a brownfield site with existing planning for a Data Centre development (DCC Reg ref 2229/19).

The lands are primarily zoned Z4 (District Centre) with partial zoning in Z6 (Employment/Enterprise) and Z9 (Amenity/open space network/green network). As outlined in the planning report prepared by John Spain and Associates [(5)] provided with planning, the acceptability of data centre development on this site, and under the Z4 and Z6 zoning is demonstrated by the planning history set out previously and consistent with surrounding business park development. The Z4 zoning is residual

based on the previously permitted significant mixed-use development at this location. The southern area of the site is subject to a Z9 zoning objective and is a conservation area. The development will not encroach on this area and will maintain the Z9 lands free of development. The development will maintain the setback of 30 m from the Santry River and will seek to protect and enhance the appearance of the area.

It is considered that the Proposed Development is consistent with the existing land uses and the wider industrial/commercial land uses in the IDA Business Park.

4.2 RELATIVE ABUNDANCE, AVAILABILITY, QUALITY AND REGENERATIVE CAPACITY OF NATURAL RESOURCES IN THE AREA AND ITS UNDERGROUND RESOURCES

4.2.1 Hydrogeology and Hydrology

Inspection of the available Geological Survey of Ireland mapping shows that the bedrock geology underlying the Proposed Development site belongs the Lucan Formation (west area) and Tober Colleen Formation (to the east). The GSI categorises the bedrock aquifer underlying the Proposed Development site as having a 'Low' vulnerability (>10 m of low permeable overburden thickness) which is consistent with the site investigation results.

The bedrock aquifer underlying most of the Proposed Development site according to the GSI National Draft Bedrock Aquifer Map is classified as a 'Poor Aquifer' (Pl) which is described as Bedrock which is Generally Unproductive except for Local Zones. The north-western part of the site is, however, classified as a Locally Important Aquifer (Ll), Bedrock which is Moderately Productive only in Local Zones).The site is not located near any public groundwater supplies or group schemes. There are no groundwater source protection zones in the immediate vicinity of the site.

The Groundwater Body (GWB) underlying the site is the Dublin GWB. Currently, this GWB is classified under the WFD Risk Score system (EPA, 2021) as 'under review'. The Dublin GWB was given a classification of 'Good' for the last WFD cycle (2013-2018).

Currently, the EPA classifies the Santry River waterbody located to the south of the site as having 'Poor' status (3rd Cycle 2013-2018) and as being 'At risk' of not achieving Good status, which means that there is a possible threat to the ecological status resulting in harm to the river ecosystems. This 'Poor' status in the Santry River is due to its Invertebrate Status or Potential (EPA, 2021). An active EPA water quality station is located next to the subject site (Clonshaugh Road Bridge); this station is classified with a Biological Q Rating of 'Q2-3' according to its 2019 records, which means a 'Moderately Polluted' status in the river. This is consistent with historical ecological conditions recorded in the Santry River during previous years.

There is no direct discharge proposed to the Santry River or groundwater. The contractor will be required to operate in compliance with the Outline Construction Environmental Management plan (CEMP)[6] to manage any accidental risk of discharge of sediment or hydrocarbon contaminated water during construction. Design measures including bunding of oil tanks and the installation of two interceptors on the stormwater drainage will provide mitigation against unlicensed discharge during operation.

OPW Flood Maps show that the area proposed for development is located within Flood Zone C (i.e., where the probability of flooding or AEP from rivers is less than 0.1% or 1 in 1000). Some of the greenfield area to the south of the site (i.e., the immediate vicinity of the Santry River) are within 1% and 10% AEP fluvial extent and therefore within Flood Zone A. Attenuation will ensure that there is no off site risk of increased flooding.

Based on the hydrogeological and hydrological assessment (Appendix E), It is considered that the Proposed Development will have an imperceptible (following EIA guidance) impact on the existing water environment.

4.2.2 Biodiversity

The potential ecological impacts of Proposed Development have been considered in terms of the sensitivity of the location through the Moore Group Appropriate Assessment (AA) Screening report and Ecological Impact Assessment (EcIA) included as Appendix B of this document.

There are no Annexed habitats or species within or adjacent to the Proposed Development site. There are no rare or protected habitats recorded within the study area. The general habitats under the footprint of the Proposed Development are of low local ecological value. The predominant habitat within the site is Spoil and bare ground (ED2). The grassy verges (previously amenity grassland (GA2)) surrounding the central cleared area have become rank and overgrown. The amenity grassland buffer between the main site area and the Santry River is populated by dense grass and tall herbs with scattered trees forming a woodland type of habitat including Horse chestnut, Hybrid Black poplar, White poplar, Aspen, Birch, Willow, Sycamore, Alder and Rowan. The denser area is located to the southwestern corner of the site.

There are no surface water conduits to the Santry River and it is highly unlikely that run-off water would reach the Santry River during construction given the distance from the Proposed Development area and the intervening grassland and woodland buffer. The Proposed Development site observes a minimum buffer zone of no development of 30m to the Santry River. There will be no discharges during construction to the Santry River.

The nearest European sites to the Proposed Development are coastal sites of Dublin and Baldoyle Bays and the Malahide Estuary, including North Dublin Bay SAC, situated 4.33km to the southeast, and South Dublin Bay and River Tolka Estuary, 3.88km to the south, see Table 4 below.

Site Code	Site Name	Distance (km)[1]
000199	Baldoyle Bay SAC	4.91
000205	Malahide Estuary SAC	6.56
000206	North Dublin Bay SAC	4.33
000210	South Dublin Bay SAC	6.69
004006	North Bull Island SPA	4.31

[1] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

004016	Baldoyle Bay SPA	5.24
004024	South Dublin Bay and River Tolka Estuary SPA	3.88
004025	Malahide Estuary SPA	6.56

Table 4 European Sites located within the potential Zone of Influence of the Proposed Development. *Note Zone of Influence based on 15 km buffer and guidance given by Office of the Planning Regulator (March 21)*

The AA Screening concluded that:

- The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
- The Proposed Development, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment.
- It is possible to rule out likely significant impacts on any European sites considered in the assessment.
- It is possible to conclude that there would be no significant effects, no potentially significant effects and no uncertain effects if the Proposed Development were to proceed.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

4.3 ABSORPTION CAPACITY OF THE NATURAL ENVIRONMENT

The Proposed Development, due to its size and localised nature will not have any effect on wetlands, riparian areas, river mouths, coastal zones and the marine environment, mountain and forest areas, nature reserves and parks, or densely populated areas.

The environmental sensitivity of the proposed location in respect of Natura 2000 areas designated pursuant to the Habitats Directive and the Birds Directive been addressed through the AA Screening (Appendix B).

The Archaeological assessment undertaken by Cultural Resource Development Services Ltd (CRDS) in Appendix H has considered the landscapes and sites of historical, cultural or archaeological significance that are likely to be affected by the Proposed Development.

The Archaeological assessment concluded that there are no recorded archaeological monuments located within the Proposed Development site boundary. There is one recorded archaeological monument within the study area. This site will not be impacted on, directly or indirectly, by the Proposed Development, due to its distance from the site. As the Proposed Development will consist of the redevelopment of previously disturbed land within the footprint of the Proposed Development site. Should any previously unknown features have been present in these areas, they would not have survived the construction of previous developments.

5.0 TYPES AND CHARACTERISTICS OF POTENTIAL IMPACTS

This section sets out the likely significant effects on the environment of the Proposed Development in relation to criteria set out under paragraphs 1 and 2 (as set out in Sections 4 and 5 above), with regard to the impact of the project on the factors specified in paragraph (b)(i)(I) to (v) of the definition of 'environmental impact assessment report' in section 171A of the Act (as amended).

The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the *Guidelines on Information to be contained in Environmental Impact Assessment Reports* (EPA, 2017).

5.1 POPULATION AND HUMAN HEALTH

5.1.1 Construction (Inc Demolition) Phase

The potential impacts of the Proposed Development on population human health and populations would be nuisances such as increased air pollution (dust), noise, traffic, and visual impact and construction and demolitions waste. There is no significant risk of pollution of soil, groundwater or watercourses associated with the Proposed Development.

The CEMP will set out requirements and standards in relation to construction noise, traffic, and dust generation that must be met during the construction stage and will include any subsequent planning conditions relevant to the Proposed Development.

The potential impact of the Proposed Development with respect to population and human health during the construction phase is ***negative***, ***not significant*** and **short-term**. There are no likely significant effects in terms of the population and human health during the construction phase and it would not warrant preparation of an EIA on these grounds.

5.1.2 Operational Phase

A detailed Air Quality Impact Assessment has been undertaken (discussed in Section 5.4) to assess the impact of the Proposed Development with reference to human health criteria and concluded, based on conservative assumptions, that the Proposed Development will not result in any off-site exceedance of the relevant ambient air quality standards.

Noise reduction is a central consideration in the design of the Proposed Development. Based on the findings of the Noise and Vibration Impact Assessment (Appendix 7)the predicted noise levels from the Proposed Development, comply with the relevant noise criteria.

There are no planned direct discharges to water or land, although the risk of accidental discharge or spills exists. A number of design measures will be adopted to prevent the contamination of groundwater during the operational phase as described in Section 5.2

The design of the Proposed Development has due regard of the sensitivity of the surroundings. Landscape and Visual impacts are discussed further in Section 5.7.

The potential impact of the Proposed Development with respect to populations and human health during the operational phase is ***neutral***, ***not significant*** and ***long-term***.

There are no likely significant effects in terms of the populations and human health as during the operational phase, and it would not warrant preparation of an EIA on these grounds.

5.2 LAND, SOILS, GEOLOGY, HYDROGEOLOGY, HYDROLOGY

5.2.1 Construction (Inc Demolition) Phase

Soil Handling, Removal and Compaction

Due to the previous development at the site, there is evidence of minor levels of contamination on site. Site Investigations and environmental testing has confirmed that the soil is suitable for disposal to a non-hazardous landfill.

Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments. The project specific CEMP will set out best practice construction methodology to manage the soil movement on the site.

Accidental Spills, Dewatering, Run-off and Sediment Loading

Surface water run-off from site preparation, levelling, landscape contouring and excavations during the construction phase may contain increased silt levels or become polluted from construction activities. As there is no open water connection with the Santry River, the potential for impact negligible. The contractor will be required to operate in compliance with a CEMP to minimise the potential for contaminated water to discharge to sewers.

No dewatering is anticipated to be required for construction as groundwater is at a sufficient depth in comparison to required excavation levels and water ingress will be unlikely to occur.

Wastewater

Welfare facilities will be provided for the contractors on site during the construction works. During construction, portable sanitary facilities will be provided with waste collected and disposed of appropriately to an appropriate licenced facility. There are no predicted adverse impacts on wastewater systems during construction.

Conclusions

The predicted impact on land, soils, geology, hydrogeology, and hydrology during construction is considered to be ***negative, imperceptible*** and **short-term**. There are no likely significant effects in terms of the land, soils, geology, hydrogeology, and hydrology during the construction phase and it would not warrant preparation of an EIA on these grounds.

5.2.2 Operational Phase

Increase in Hardstand

There will be no significant increase in hardstand as a result of the Proposed Development. The proposed surface water drainage system for the development

comprises positive stormwater networks, and an attenuation system. The proposed surface water drainage system was designed in accordance with the GDSDS.

Accidental Spill and Leaks

The project design incorporates full containment for all oil storage, hard stand areas around the bunded oil storage area and stormwater drained through an oil interceptor with a second interceptor upgradient of the final discharge of stormwater from the site. As s a result, in the unlikely event of an accidental release, there is a negligible potential for impact to the receiving sewer or soil/groundwater.

Conclusions

The predicted impact on land, soils, geology, hydrogeology, and hydrology during operation is considered to be ***neutral, imperceptible and long term.*** There are no likely significant effects in terms of land, soils, geology, hydrogeology, and hydrology and it would not warrant preparation of an EIA on these grounds.

5.3 BIODIVERSITY

5.3.1 Construction (Inc Demolition) Phase

The potential impact from the Proposed Development on biodiversity with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive has been considered as a part of the AA Screening and Ecological Assessment (EcIA) provided with the planning documentation In Appendix B.

The EcIA concludes there were no rare or protected habitats or species recorded on the site and there were no records of invasive species. The habitats under the footprint of the area proposed for the data centre and associated structure footprint are of low local ecological value. The Proposed Development site observes a minimum buffer zone of no development within 30m of the Santry River negating the potential for any accidental discharges during construction to the Santry River. The only proposed works are additional planting of trees and fencing. Discharges during operation are to public sewers. Best practice measures are included in the design and CEMP to negate any off-site impact on birds and bats. The Proposed Development is predicted to have a neutral imperceptible effect on biodiversity. On the basis of the above with regard to the evidence set out within the AA Screening Report and the EcIA the potential effects on local biodiversity and ecology are ***neutral***, ***imperceptible,*** and ***short term*** for the construction phase. There are no likely significant effects in terms of biodiversity and ecology, and it would not warrant preparation of an EIA on these grounds.

5.3.2 Operational Phase

The operational phase of the Proposed Development is not predicted to have any impact on biodiversity.

5.4 AIR QUALITY AND CLIMATE

5.4.1 Construction (Inc Demolition) Phase

Due to the low volume of construction stage traffic associated with the proposed project, a detailed air quality and climate assessment was screened out as there is no potential for significant impacts to air quality or climate. Impacts to air quality are

considered localised, ***short-term***, and ***imperceptible***. Impacts to climate are considered ***short-term*** and ***imperceptible*** and will not impact Ireland's ability to meet its GHG targets under Regulation (EU) 2018/842.

In terms of construction dust impacts, the concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

The CEMP will set out minimisation measures to ensure nuisance dust arising from demolition, site clearance and construction activities is prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the Proposed Development.

There is low potential for fugitive dust generation during construction due to the low sensitivity of the receiving environment and scale of the proposed works. The predicted impact of the construction works on air quality as a result of dust emissions will therefore be ***short-term*** and ***imperceptible***.

On the basis of the above with regard to the evidence set out within the Air Quality Impact Assessment the potential effects on Air Quality and Climate are ***negative***, ***imperceptible,*** and ***short term*** for the construction phase. There are no likely significant effects in terms of Air Quality and Climate, and it would not warrant preparation of an EIA on these grounds.

5.4.2 Operational Phase

An Air Quality Impact Assessment has been undertaken by AWN Consulting and included in Appendix D. The assessment was carried out to determine the potential air quality impacts for the Proposed Development. There will be a total of 12 no. main diesel generators on site which will emergency backup power to the site Air dispersion modelling of nitrogen dioxide (NO_2) emissions was carried out using the United States Environmental Protection Agency's regulated model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of NO_2 at a variety of locations beyond the site boundary.

A number of modelling scenarios were investigated for the purposes of this assessment. Both normal day-to-day testing operations were considered as well as emergency operations and testing operations

The modelling study has concluded that provided the stacks are built to a height of 25m for the Data Building A generators and a stack height of 16m for the Data Building B generator that the emissions from the diesel generators will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health.
On the basis of the above with regard to the evidence set out within the Air Quality Impact Assessment the potential effects on Air Quality are ***negative, imperceptible,*** and ***long-term*** for the operational phase.

Section 8 of Appendix D Air and Climate Assessment assessed that on the basis that the Proposed Development will consume 16.8MW of power per data storage building, this equates to 589 GWh annually for the Data Centre based on the assumption of the national fuel mix. This translates to approximately 47,830 tonnes of CO_2eq per year which will have an ***indirect***, ***long-term, negative*** and ***slight*** impact on climate.

There are no likely significant effects in terms of Air Quality and Climate, and it would not warrant preparation of an EIA on these grounds.

5.5 NOISE & VIBRATION

A site-specific Noise and Vibration Impact Assessment Report (Appendix C) has been prepared by AWN Consulting, this is provided with the planning documentation. This report has included the following:

- Review appropriate guidance and standard documents relating to environmental noise, typical local authority planning conditions, etc. in order to identify appropriate noise criteria for the construction phase of the development and site operations;
- A description of the existing noise climate captured through environmental noise surveys at locations representative of the nearest noise sensitive locations to the development site;
- Description of noise modelling assessment relating to operational phase;
- Assessment of predicted levels against the appropriate criteria and existing noise levels and the required mitigation measures.
- A review of typical construction noise and vibration limits

5.5.1 Construction (Inc Demolition) Phase

During the construction phase it is expected that there will be some temporary impact on the nearest residential properties due to noise emissions from the plant equipment required for construction. However, given that the construction phase of the development is short term in duration, it is expected that the various noise sources will not be excessively intrusive. Furthermore, the application of binding hours as set down by planning conditions for construction, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum.

The CEMP will set out mitigation measures to ensure nuisance noise arising from demolition, site clearance and construction activities is prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the Proposed Development.

On the basis of the above with regard to the evidence set out within the Noise and Vibration Impact Assessment the potential effects on noise and vibration are ***imperceptible*** and ***short term*** for the construction phase. There are no likely significant effects in terms of Noise and Vibration, and it would not warrant preparation of an EIA on these grounds.

5.5.2 Operational Phase

As outline in the Noise Assessment The existing noise environment in the vicinity of the nearest noise sensitive locations is dictated by local and distant road traffic movements with a degree of existing plant noise becoming more apparent during night-time periods. The primary noise during the operational phase is associated electrical and mechanical plant equipment particularity the emergency generator testing, and emergency operations.

The noise model predictions (Appendix C) conclude the following:

- *Scenario A: Day to Day Operations* – The figures presented in the Noise Assessment indicate that the predicted noise levels at the various noise sensitive locations identified in the vicinity of the site satisfy the adopted criteria outlined in the relevant sections of this assessment.

- *Scenario B: Emergency Operations* – Generators with noise levels of the order of 85 dB(A) at 1m will be required in order to minimise noise emissions from site in line with the noise criteria that would be applicable to nearby properties for emergency operations.

- *Scenario C: Generator Testing* – The modelling has indicated that noise emissions associated with generator testing is within the adopted daytime criterion when these activities will take place.

On the basis of the above with regard to the evidence set out within the Noise and Vibration Impact Assessment in Appendix C, the potential effects on noise and vibration are ***imperceptible***, and ***long term*** for the operational phase. There are no likely significant effects in terms of Noise and Vibration, and it would not warrant preparation of an EIA on these grounds.

5.6 LANDSCAPE AND VISUAL IMPACT

Brady Shipman Martin has undertaken a landscape assessment in order to assess the risks to both the known and potential landscape resource as a result of the Proposed Development. This assessment is included as Appendix I.

5.6.1 Construction (Inc Demolition) Phase

Construction of the proposed development will give rise to short term and substantially localised effects on landscape character. Within the local context, the magnitude of development is considered medium. Construction activity including movement of construction vehicles and gradual emergence of structures will result in localised disturbance. The predicted impact on landscape and visual impact during construction is neutral to negative, moderate to slight and short term in duration. There are no likely significant effects in terms of the Landscape and Visual Impact during construction, and it would not warrant preparation of an EIA on these grounds.

5.6.2 Operational Phase

The proposed development comprises redevelopment of lands within the southeastern portion of the Clonshaugh Industrial Estate where two light industrial units previously stood.

The Clonshaugh Industrial Estate lands are generally mostly *"Z6 – To provide for the creation and protection of enterprise and facilitate opportunities for employment creation"*. The southeasternmost portion of the lands are zoned *"Z4 – To provide for and improve mixed-use facilities".* The southern edge of the Clonshaugh industrial Estate is defined by the Santry River Park and is zoned *"Z9 – To preserve, provide and improve recreational amenity and open space and green networks."* The Santry River Park is also designated as a Conservation Area.

The proposed development site includes areas of Z4, Z6 and Z9 zoned lands. The development site is also subject to an extant permission for data centre development permitted under Reg. Ref.: 2229/19, and subsequently amended by Reg. Ref. 3200/20, which confirm the suitability of these lands for development of a data centre facility.

Whereas the southern edge of the proposed development site ownership boundary extends into the Z9 zoned lands and to the Santry River, the built elements of the proposed development will be set back from the river corridor and outside of the Z9 zoned lands. The proposed development includes reinforcement of the riverbank tree planting along the Santry River to maximise biodiversity and enhance the amenity value of the Santry River Park.

The predicted impact on landscape and visual impact during operation is neutral to negative, moderate to slight and long term. There are no likely significant effects in terms of the Landscape and Visual Impact during operation that would warrant preparation of an EIA.

5.7 ARCHAEOLOGY , ARCHITECTURE AND CULTURAL HERITAGE

CRDS Limited has undertaken an archaeological assessment in order to assess the risks to both the known and potential archaeological heritage resource as a result of the Proposed Development. This assessment is included as Appendix H.

5.7.1 Construction (Inc Demolition) Phase

The archaeological, architectural and cultural heritage impact at the site can be summarised as follows:

- There are no recorded archaeological sites or monuments within the Proposed Development lands, as listed in the Record of Monuments and Places for Co. Dublin.
- The Proposed Development will consist of the redevelopment of previously disturbed land within the footprint of the Proposed Development site. Should any previously unknown features have been present in these areas, they would not have survived the construction of previous developments.
- Should any excavations (apart from planting and fencing) be required in the greenfield area then It is anticipated that a condition on grant of permission would require that the developer engage the services of a fully licenced archaeologist to coordinate and undertake the required excavation of identified archaeological features in consultation with the National Monuments Service.

The impact during construction is considered to be ***neutral to negative, not-significant*** and ***short term*** in duration. There are no likely significant effects in terms of the Cultural Heritage Impact during construction, and it would not warrant preparation of an EIA on these grounds.

5.7.2 Operational Phase

The operational phase of the Proposed Development is not predicted to have any impact on archaeological, architectural and cultural heritage.

5.8 TRAFFIC AND TRANSPORTATION

CSEA has undertaken a traffic and transportation assessment in order to assess the risks to both the known and potential archaeological heritage resource as a result of the Proposed Development. This assessment is included as Appendix E.

5.8.1 Construction (Inc Demolition) Phase

During the construction phase of the Proposed Development, there will be additional traffic movements to/from the site from construction personnel, security staff, professional staff (i.e., design team, utility companies), excavation plant, dumper trucks and deliveries/removal of materials (waste/spoil). It is estimated that on average 275 no. staff will be working on the site during the construction phase. This number will increase during the peak construction to an estimated 400 no. staff.

The Traffic and Transportation Assessment confirmed following traffic modelling that there will be no significant impact upon the established local traffic conditions with all junctions within the study area.

On the basis of the above with regard to the evidence set out within the Traffic and Transportation Assessment the potential effects on Traffic and Transportation are ***short-term***, ***negative*** and ***not significant*** for the construction phase. The cumulative impacts of the construction phase in conjunction with surrounding permitted developments has also been assessed and there is an overlap in construction periods envisaged. However, given the temporary nature of the construction phase, the overall impact is considered ***short-term***, ***negative*** and ***not significant.*** There are no likely significant effects in terms of Traffic and Transportation, and it would not warrant preparation of an EIA on these grounds.

5.8.2 Operational Phase

Vehicles will access the development via the existing Business and Technology Park Estate Road. This road is a private road, approximately 1km in length. It forms a T-junction with The R104 at its south end and is a dead-end at its north end. Security barriers are provided approximately 100 metres from its south end. The Proposed Development includes the provision of 58 no. carparking spaces , 2 no. HGV loading bays and 24 no. cycle parking spaces, serving the Proposed Development.

The Traffic and Transportation Assessment demonstrates that the additional traffic generated as a result of the operational phase can be accommodated within the surrounding road network and will not have an adverse impact.

The operational traffic associated with the surrounding permitted developments has been accounted for in the Traffic and Transport Assessment and therefore the cumulative impact has been accounted for.

A Mobility Management Plan (MMP) has been prepared by CSEA and provided with the Engineering report included with the planning submission to provide for the transportation needs of people and goods during the operational phase of the Proposed Development. The aim is to encourage sustainable and public transport modes over the use of the private car.

On the basis of the above with regard to the evidence set out within the Traffic and Transportation Assessment the potential effects on Traffic and Transportation are ***long-term, neutral*** and ***imperceptible*** for the operational phase. There are no likely

significant effects in terms of Traffic and Transportation, and it would not warrant preparation of an EIA on these grounds.

5.9 MATERIAL ASSETS, AND WASTE

5.9.1 Construction (Inc Demolition) Phase

Utilities: Foul Sewer, Stormwater and Potable Water

Welfare facilities (canteens, toilets etc.) will be required for the construction phase. It is anticipated foul sewage arising from welfare facilities will either be collected by tanker or a temporary connection to the mains network be established. There will be approximately 275-400 (Peak) of staff required for the construction phase of the Proposed Development.

Measures to contain run-off water containing silt is detailed in the CEMP, this will include using temporary on-site settlement ponds/tanks/silt busters to ensure adequate silt removal prior to discharge to public drain(if required).

The power and electrical supply requirements during construction are relatively minor, and there is no potential impact anticipated on existing users.

Any excavations and connections will be undertaken with consultation with the utility operators, therefore there is no potential impact anticipated on electrical infrastructure to existing users.

Waste and Waste Management

Other than materials necessary for the construction of the building the Proposed Development will not produce significant volumes of waste.

All waste arising during the construction phase will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations and the Waste Management Plan. In the event, there is excess material with no defined purpose, it will be transported to an authorised soil recovery site.

Waste during construction will be managed in accordance with a project specific CEMP.

It is considered that the Proposed Development will not have any significant impact in terms of resources or waste generation.

A carefully planned approach to waste management as set out in Section 3.5 and adherence to the C&D WMP during the construction and demolition phase will ensure that the impact on the environment will be ***short-term, neutral*** and ***imperceptible***.

Conclusion

There are no likely significant environmental effects in terms of the material assets, for the Proposed Development and considering the existing environment and proposed future environment which would warrant preparation of an EIA.

5.9.2 Operational Phase

Utilities: Foul Sewer, Stormwater and Potable Water

Water supply and wastewater will be provided via the existing public mains network adjacent to the site. The disposal of foul water from the site is separated from that of surface water. Details of the confirmation with Irish Water is included with the Engineering Planning Report submitted as part of the planning application for the Proposed Development. There is no predicted impact in respect of foul sewer, stormwater and potable water, that would warrant the preparation of an EIA report.

During operation, the power requirements will be provided from the existing ESB substation (permitted and constructed under the extant permission) located to the west of the site. A connection agreement to supply the proposed development is in place with ESB. Full details on power supply, energy efficiency and sustainability are provided in the Energy Statement provided with planning.

Waste and Waste Management

The Proposed Development will give rise to a variety of waste streams during the operational phase, i.e., when the project is completed, and fully operational. The majority of waste will be generated from packaging for equipment deliveries to the facility which is likely to be at its peak in the early months of operation. During the operational phase, a structured approach to waste management as set out in Appendix G will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, neutral*** and ***imperceptible***.

Conclusion

There are no likely significant environmental effects in terms of the material assets, for the Proposed Development and considering the existing environment and proposed future environment which would warrant preparation of an EIA.

5.10 ASSESSMENT OF POTENTIAL IMPACTS FROM INTERACTIONS AND CUMULATIVE IMPACTS

Interactions

This section discusses the potential interactions and inter-relationships between the environmental factors discussed in the preceding sections. This section covers both the construction (including demolition), operational and decommissioning phases of the Proposed Development. In accordance with the guidance, not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

The majority of the interactions are considered not to be significant.

In the absence of mitigation, the following potential interaction could exist during construction:

- between land, soil geology, hydrogeology and hydrology if poorly managed surface water is allowed to run-off unmitigated during the construction phase of the Proposed Development.

– between air quality and human health and biodiversity, if dust generated is not managed adequately

– between noise and human health and biodiversity, if construction noise is not managed adequately

However, these are potential short-term interactions associated with the construction phase. In advance of work starting on site, the works contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The measures within the CEMP will ensure that pollution and nuisances arising from demolition, site clearance and construction activities are prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the Proposed Development.

It is considered that there will be no likely significant interactions during construction or operation which would warrant preparation of an EIAR.

Cumulative Impacts

As part of the assessment of the Proposed Development, account has been taken of planned developments in the area as listed in Appendix A and referred to within the individual reports.

The Proposed Development is construction on a previously developed site. The buffer with the Santry River will remain undeveloped (no structures or oil storage etc) as previous. Mitigation is included in the project design to minimise impacts on the receiving environment. Each project currently permitted in the wider area is subject to planning conditions which include appropriate mitigation measures to minimise environmental impacts. Provided that mitigation measures for other developments are implemented as permitted, there will be no significant cumulative effects. The traffic, air and noise models included in the relevant appendices to have considered relevant developments to assess cumulative impact.

Any future development proposed on the surrounding lands should be cognisant with the zoning and will be subject to EIA and/or planning conditions which include appropriate mitigation measures to minimise environmental impacts.

Based on the assessment of the environmental sensitivities in the existing environment and consideration of potential cumulative impacts, it is concluded that there are no likely cumulative environmental impacts which would warrant preparation of an EIA.

6.0 FINDINGS AND CONCLUSIONS

The purpose of this EIA Screening Report has been to consider whether there is a requirement for the preparation of an Environmental Impact Assessment Report (EIAR) to accompany the planning application to Fingal County Council (‘FCC’) for the Proposed Development.

The Proposed Development and component parts have been considered against the thresholds outlined in Schedule 5, Part 2 Class 10 (a) to (m). The most relevant project type in the context of the Proposed Development is Class 10 (a) and Class 10 (iv):

10. Infrastructure projects

(a) Industrial estate development projects, where the area would exceed 15 hectares.

(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

On the basis of the evaluation set out in Section 2.0 of this document, an EIA for the Proposed Development is not mandatory; the Proposed Development is considered to be a sub-threshold development and therefore there is discretion over the submission of an EIAR with the planning application.

AWN has considered the Proposed Development and assessed the potential for significant environmental effects and the need for an EIAR on a discretionary basis; this evaluation is documented in Sections 3.0, 4.0 and 5.0 and is summarised below:

- The Appropriate Assessment Screening (Appendix B) concludes that an Appropriate Assessment is not required. It is considered that the Proposed Development alone or in combination with other developments will have no likelihood of direct or indirect effects on European sites in view of their conservation objectives.
- The EcIA (Appendix B) concludes there were no rare or protected habitats or species recorded on the site and there were no records of invasive species. The habitats under the footprint of the area proposed for the data centre and associated structure footprint are of low local ecological value. The Proposed Development site observes a minimum buffer zone of no development within 30m of the Santry River negating the potential for any accidental discharges during construction to the Santry River. Discharges during operation are to public sewers following any necessary treatment on site (e.g., interceptors on stormwater discharges). Best practice measures are included in the design and CEMP to negate any off-site impact on birds and bats. The Proposed Development is predicted to have a neutral imperceptible effect on biodiversity.
- A detailed Air Quality Impact Assessment Report (Appendix D) was completed to assess the impact of the development with reference to the protection of the environment and human health. This report concludes, on conservative assumptions, that the Proposed Development will not result in any off-site exceedances of the applicable ambient air quality standards (including at the nearest residential receptors).
- The Noise and Vibration Impact Assessment Report (Appendix C) has assessed the potential noise impact of the development and concludes that the Proposed Development, will comply with the relevant noise criteria at noise sensitive locations (including at the nearest residential receptors).
- The Cultural Heritage Assessment Report (Appendix H) concludes that there are no recorded archaeological sites or monuments within the Proposed Development lands, as listed in the Record of Monuments and Places for Co. Dublin. As the Proposed Development footprint will consist of the redevelopment of previously disturbed land within the footprint of the Proposed Development site, should any previously unknown features have been present

in these areas, they would not have survived the construction of previous developments.

- The Traffic and Transportation Assessment (Appendix E) concludes that the Proposed Development (construction and operation) will not have a significant impact upon the established local traffic conditions with all junctions within the study area. Traffic generated as a result of the operational phase can be accommodated within the surrounding road network and will not have an adverse impact.
- The Soils Geology and Water Assessment (Appendix F)concludes that with retention of the 30 m buffer for the Santry River included in the project design together with other design elements such as bunding of oil tanks, interceptors on stormwater drainage and attenuation of stormwater during operation and, requirement to comply with a CEMP during construction, there is no likely impact on the receiving environment.
- The Waste Management Assessment (Appendix I)concluded that other than materials necessary for the construction of the building the Proposed Development will not produce significant volumes of waste. Waste during construction will be managed in accordance with a project specific Construction and Demolition Waste Management Plan.
- The Landscape Assessment (Appendix I) concludes that the predicted impact on landscape and visual impact during operation is neutral to negative, moderate to slight and long term. There are no likely significant effects in terms of the Landscape and Visual Impact during construction or operation that would warrant preparation of an EIA.
- The preparation of, and compliance with, a Construction Environmental Management Plan (CEMP) by the construction contractor prior to commencement will address potential short-term nuisances (such as dust and noise etc.) and risks from the storage of any hazardous substances (fuels, chemicals and other construction materials that may pose a risk to the environment) are avoided and minimised. The CEMP will ensure potential nuisances during the construction of the facility are avoided and minimised.

AWN has concluded, there are no likely significant environmental effects on the receiving environment for the Proposed Development, which would warrant preparation of an EIA.

A mandatory EIA is not required for the Proposed Development, and as the potential effects are not significant it is submitted by AWN that there is not a requirement for an EIAR to be submitted with this planning application.

7.0 REFERENCES

(1) Environment Protection Agency. Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft). EPA: 2017.

(2) Ireland. Planning and Development Regulations, 2001 as amended.

(3) European Union. Environmental Impact Assessment of Projects Guidance on Screening. EU Luxembourg: 2017.

-European Union. Guidance on the preparation of the Environmental Impact Assessment Report. EU Luxembourg: 2017.

-Department of Housing, Planning and Local Government. Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment. DHPLG: 2018.

(4) CSEA, Engineering Planning Report- Drainage and Water Services, October 2021.

(5) John Spain Associates, Planning Report in respect of Proposed Data Centre Development at the site of former units 15 and 16 and the former Ricoh Building, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. October 2021.

(6) CSEA, Flood Report, October 2021.

(7) CSEA, Outline Construction & Environmental Management Plan, October 2021.

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021

APPENDIX A

RELEVANT PLANNING ASSESSMENT

Prepared by

AWN Consulting Ltd

APPENDIX A

RELEVANT PLANNING HISTORY

The DCC Planning Department website was consulted in order to generate a list of granted planning permissions from the surrounding areas of the Proposed Development within the previous five years (since September 2016). The areas considered were the Clonshaugh Business and Technology Park, Clonshaugh Industrial Estate and the Willsborough Industrial Estate. There are residential estates to the south and east of the industrial and business parks but any permissions in these estates are on a small scale and are not considered noteworthy in the context of this assessment as they will have minimal environmental impact. The outcome of this search is presented in Table 1 below.

As the site is within close proximity of the boundary between the DCC and Fingal County Council (FCC) administrative boundaries, the FCC website was also consulted. This includes a search for planning permissions granted within the last five years within the industrial parks west of the site across the M50 (i.e. Airways Industrial Estate and Woodford Business Park) as well as on lands to the north of the site across the R139. Similar to the above paragraph, there are a number of residential permissions which have been omitted due to their and are not considered noteworthy in the context of this assessment as they will have minimal environmental impact. Table 2 presents a list of the notable applications in FCC (or An Bord Pleanála (ABP)), where indicated) within the past five years.

Table 1. Recent planning applications to DCC in the locality of the Proposed Development site. DCC planning website search conducted on Sept 28th 2021

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
3015/21 Forest Laboratories Ireland	Planning permission for the construction of a stand alone sprinkler tank and pump house and all associated site works.	Abbvie Ireland, Clonshaugh Business & Technology Park, Dublin 17, D17 E400	GRANT PERMISSION 27th September 2021
2743/21 Health Service Executive	Permission for development (overall campus c. 18.5 ha). The area subject to the planning application is 0.8133 ha. The proposed development will consist of the provision of lighting columns with light fittings and bollard lighting within the approved south car park extension area (permitted under Reg. Ref. No. 4506/19) and all associated services and site development works.	Beaumont Hospital, Beamont Road, Dublin 9	GRANT PERMISSION 18th August 2021

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
2847/21 Abbvie Ireland	The development will consist of: 1. Construction of 2.4m high, site security fencing to the perimeter of the 3 no. Abbvie Clonshaugh sites (B1, B2 & B3), to include new vehicular access gates, pedestrian swing gates, CCTV camera & security lighting poles, landscaping and associated works. 2. Construction of new 2,267 sqm concrete hard standing yard to the rear (North) of Building 1 (Site B1), new concrete retaining wall, landscaping and associated works.	Abbvie, Clonshaugh Business and Technology Park, Dublin 17, D17 E400	GRANT PERMISSION 22nd July 2021
3803/20 Mullins Developments LLC	The proposed development comprises: 1. 2 no. 2 storey data centre buildings (each 16,576 sqm), which are 16m in height at the main parapet level. Each building to include: Office administration area, data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage spaces, screened plant and solar panel array at roof level, with rainwater harvesting system to support industrial water requirements. 16 no. emergency generators with emission stacks along with a single emergency house supply generator, all contained in a fenced compound adjacent to each building. Diesel storage tank, fuel filling area and associated plant. 2. 1 no. water sprinkler pump room (68 sqm), water storage tanks and humidifier tanks (175 sqm all inclusive). 3. 1 no. single storey client control building (216 sqm) and 2 no. transformers set within a fenced compound. 4. Demolition of 26 sqm substation building. 5. Partial diversion and undergrounding of ESB overhead lines. 6. Construction of internal site road network and circulation areas connecting to existing internal road network to the south, footpaths, provision of 100 no. car parking spaces, 4 no. motorcycle spaces and with 68 no. cycle parking spaces within a bicycle shelter, all accessed via existing campus to the south. 7. Temporary construction access road along western boundary. 8. Landscaping and planting including provision of planted berms to the eastern and northern boundary. 9. Perimeter security fencing, site lighting, bollards, camera poles, bin stores and all associated and ancillary site works including underground utility cables, water supply, foul and storm drainage network & over ground attenuation pond. All on an application site area measuring 11.52 hectares. An Environmental Impact Assessment Report (EIAR) will be submitted to the Planning Authority with the planning application and the EIAR will be available	Woodlands & Former Diamond Innovations Site, Clonshaugh Business & Technology Park, Dublin 17	GRANT PERMISSION 8th July 2021

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	from inspection or purchase, at a fee not exceeding the reasonable cost of making a copy, during public opening hours at the offices of Dublin City Council.		
2514/21 ABC Abrasives Ltd.	Planning permission sought for warehouse extension to front and increase in height of part of existing warehouse building to present day warehouse standards to provide extra storage; and demolition of small section of two storey offices and incorporation of floor area of same into warehouse; demolition of 2 small stores to rear to provide staff car parking; relocation of vehicular entrance at front to provide access to side and proposed car parking to rear; provision of disabled person's toilet and new internal stairs; and associated works generally.	Unit 8B, Malahide Road Industrial Park, Coolock, Dublin 17	GRANT PERMISSION 8th July 2021
0213/20 ABP: 309465 Pramukh Gogineni	SHEC: The construction of a new three-storey apartment scheme with a dormer third floor consisting of the following: (i) 3 one bedroom apartments; (ii) 6 two-bedroom apartments; (iii) private balconies; (iv) a bin storage area; (v) 10 on-site vehicle parking bays; (vi) 9 bicycle parking bays; (vii) 150.5sqm landscaped communal open space; (viii) new boundary walls; (ix) provision for all storm water, foul drainage, mains water and electricity supply connections ancillary to the development.	A site to the rear of No. 1-4 Newbury Wood, fronting onto Clonshaugh Road, Clonshaugh, Dublin 17	GRANT PERMISSION ABP WITH REVISED CONDITIONS 22nd June 2021
3865/20 Lidl Ireland GmbH	Planning permission for the demolition of the existing building immediately south of "The Range" store and the construction of a single storey discount food store (supermarket) with ancillary off-licence sales area. Provision of 75 surface level car parking spaces within the application red line boundary, including two electrical vehicle (EV) charging spaces (parking outside the application red line boundary is operational and therefore does not form part of this application); boundary treatments; 12 cycle stands (space for 24 bicycles); trolley bay canopy; hard and soft landscaping; ESB substation building and external mechanical plant areas; site lighting and connections to drainage and on site drainage infrastructure including attenuation tank; roof mounted photo-voltaic panels; all advertising signage. Access to the proposed development is via the two existing operational access points on the Clonshaugh Road, used by "The Range". All ancillary works to facilitate the development.	Property adjacent and generally south of "The Range" store, Clonshaugh Road, Coolock, Dublin 17, D17 TY30	GRANT PERMISSION 3rd June 2021

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
3763/20 Digital Netherlands IV BV	The development will consist of the construction of a pitched roof and louvered panel walls to the eastern side of the existing fuel storage tank building located on the southern boundary of the site to match the existing building and the installation of 4 no. generators - 2 no. each within the existing recessed plant enclosures on the roof on the northern and southern sides of the building.	Eircom Building, Clonshaugh Business and Technology Park, Dublin 17	GRANT PERMISSION 22nd January 2021
2308/20 Butlers Chocolates	Extension to the side of existing manufacturing facility to consist of single storey warehouse building (Block E) 627 sq.m gross area & all associated site works.	A site to the rear of No. 1-4 Newbury Wood, fronting onto Clonshaugh Road, Clonshaugh, Dublin 17	GRANT PERMISSION WITH REVISED CONDITIONS 22nd June 2021
4782/19 Lidl Ireland Gmbh	Planning permission for: amendments to the mixed-use development, granted planning permission under PA Ref: 3960/17 and to Pa Ref: 2686/19. The amendments relate to the foodstore and office portion (Block 3). The numbered amendments below cross reference to the submitted plans. The development consists of the completion of the development subject to the following amendments: (1) Reposition window on canteen on south elevation and new window above exit door on the north elevation of the foodstore (2a) Photovoltaic solar panels on roof of foodstore (2b) photovoltaic solar panels on roof of offices (3) modifications to staff welfare layout, canteen, freezer/chiller area with new reception area servicing offices above. (4) ESB substation omitted. (5) Trolley bay repositioned and design of same revised. (6) Fence line to the north of the site as part of compliance with condition 5 of PA Ref: 2686/19 to include 2m high Palladin Mesh fence with Pyracantha hedging to outer face and fence positioned along the boundary line of the property (7) New access walkway to roof deck (8) Window to be used to access roof deck. (9) Minor parapet level adjustment of foodstore. (10) Electric vehicle charging points/spaces repositioned. (11) Revision to car parking to include 3 additional spaces and revised car parking space surface treatment from permeable paving to asphalt and amendments to the associated car parking drainage proposals. (12) Enclosed bin store relocated to service ramp area.	Lands located in Ballymun at the site bounded by Balbutcher Lane, Balcurris Road and the R108 (Ballymun Main Street) Ballymun, Dublin 11, and also the Horizons Centre, Balcurris Road, Ballymun, Dublin 11	GRANT PERMISSION 21st April 2020

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
4506/19 The Health Service Executive	The Proposed Development will consist of the construction of a three storey (approx. 6,657 sq. m) extension to the existing Phase 1 St. Luke's Radiation Oncology Centre in line with the objectives of the National Plan for Radiation Oncology, the demolition of the Medical Records Building (approx. 313.6 sq. m), demolition of existing Phase 1 entrance lobby and part demolition of existing link corridor (approx. 171.5 sq. m), modifications to the existing Phase 1 building elevation, the provision of photovoltaic panels on the roof of the existing Phase 1 and proposed Phase 2 buildings, the relocation of a gas skid, alterations to the existing set down area/access road to the front entrance of the building, modifications to the north staff car park, the extension of the surface car park to the south of the campus to provide an increase of 222 no. parking spaces (of which 145 no. are relocated from the proposed Phase 2 site and the existing northern car park), 34 no. bicycle parking spaces, pedestrian and wayfinding provisions, all associated landscaping, site services and site development works.	Beaumont Hospital, Beaumont Road, Dublin 9	GRANT PERMISSION 17th April 2020
3826/19 MKN Property Group	Planning permission for amendments to a previously permitted residential development (Reg. Ref. 3930/18; ABP-303146-18). The proposed revisions shall consist of: (a) an increase of 15 no. apartments (comprising 7 no. 1 bedroom units; 7 no. 2 bedroom units; 1 no. 3 bedroom unit) to provide 86 no. apartments (71 previously permitted) within 2 no. blocks and increase in the heights of previously permitted Blocks 02 and 03 from 4 storeys to 5 storeys; (b) the proposed development shall now comprise the following: Block 02 - 5 storey block (4 storeys plus setback penthouse level) (4 storeys previously permitted) comprising of 38 no. residential units (18 no. 1 bedroom units and 20 no. 2 bedroom units) with balconies/terraces on east and west elevations. Block 03 - 5 storey block (4 storeys plus setback penthouse level) (4 storeys previously permitted) comprising 37 residential units (18 no. 1 bedroom units, 18 no. 2 bedroom units and 1 no. 3 bedroom unit) with balconies/terraces on northwest and southeast elevations; (c) associated internal and elevational changes to Blocks 02 and 03; (d) increase in basement level area with increase in car parking spaces from 75 no. spaces to 97 no. spaces and increase in basement level bicycle parking spaces from 70 no. spaces to 111 no. spaces; (e) reposition the vehicular and pedestrian access gate to St. Brigid's Road; (f) increase in open space area in lieu of 4 no. houses omitted by condition no. 2(b) attached ABP Ref. 303146-18; (g) Provision of Fire Tender Access to the south of Block 01 and 02; and (h) All associated engineering and site development works necessary to facilitate the development	Former Holy Faith Convent Building, St. Brigid's Road, Killester, Dublin 5	GRANT PERMISSION 11th February 2020

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
4213/19 Butlers Chocolates	Permission for a single storey loading bay enclosure, 118sq.m gross area, to the front of warehouse building(Block D) currently under construction & all associated site works.	Butlers Chocolates, Clonshaugh Industrial Estate, Clonshaugh, Dublin 17.	GRANT PERMISSION 14th January 2020
4367/19 The Electricity Supply Board (ESB)	The development will consist of: A c. 200m long medium/low voltage (MV/LV) underground cable (UGC), to be installed in underground cable ducting in a c. 1m wide trench of depth c. 1m within an area of c.200sq.m., connecting the existing ESB network within the former Diamond Innovations site to the existing ESB Darndale substation. The UGC also includes ancillary electrical equipment. The development includes all associated and ancillary works. An Environmental Impact Assessment Report (EIAR) which complies with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I> 296 of 2018) will be submitted to the Planning Authority with the application. The EIAR will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy, during office hours at the offices of the planning authority.	The former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park, and adjacent lands, Dublin 17	GRANT PERMISSION 8th January 2020
3400/19 Amazon Data Services Ireland Ltd	Planning permission for development on a site of c. 0.025 hectares at Clonshaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building B). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works	Clonshaugh Business and Technology Park, Dublin 17	GRANT PERMISSION 26/10/2019
2737/19 Dwyer Nolan Developments Ltd.	Permission for development, consisting of modifications to a permitted mixed use development under Ref. 2713/17, located at Santry Avenue and Swords Road, Santry, Dublin 9. Permission is sought to increase the height of Blocks A, B and C from permitted 5 storeys to proposed 7 storeys and for a change in unit type and increase in number of apartments i.e. 70 no. apartments, which will result in a change from 137 no. permitted apartments to 207 no. 1, 2 & 3 bed apartments in the aforementioned buildings, including provision of balconies and roof terraces (i.e. 240sq.m. each) to Blocks A, B & C. The ground floor of Block C will accommodate a unit (i.e. 210sq.m.) for community use in compliance with condition no. 3 attached to planning permission Ref. 2713/17. The Proposed Development also seeks to provide additional office floor	Santry Avenue, & Swords Road, Santry, Dublin 9	GRANT PERMISSION 1st October 2019

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	space to both Blocks D & E, providing an increase of 2,931sq.m. of office accommodation to the overall previously permitted development. Block D will increase in height from permitted 2 & 4 storeys to proposed 3 & 5 storeys, while Block E will increase in height from permitted 4 storeys to proposed 5 storeys. Permission is also sought for an extension to the permitted basement car park, (i.e. 1,273sq.m.), to accommodate 52 no. additional car parking spaces, additional bicycle parking and a new emergency escape route to the surface. The Proposed Development also provides for conversion of 3 no. surface car parking spaces to 3 no.; spaces to the north of Block B, and all associated site development works, on a site area of 1.55ha. The effect of the Proposed Development will be a modification to an extant permission under Ref. 2713/17.		
3644/19 Drive Investment Funds PLC	Permission is sought for Change of Use from former Liz Delaney's Public House + Club of recreation building to include gym use (Class 11(e) without pool) which includes existing basement = 135 sqm, existing ground floor = 1130 sqm, existing first floor = 611 sqm and single storey extensions at ground floor = 48 sqm and at first floor = 16 sqm, creating total development area = 1940 sqm, minor elevational changes including addition of entrance and relocation of fire escape doors and external works to include rebranding existing and additional signage and provision of new bicycle stands.	Units 59, 60 and 61, Northside Shopping Centre, Clonshaugh Road Coolock, Dublin 5	GRANT PERMISSION 24th September 2019
3301/19 Bloom Capital Limited	Planning permission for development at a site, on former Chanel College Lands, Main Street, Coolock, Dublin 5. The site fronts onto three roads, Chanel Manor Close to the south; Main Street to the east; and the access road to Parnell GAA Club. The development will comprise the construction of two apartment blocks over the basement car and bicycle parking providing a total of 88 no. apartments. Block 1 will measure up to six storeys in height with a recessed fourth and fifth floor and will contain 73 no. residential apartments. Block 2 will measure up to 5 storeys in height with a recessed top floor and will contain 15 no. residential apartments. All apartments will have a private balcony/terrace facing north/south/east/west. The apartment blocks will provide a mix of 22 no. 1 bed apartments, 50 no. 2 bed apartments and 16 no. 3 bed apartments. All associated site development works, services provision, vehicular/pedestrian accesses, car and bicycle parking, open space, bin stores, landscaping and boundary treatment works.	site on former Chanel College Lands, Main Street, Coolock, Dublin 5	GRANT PERMISSION 13th August 2019

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
SID Application ABP Ref. PL29N.303687 Amazon Data Services Ireland Ltd. (ADSIL)	Provision of a double circuit 110kV underground transmission line between the Belcamp 220kV and 110kV substation and the Darndale 110kV substation covering a distance of approximately two kilometres.	The proposed transmission line covers a distance of approximately 2 km within the following townlands: • Belcamp, Co. Dublin; • Clonshaugh, Co. Dublin; and • Willsborough, Co. Dublin	GRANT PERMISSION 8th August 2019
2544/19 Paul French-O'Carroll	Construction of a 2 storey rear extension for stairway & lift , and for the alterations to part of existing 1st floor level necessary for a change of use from existing storage rooms to training rooms, lecture room, coffee area & wc's and for 3 new windows on south elevation and 1 new window on north elevation and for repositioning existing fire exit on east elevation ground floor of existing 2 storey commercial premises.	Medicall Ambulance Ltd., Unit 25, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17, D17 C651	GRANT PERMISSION 19th June 2019
2229/19 Clonmont Developments Ltd	Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre including data halls, offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the Proposed Development is c.9,520.5m.	Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17	GRANT PERMISSION 30th May 2019
2402/19 Mullins Developments LLC	Permission for development at the former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park and adjacent lands, Dublin D17 V088. The development will consist of: (1) 2 no. satellite antennae, 5.4m in diameter on; (2) 2 no. support towers in galvanised structural steel clad in powder coated steel mesh; (3) Access stairs and platforms	Former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park, Dublin 17	GRANT PERMISSION 23rd July 2019

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	behind existing plant screen; (4) 3m 2 tool cabin behind existing plant screen and; (5) 2 no. access roads for maintenance in permeable paving.		
4546/18 Vodafone Ireland Limited	RETENTION: Permission for retention (Previous Ref. No.:3040/12) of an existing development at this site. The development consists of an existing 19-metre-high telecommunications supports structure, with antennas, equipment container and associated equipment within a fenced compound. The development forms part of Vodafone Ireland Ltd's existing GSM and 3G Broadband telecommunications network	Willsborough TD, Clonshaugh, Dublin 17	GRANT RETENTION PERMISSION 14th March 2019
3791/18 Cairn Homes Properties Limited	Full Development Description Cairn Homes Properties Limited intend to apply for planning permission for development at a site of c.2.6 hectares at "Parkside" development lands located on the former Balgriffin Park lands, Dublin 17. The application site is located south-west of Parkside Phase 2C (currently under construction), west of St. Michael's Cottages, south-east of Parkside Square, the neighbourhood park and green link pedestrian/cyclist route between Belmayne Avenue and the Hole in the Wall Road. The Proposed Development will comprise a residential scheme of 96 no. 2-3 storey, 2-4 bedroom residential units. The development will include 64 no. houses comprising 12 no. semi-detached and 52 no. terraced houses ranging in size from c.112sq.m to c.167sq.m and 32 no. apartment/duplex units ranging in size from c.85sq.m to c.114sq.m. Apartments/duplexes with south/east/west facing balconies/terraces. All associated site development works, services provision, vehicular/pedestrian access, car and bicycle parking, open space, bin stores, landscaping and boundary treatment works. Modifications to permission DCC Reg. Ref.: 2941/14 to include completion of the central section of the 'green link' pedestrian and cyclists route through the residential proposal.	Parkside, Balgriffin Park Lands, Dublin 17	GRANT PERMISSION 21st March 2019
3997/18 Pargo Properties One Limited	Planning Application for new part single storey / part 2 storey Block 6 (1,640 sq.m.) containing 5 no. single storey warehouse units at 242 sq.m. with 2 storey ancillary offices at (82 sq.m.) each; and new part single storey/part 2 storey Block 7 (1,972 sq.m.) containing 6 no. single storey warehouse units at 242 sq.m. with 2 storey ancillary offices at (82 sq.m.) each; car parking and associated siteworks all for use as Light Industrial/Workshop/Enterprise Units.	Port Tunnel Business Park, Unit 13, Clonshaugh Industrial Estate, Dublin 17	GRANT PERMISSION 15th February 2019

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
4277/19 Beaumont Hospital	Permission is sought for a single-storey extension (28 sq.metres) at lower ground floor level in the courtyard at the east side of the Radiology Department to house offices at Beaumont Hospital, Beaumont Road, Dublin 9.	Beaumont Hospital, Beaumont Road, Dublin 9	GRANT PERMISSION 28th January 2019
4185/18 Mullins Developments LLC	The development will comprise: (1) The construction of a new two-storey c.16,860 sq. m. building for use as data storage facilities containing; data storage rooms, electrical & mechanical plant rooms and support areas including offices and welfare facilities, loading bays, back-up generators and water storage tanks; mechanical plant at roof level is screened from view on all sides by permanent screens. The facility will also include (2) 40 no. car parking spaces; and (3) associated landscaping and site infrastructure.	Former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park, and adjacent lands, Dublin D17	GRANT PERMISSION 24th January 2019
3478/18 Kedington Ltd.	Planning permission for 3 no illuminated wall mounted box signs on the front and rear elevations, a 6m flag pole in the planted area in front of the main entrance and planning permission for retention for a directional kerb sign board at the rear entrance, a new door, screen and access ramp to the rear trade counter on the rear elevation.	East Corner, Willsborough, Clonshaugh Business and Technology Park, Dublin 17.	GRANT PERMISSION 11th October 2018
3096/18 Mullins Developments LLC	The development will comprise: 1) The construction of a new two-storey c.16,860 sq.m building for use as data storage facilities containing: data storage rooms, electrical & mechanical plant rooms and support areas including offices and welfare facilities, loading bays, back-up generators and water storage tanks; mechanical plant at roof level is screened from view on all sides by permanent screens. The facility will also include: 2) 40 no. car parking spaces; 3) Amendment to previously permitted site landscaping and associated site infrastructure - Planning Permission Reg.Ref. DCC 4449/16. An EIS will be submitted to the Planning Authority with the planning application and the EIS will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy, during public opening hours at the offices of Dublin City Council	Former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park, and adjacent lands, Dublin 17	GRANT PERMISSION 23rd August 2018

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
2347/18 Butlers Chocolates	Extension to previously permitted planning reference 4008/15. Extension is to comprise of the installation of a rooftop solar photovoltaic array (595 sq.m) and associated electrical infrastructure on existing manufacturing facility	Butlers Chocolates, Clonshaugh Business and Technology Park, Dublin 17.	GRANT PERMISSION 25th May 2018
4019/17 Butlers Chocolates	Permission is being sought for alterations and additions to existing manufacturing facility, comprising the construction of a new 2-storey extension to the front elevation, incorporating a new main entrance foyer/reception area, meeting rooms, and staff facilities, with an area of 217. 6sq.m at ground floor level, and a new staff cafeteria area, together with additional offices and meeting rooms with an area of 197sq.m at first floor level.	Butlers Chocolates, Clonshaugh Business and Technology Park, Dublin 17	GRANT PERMISSION 24th January2018
3798/17 Forest Laboratories (IRL) Ltd.	Forest Laboratories Ireland Limited intends to apply for permission for the installation of 1 NO. extract unit along with supporting structure, duct work, pipe work, discharge pipe and all associated site works - all located at existing roof level plant deck and 2 No. fire exit doors and 1 No. roller shutter door.	Building 2, Clonshaugh Business and Technology Park, Dublin 17.	GRANT PERMISSION 11th December 2017
3328/17 Irish Commercials (Sales) Ltd.	RETENTION: for revisions to existing workshop previously granted under planning ref 6311/05 consisting of, A removal of the internal dividing wall, B- 3 No. Up and Over doors to the East Elevation, together with all associated site works	35 & 36 Block 3, Port Tunnel Business Park, Clonshaugh, Dublin 17.	GRANT RETENTION PERMISSION 9th October 2017
2822/17 Forest Laboratories (IRL) Ltd.	Permission for the removal of 2 no. Existing air handling units (with associated works) and electrical control panel. Installation of 1 no. Air supply & extract unit & 1 no. Air extract unit along with supporting structure duct work, pipework, discharge pipes and all associated site works. All located at existing roof level plant deck.	Clonshaugh Business and Technology Park, Dublin 17	GRANT PERMISSION 4th August 2017

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
2238/17 Allman Equities Ltd.	The development will consist of extending the existing offices internally into part of the warehouse resulting in a change of use along with the addition of windows to the north and south elevations and associated site development works, all on a site of 0.6 hectares approximately.	Vanderbilt, Clonshaugh Business & Technology Park, Dublin 17	GRANT PERMISSION 22nd May 2017
2244/17 Amazon Data Services Ltd.	The development will consist of the upgrade of existing boundary railings and palisade fence by increasing the height of the existing fencing and railings by 0.7 meters to the overall site boundary.	DUB 10-51, Clonshaugh Business & Technology Park, Dublin 17.	GRANT PERMISSION 22nd May 2017
3848/16 Beaumont Lodge Nursing Home	Planning permission is sought by Beaumont Lodge Nursing Home Ltd. for a nursing home development on lands at the former Saint John of God Secondary School, Kilmore Road, Artane, Dublin 5 (bounded by Saint John's Court to the rear). The proposed development will consist of the demolition of the existing one/two storey secondary school building and the construction of a four storey over part basement, 224 bed nursing home with associated ancillary/common facilities, office/administration areas, plant/store rooms, and garden balconies/terraces fronting onto the landscaped courtyards; 86 car parking spaces, 40 bicycle spaces and 3 motorcycle spaces all at surface level; provision of a new vehicular and pedestrian access onto Kilmore Road; provision of new vehicular accesses to the rear onto Saint John's Court to serve the nursing home and the adjoining playing pitches; landscaping; boundary treatments; and all associated engineering and site works necessary to facilitate the development	Lands at the former Saint John of God Secondary School, Kilmore Road, Artane, Dublin 5 (bounded by Saint John's Court to the rear)	GRANT PERMISSION 2nd May 2017
4449/16 Amazon Data Services Ireland Ltd.	The development will comprise: (1) The construction of a new one-storey c.14,107 sq. m. building for use as electrical rooms for electronic operations, mechanical plant rooms and support areas including offices and welfare facilities, a loading bay, back-up generators and a water tank farm. The facility will also provide (2) 30 no. car parking spaces; (3) The relocation of an attenuation area to the western side of the site; (4) Landscaping and associated ancillary works; (5) The addition of an 8m acoustic screen to the existing transformer compound (Planning Permission Reg. Ref. DCC 3288/16). (6) Changes to previously approved perimeter security boundary railings and fencing including a fenced vehicle lock with double gates placed at the main site entrance. This change is consequent on the enlargement of the site of the existing DUB 54 building (Planning Permission Reg. Ref. DCC3874/15) to form the current site by the addition of lands to the east and west. The security hut at the site entrance has been amended by the addition of a services room. The building height to top of plant screen is circa	Former Diamond Innovations site (Unit 1C) and adjacent lands, Clonshaugh Business and Technology Park, Clonshaugh, Dublin 17	GRANT PERMISSION 6th April 2017

Dublin City Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	11.5m. meaning mechanical plant at roof level of the main building is screened from view on all sides.		
3925/16 Telent Technology Services Limited	RETENTION: 1sq.m roof light, 1.8 m wide approach path at front entrance, dropped kerb to facilitate 2 new designated accessible parking spaces and 6 sq.m of additional first floor area, where existing stairs was removed	Unit 9, Willsborough Cluster, Clonshaugh Industrial Estate, Dublin 17.	GRANT RETENTION PERMISSION 16th January 2017
3288/16 ADSIL	The development will comprise amendments to a previously issued Planning Permission (Reg. Ref. No. 3874/15), including: (1) The construction of a new two storey substation building, area 690 sq.M; (2) The addition of a transformer bay and associated fire wall to the transformer compound and reorientation of the compound on a north-south axis; (3) The enlargement of the single storey client control building by 30 sq. m and its relocation to the north end of the compound; (4) The consequent rearrangement of the compound access road and fencing; the combined gross floor area of all additional proposed buildings is 720 sq. m.	Former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park, Dublin 17	GRANT PERMISSION 10th August 2016
2989/16 ESB Telecoms Ltd.	The continued use of the existing 24m high lattice communications structure carrying antennae and dishes shared with third party operators within a secure compound (previously granted permission LA ref. 2370/11).	ESB's Clonshaugh 38kV Substation site, Clonshaugh Industrial Estate, Coolock, Dublin 17	GRANT PERMISSION 26th September 2016
3007/16 Butlers Chocolates	RETENTION: Full permission for an extension to the rear of existing manufacturing facility to consist of single storey warehouse building of 950 sq. metres gross floor area & all associated site works and retention permission for additional car park entrance at front of building.	Butlers Chocolates, Clonshaugh Industrial Estate, Clonshaugh, Dublin 17	GRANT RETENTION PERMISSION 2nd September2016

Table 2. Recent planning applications to FCC in the locality of the Proposed Development site. FCC planning website search conducted on September 28th 2021.

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
F21A/0147 Genvest ULC	2 no single storey light industrial buildings (total floor area of 3,333 sq.m) accommodating 3 units including ancillary office space; internal site road (356m) with associated verges and footpaths accessed via internal distributor road; 84 no car parking spaces; 42 no. bicycle parking spaces; surface water attenuation; sub-station and switch room; relocation of overhead power lines; pedestrian entrance gate to adjoining petrol station site; totem signage at entrance to development; landscaping and boundary treatments; site works and services; all on a site of 1.94ha. AI received 06/09/21	Site west of Stockhole Lane/Clonshaugh Road, Clonshaugh, Co. Dublin.	Request for Additional Information 6th May 2021
F20A/0166 ABP 307884 Trimstar Ltd	Revision to the 100 bedroom hotel permitted under Reg. Ref. F16A/0587. Minor internal alterations/amendments to the permitted ground, first, second, third and fourth floor plans of the hotel including relocation of internal staircases, reduction in width of corridors, general internal layout modifications including the reconfiguration of permitted bedrooms with a minor overall reduction in gross floor area of permitted hotel. There is no increase in the number of bedrooms permitted (i.e.100 bedrooms). Permission is also sought to amend condition 3 of Reg. Ref. F16A/0587 to now permit meeting rooms within the hotel at ground floor and fourth floor levels with associated reconfiguration of these floors to accommodate ancillary uses including reception, fitness room, food preparation area, etc. Permission is sought for the associated revisions to the elevations of the permitted hotel to accommodate the proposed changes, amendments to the permitted basement level to provide for the reconfiguration of laundry room, plants rooms etc. with associated increase in parking spaces to now provide for 35 no. car parking spaces at basement level in lieu of the permitted 33 no. spaces, revisions to permitted site layout plan to now provide for 56 spaces in lieu of the permitted 57 spaces (91 no. parking spaces now proposed in total), covered walkway and all associated site works necessary to facilitate the development.	Lands adjacent to the Carlton Dublin Airport Hotel, Turnapin Great, Old Airport Road/Swords Road, Cloghran, Co. Dublin.	GRANT PERMISSION ABP 2nd December 2020
F19A/0401 Kategale Limited	The Proposed Development is Phase 1 of a 2 Phase masterplan for a mixed residential and commercial scheme on an overall site of c.1.5 hectares, including adjoining lands to the west bound by Northwood Crescent, to the south and west and the north by the Crescent Office Building (Northwood Crescent, Northwood, Santry, Dublin 9). The proposed Phase 1 development will comprise the construction of 2 no. blocks comprising a residential and commercial office development, respectively, with a new proposed shared access road from Northwood Road to the east. The residential development component will comprise a 4 to 7 storey block (c. 8,745 sq.m, gross floor area) over podium level (8 storeys	Lands located at the southwestern junction of Northwood Avenue and Northwood Road, Northwood, Santry, Dublin 9.	GRANT PERMISSION 15th April 2020

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	over ground in total) to include: 99 apartments consisting of 10 no. studio units, 35 no. one-bedroom units, 41 no. two-bedroom units, 13 no. three-bedroom units; plant rooms; entrance lobby and internal circulation space; internal waste collection area; residential amenity space; ESB sub-station; switch room; private open space in the form of balconies and terraces (808 sq.m); communal amenity space with children's play area, formal planting and lawn at podium level (1,159 sq.m); 102 no. residential car parking spaces (including 5 no. accessible car parking spaces); 3 no. car sharing parking spaces; 226 residential cycle parking spaces; 4 no. motorbike parking spaces; a four storey commercial office block (c. 3,030 sq.m gross floor area) with 36 no. car parking spaces, 53 no. cycle parking spaces, and all other ancillary spaces including reception area, staff changing and shower facilities, toilets; circulation areas, ESB substation, waste collection area; switch room and plant room; relocation of existing zebra crossing to facilitate the proposed site access road at Northwood Road (to the east); and closure of an existing site access at Northwood Crescent (to the south). The development will also consist of the provision of external circulation areas; pedestrian footpaths; lighting; all hard and soft landscaping; planting; boundary treatments; green roofs; changes in level; and all other associated site excavation works, site development works and site services above and below ground.		
F20A/0058 DAA plc	The removal of all existing portacabins and the construction of a vehicle maintenance building comprising of 2 no. units with mezzanine levels, 2 no. storage areas, a new boundary wall and all associated site development works. The proposed storage areas will each consist of 3 no. oil tanks, 2 no. bunded storage units and a refuse store.	The Junction of the Swords Road (R132) and Corballis Road south, Corballis Park, Dublin Airport, Swords, Co. Dublin.	GRANT PERMISSION 3rd April 2020
SHD/015/19 Cosgrave Developments	The development will consist of 4 no. 8-storey apartment blocks arranged around a communal courtyard all over a shared basement. The apartment blocks will accommodate 331 no. apartment units with associated ground floor terraces and upper floor balconies providing 6 no. one bedroom units, 292 no. two bedroom units and 33 no. three bedroom units. The development will also include: residential shared services consisting of a multi-function area (c.133sq.m), a gym (c.140sq.m) and concierge area; a childcare facility (c.224sq.m) and 5 no. ground floor mixed use units capable of accommodating class 1,2,8, café and restaurant uses with an overall total area of c. 939 sq.m; ancillary car parking (comprising 331 no. resident spaces and 3 no. disabled spaces at basement level; 3 no. car club spaces and 1 no. disabled space at surface level); ancillary bicycle storage spaces comprising 690 no. spaces at basement level and 70 no. spaces at surface level; all associated plant; refuse storage areas; communal open space; public open space; a substation; green route connection across car park associated with Gulliver's Retail Park and	Site off Northwood Avenue, Santry, Dublin 9.	Approved By An Bord Pleanala 24th March 2020

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	Local Centre with existing pedestrian and cycle paths on Northwood Avenue; associated drainage arrangements; utility connections, landscaping; public lighting; and; all site development works. The application contains a statement setting out how the proposal will be consistent with the objectives of the Fingal Development Plan 2017-2023. An Environment Impact Assessment Report (EIAR) has been prepared in respect of the Proposed Development and accompanies this application. The application together with an Environmental Impact Assessment Report may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, during the public opening hours at the offices of An Bord Pleanála and Fingal County Council.		
F20A/0129 KC Delivery Services Ltd.	The proposed development consists of the partial change of use, extension and internal alteration of the existing warehouse with ancillary office building (approved under Dublin County Council Reg. Ref. 89A/1934 as modified by Fingal County Council Reg. Ref. F97A/0010, f97a/1000 and F01A/0038). Retention planning permission is sought for the following: (i) 15 no. window opes to be filled in with cladding to match existing building on north and south elevations at ground and first floor levels and installation of 3 no. double height loading doors at ground floor level on the south elevation. Planning permission is sought for the following: (i) Change of use of previously approved ground floor office floor area approved under Reg. Ref. F97A/1000 to logistics, warehouse and distribution use (442 sq.m). This will operate in conjunction with existing approved ground floor warehouse area approved under F97A/1000 (54 sq.m.); (ii) installation of 2 no. double height loading doors at ground floor level on the south elevation and alteration of ground level to provide level access to loading doors from yard; (iii) construction of a new 54 sq.m. extension (including internal Conveyor belt system) for the delivery and unloading of goods to the west elevation facing Boeing Road with new double height loading door; (iv) 3 no. signs (3.8 sq.m. each) 1 no. located on the western elevation of the building facing Boeing Road, 1 no. located on the south elevation and 1 no. located on the eastern elevation facing the M1; and (v) all associated landscaping, lighting and site development works to facilitate the development.	Former Pharmacia and Upjohn Ltd. Premises, Boeing Road, Airways Indistrial Estate, Santry, Dublin 17, D17 A728.	GRANT PERMISSION 23th March 2020
F19A/0419 Kategale Limited	The Proposed Development is Phase 2 of a 2 Phase masterplan for a mixed development on an overall site of c.1.5 hectares, including adjoining lands to the east located at the south western junction of Northwood Avenue and Northwood Road, Northwood, Santry, Dublin 9. The proposed Phase 2 development will comprise the construction of a proposed shared access road from Northwood Road to the east and a new residential block comprising 6 storeys over podium (7 storeys over ground) (c.6,742 sq.m. gross floor area) to include: 12 no. studio units, 19 one-bedroom units, 41 two-bedroom units, 6 three-bedroom units; internal plant room;	Northwood, Santry, Dublin 9.	GRANT PERMISSION 5th March 2020

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	generator room; entrance lobby and internal circulation space; internal waste collection area; residential amenity space (communal facilities); private amenity space in the form of balconies and terraces (c. 730 sq.m); communal amenity space with children's play area, formal planting and lawn at podium level (c. 674 sq.m); a total of 72 no. car parking spaces (including 4 no. accessible car parking spaces); 160 no. cycle parking spaces; 3 no. motorbike parking spaces; creation of a pedestrian crossing point to provide safe and efficient pedestrian access between the Proposed Development and crèche (permitted under Reg. Ref. F18A/0438); and closure of an existing site access at Northwood Crescent (to the west). The development will also consist of the provision of external circulation areas; pedestrian footpaths; lighting; all hard and soft landscaping; planting; boundary treatments; changes in level; and all other associated site excavation works, site development works and site services above and below ground. All on this site of c.0.68 hectares comprising lands bound by Northwood Crescent to the south and west, 'The Crescent' Office Building to the north, and Northwood Road to the east, at Northwood, Santry, Dublin 9.		
F19A/0513 Ryanair DAC	The amalgamation of, and change of use of Unit 6.1 (a single storey, part two storey building) and Unit 6.2 (single storey, part two storey building). The Proposed Development will result in ancillary office use to a training centre use and will include the following internal works. 1) 1 no. four bay full motion stimulator hall; 2) 2 no. fixed base simulators 3) fuselage training room 4) ancillary training rooms, briefing rooms, staff welfare facilities, archive room and office spaces. 5) Minor elevational changes 6) provision of enclosed external plant including 2 no. condensors, cooling equipment for comms room and air handling equipment for simulator room 7) enclosed bin store 8) generator 9) MV substation and switch room 10) modular trainer 11) 44 no. bicycle parking spaces, car parking and all associated site development and landscape works.	Units 6.1 & 6.2, Woodford Business Park, Santry, Dublin 9	GRANT PERMISSION 4th March 2020
F20A/0004 Steinfort Investment Fund	Demolition of existing industrial units (2417 sq.m). Construction of 2 no. apartment blocks (3-5 storeys in height), comprising 35 no. units (13 no. 1-bed, 18 no. 2-bed and 4 no. 3-bed), all with balconies/terraces facing north/south/east/west. Development to be accessed from Oak Avenue (existing) to the south with additional new pedestrian access to the east. Provision of car parking (surface) and cycle parking, open spaces and all associated site development works, landscaping, boundary treatments and other servicing works.	Lilmar Industrial Estate, Oak Avenue, Santry, Dublin 9.	REQUEST ADDITIONAL INFORMATION 28th February 2020
F19A/0534 Carra Shore Hotel (Dublin) Ltd.	Construction of a single storey office building of 134sq.m. gross floor area, located at ground floor level to the permitted decked car park. Mechanical plant will be provided above at deck level.	Site west of Stockhole Lane/Clonshaugh Road, Clonshaugh, Co. Dublin.	GRANT PERMISSION 13th January 2020

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
F19A/0095 Frylite Dublin Ltd.	Temporary permission (5 years) for the temporary change of use of part of the APB meat processing plant from meat processing to a waste transfer and processing facility (non-hazardous wastes) providing for: (a) the collection, processing, storage and bulking up of used and fresh cooking oil; (b) a waste transfer facility for food waste; and (c) the washing of used cooking oil containers. Temporary planning permission (5 years) is also sought for: temporary installation of a dissolved air floatation tank; continued use of portacabin office accommodation (permitted under application Ref. No. F16A/0387; continued use of part of the building for collection, storage and bulking up of used cooking oil (temporary permission granted under F16A/0002) use of 6 No. existing silos for storage of fresh cooking oil and use of 1 No. existing silo for storage of used cooking oil (silos granted temporary permission under F16A/0002); 6 No. proposed silos for storage of used cooking oil; and all related site development works. A Waste Facility Permit from Fingal County Council will be required for this Proposed Development. Add Info received 24th June 2019.	ABP Meat Processing Plant, St Anne's, Cloghran, Ballymun, Co. Dublin.	GRANT PERMISSION 27th August 2019
F19A/0221 Gannon Properties	Amendments to permitted developments Reg. Ref. F15A/0609, PL06F.248052 at Belcamp, a Protected Structure (RPS No. 463), comprising revisions to layout and house types of 49 no. two storey houses comprising 37 no. 3-bedroom houses and 12 no. 4-bedroom houses on a 1.21 ha portion of the lands, with access from the Malahide Road. The development includes 98 no. on-curtilage car parking spaces and all associated and ancillary site works.	Belcamp, Malahide Road, Dublin 17.	GRANT PERMISSION 21st July 2019
F19A/0149 IDA Ireland	Remediation by excavation and removal of circa 22,000 cubic metres of mixed waste material illegally deposited on lands at Belcamp. The project will involve site preparatory works, excavation and infill works, installation of a cut-off wall to the south and south west and restoration with grass and treeline where applicable. An Environmental Impact Assessment report (EIAR) and Natura Impact Statement (NIS) has been prepared and accompanies this planning application and is available for inspection.	Belcamp, Clonshaugh, Dublin 17	GRANT PERMISSION 17th July 2019
F19A/0168 DAA plc	An extension of the existing Terminal 1 baggage hall in two locations to facilitate the mandatory upgrade of the airport security screening system for passenger baggage. The first extension provides for the construction of a new Southern Extension over 5 levels (Gross Floor Area of 3,735 sq.m. and maximum height of 24.87m). This will replace the existing Carousel No. 4 building (whose demolition is permitted under Planning Ref. F18A/0638), located between Terminal 1 and Terminal 2 (known as Area C) connected via enlarging the existing opening in the southern facade of Terminal 1, comprising extended baggage hall with internal Open Mesh Flooring at mezzanine levels to house baggage screening equipment and belts, associated baggage control room, office and staff facilities overhead, ancillary circulation, maintenance space, including new stair core and lift, above ground connection into	Terminal 1 Baggage Hall, Terminal 1, Dublin Airport, Collinstown, Co. Dublin.	GRANT PERMISSION 10th June 2019

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	the existing Terminal 2 baggage hall to facilitate a baggage conveyor link, maintenance space and rooftop plant. The second extension provides for the construction of a new Western Extension (Gross Floor Area of 177 sq.m.) to the existing Terminal 1 Baggage Hall at arrivals level (Level 10) (known as Area E), over an existing access ramp, to accommodate new baggage machinery. The development includes all ancillary works, including demolition of existing lift lobby at ground and first floor level, connections to services, associated fencing and site works, all on a planning application site of 0.3 ha.		
F19A/0049 DAA plc	Development at a site at the Immigration Hall serving Pier 1 and Pier 2 and adjoining surface car park and rooftop at Terminal 1, Dublin Airport, Collinstown, Co. Dublin. the development will consist of: a) a single-storey extension of Pier 1 and Pier 2 Immigration Hall by 673 sq.m. to the north-east (currently 1,607 sq.m., proposed 2,280 sq.m.) to provide additional internal passenger queuing space; b) partial recladding with feature timber cladding; c) rooftop plant with screening louvers; d) demolition and relocation of an existing fire escape stairs; e) re-organisation of the adjoining surface car park resulting in a net loss of 22 spaces (currently 74 no. spaces, proposed 52 no. spaces) and new coach turning route; f) new glazed single-storey entrance porch to the rear of the VIP lounge (16 sq.m); g) two emergency escape doors; and h) a gas skid (7sq.m), landscaping and all associated site development works, all on a site of 0.696 ha. Add Info received 16th May 2019.	Terminal 1, Dublin Airport, Collinstown, Co. Dublin	GRANT PERMISSION 7th June 2019
F20A/0058 DAA plc	The removal of all existing portacabins and the construction of a vehicle maintenance building comprising of 2 no. units with mezzanine levels, 2 no. storage areas, a new boundary wall and all associated site development works. The proposed storage areas will each consist of 3 no. oil tanks, 2 no. bunded storage units and a refuse store.	The Junction of the Swords Road (R132) and Corballis Road south, Corballis Park, Dublin Airport, Swords, Co. Dublin.	GRANT PERMISSION 16th April 2019
F18A/0507 Brendan O'Connor	(a) The demolition of 396m.sq (to front) and 454m.sq (to rear) of the existing warehouse and offices; (b) demolition of single storey linking buildings between units 11 and 12 (per previously approved planning ref. F17A/0632; (C) subdivision of the unit into 2 no. units 11a & 11b; (d) change of use to unit 11a to test centre/maintenance/repairs of heavy and light commercial vehicles with ancillary office/staff facilities; (e) modifications to existing 2 storey office facilities to unit 11b, this unit is to retain its warehousing and office use; (f) changes to elevations; (g) associated car parking, site development and landscape works.	Unit 11 Airways Industrial Estate, Santry, Dublin 17.	GRANT PERMISSION 26th November 2018
F18A/0235 Petrogas Group Ltd (t/a Applegreen)	Demolition of all existing structures on the site (filling station building, canopy, canopy over brush wash, former storage structure and totem sign). construction of a two storey filling station building (912 sq.m. gfa). the ground floor will contain a net retail area of 100 sq.m (including off-licence of 9.5 sq.m); 2 no restaurants (151	Santry Service Station, Swords Road, Santry, Co. Dublin	GRANT PERMISSION 4th September 2018

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	sq.m. combined); communal seating area (74.5 sq.m); back of house (73.2 sq.m.), toilets (33.55 sq.m.) and circulation (99.47 sq.m). One of the restaurants at ground floor will include a drive-thru hatch facility and will involve hot food for consumption off the premises. The first floor will contain communal seating (153.9 sq.m), toilets (45.45 sq.m), back of house (38.2 sq.m.) and circulation (40.03 sq.m). Internal and external stair access is provided. All associated works including 6 no. pump islands, with branded canopy over, drive-thru lane, landscaping, outdoor seating, outdoor playground, brush wash, car parking spaces, 2 no. waiting bays, service bays, boundary treatment, refuelling point, vents, replacement underground tanks, refuse storage area enclosed by fencing, Main ID sign, signage (on canopy, buildings and free standing). The existing entry and exit points will remain the same with only minor amendments to same. All associated site works.		
F17A/0732 M50 Skip Hire & Recycling Limited	Permission for to extend existing materials recycling and transfer facility. The Proposed Development includes a change of use of existing industrial storage unit to form a 892.6 sq.m. extension of gross floor building space to existing materials recycling and transfer facility building and revised site boundaries including a new automated entrance gate, all ancillary site services, all recycling activities will occur indoors only.	Advance Business Park, Old Airport Road, Cloghran, Co Dublin	GRANT PERMISSION 3rd July 2018
F17A/0244 Dublin Cemeteries t/a Glasnevin Trust	Permission for the installation of 1 no. ecolation unit, associated internal alterations and plant area within the existing crematorium building (permitted under Reg. Ref: F14A/0216). The proposal also seeks permission for the retention and completion of the car park adjacent to the crematorium to provide 95 no. car parking spaces, 11 no. car parking spaces adjacent to the substation and lodge, 24 no. car parking spaces at the Entrance Plaza together with associated landscaping, upgrade of internal road network, traffic management measures including electronic barrier and site works. Add Info received 29th March 2018.	Dardistown Cemetery & Crematorium, Swords Road, Dardistown, Swords, Co Dublin, K67 HP26	GRANT PERMISSION & GRANT RETENTION 28th May 2018
F18A/0042 Songdale Ltd.	The Proposed Development will consist of the erection of a freestanding restaurant sign at ground level on the North-West elevation of the Hotel. The sign is to be a steel frame construction wrapped in light grey metal sheet with backlit lettering. The overall size of the sign will be 3m x 2.8m.	The Clayton Hotel Dublin Airport, Stockhole Lane, Clonshaugh Road, Clonshaugh, Co. Dublin.	GRANT PERMISSION 24th April 2018
F17A/0632 Airways Investments Ltd.	Demolition of 2 No. single storey buildings that links two warehouses as well as ancillary recladding of original gables and restoration of internal circulation roadway.	Unit 11-12, Airways Industrial Estate, Santry, Dublin 17.	GRANT PERMISSION 23rd January 2018
F17A/0422 Topaz Energy Ltd.	The removal of condition no. 4 of An Bord Pleanála appeal case reference PL06F.245112 (Application Register Reference F15a/0182) and to allow for the continued 24-hour opening of the service station on a permanent basis.	Topaz Service Station, Clonshaugh Road, Clonshaugh, Co. Dublin	GRANT PERMISSION 19th October 2017

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
F17A/0693 Tifco Ltd.	The development will consist of a 5-storey extension of c. 2,536m² to the rear of the Crowne Plaza Hotel, including the demolition and reinstatement of 247m² of existing hotel floorspace at the rear, ground floor level. The development will include a service yard and stores at ground floor level, with hotel accommodation above at 1st to 4th floor levels. The development will include minor internal alterations to the existing hotel accommodation at 1st to 4th floor levels to accommodate the proposed extension, resulting in the loss of 4 no. bedrooms, resulting in a combined overall total of 269 no. bedrooms (209 no. existing) and a combined gross floor area of 13,845m². The overall height of the extension to the top of plant at 5th floor level is 18.65m. The development will also include the reconfiguration of the access arrangements at the entrance to the existing multi-storey car park, piped infrastructure and ducting, roof plant, bicycle parking, changes in level and all associated site development and excavation works above and below ground on a site of c.1.8 ha	Crowne Plaza Hotel, Dublin Airport, Northwood Park, Santry Demesne, Santry, Dublin 9	GRANT PERMISSION 28th February 2018
F17A/0632 Airways Investments Ltd.	Demolition of 2 No. single storey buildings that links two warehouses as well as ancillary recladding of original gables and restoration of internal circulation roadway.	Unit 11-12, Airways Industrial Estate, Santry, Dublin 17.	GRANT PERMISSION 23rd January 2018
ABP: 300523 F17A/0449 Patrick Mangan	The demolition of existing houses and outbuildings and the construction of 32 no. residential apartments (7 no. one-bedroom units, 21 no. two-bedroom units and 4 no. three-bedroom units) in a part three-storey with set back fourth-floor penthouse level and part four-storey building with set back fifth-floor penthouse level. 41 car-park spaces are to be provided over two levels of a car-park deck and a 6m wide access road from the front slip road off Coolock Lane. Balconies or terraces are to be provided for all apartments. Provision is made for refuse, recycling and bicycle areas, hard and soft landscaping areas, boundary treatments and all other site development works, all on a site totalling c.25ha	Mulhalls And Dun Mhuire, Coolock Lane, Santry, Dublin 9	GRANT PERMISSION WiTH CONDITIONS ABP 27/11/2017
F17A/0255 Tifco Ltd	Permission for an extension of c. 3,369 m² to the Holiday Inn Express Hotel comprising (i) a 2-storey, set back extension at 5th and 6th floor levels fronting onto Northwood Avenue. (ii) a 7-storey extension to the rear of the existing hotel building, comprising 2- undercroft levels at ground and 1st floor levels to facilitate vehicular access, with 5-storeys of hotel accommodation above at 2nd to 6th floor levels, which will be facilitated by the removal of 13 no. existing car parking spaces at ground floor level; and (iii) a resident's breakfast room extension of c. 51m² at ground floor level to the rear of the hotel. The development will accommodate a total of 214 no. bedrooms (114 no. existing) and will provide a combined gross floor area of 8,768 m². The overall height of the extension to the top of plant at 7th floor level	Holiday Inn Express, Dublin Airport, Northwood Park, Santry Demesne, Santry, Dublin 9	GRANT PERMISSION 30th June 2017

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	is 24.65m. The development will also include piped infrastructure and ducting; roof plant; bicycle parking; changes in level and all associated site development and excavation works above and below ground on a site of c1.8 ha		
F17A/0190 Essentra Packaging Ireland Ltd.	Retention of a 45m² ground floor extension to the rear of the premises.	Unit 8, Constellation Road, Airways Industrial Estate, Swords Road, Santry, Dublin 17.	GRANT PERMISSION 27th June 2017
F16A/0579 Carra Shore Hotel (Dublin) Ltd.	Development on a site of approximately 1.35 hectares located west of Stockhole Lane/Clonshaugh Road, north of the R139 and east of the M1 motorway. The proposal comprises the construction of a part 10 storey and part 7 storey, 427 bedroom hotel development incorporating 317 bedrooms and 110 suites with a gross floor area of 18,940 sq.m. The proposal includes associated leisure facilities, meeting and conference rooms, café/restaurant, plant, outdoor terrace/patio areas, lighting and associated facilities. Provision of coach parking area and 461 no. of car parking spaces at surface level and within a two storey (total of 8.5 metres in height) car deck structure (three levels of parking, including surface and roof) with green walls. Access to the development is from the existing road from the Stockhole Lane roundabout. The proposed development includes landscaping (hard and soft), boundary treatment and all associated and ancillary works	Site west of Stockhole Lane/Clonshaugh Road, Clonshaugh, Co. Dublin.	GRANT PERMISSION 28th March 2017
F16A/0437 Songdale Ltd.	The Proposed Development will consist of the redevelopment of the existing hotel to comprise 1) At upper basement level, a new store room (163sq.m.); 2) At ground floor level, a new extension to existing restaurant (76 sq.m), a new extension to existing kitchen (56 sq.m) with adjacent storage room (13 sq.m.), new staff facilities to include changing rooms/lockers, canteen, toilets and storage rooms (292 sq.m), a new storage area (122 sq.m), the conversion of existing function rooms, laundry and staff facilities to create new restaurant, bar, storage, toilet and kitchen facilities (532 sq.m) and 2 no. new function rooms (251 sq.m) and the conversion of existing storage areas and toilets to new office and luggage area (223 sq.m), and a new covered walkway to rear (196 sq.m.); 3) At first floor level, the conversion of existing business centre to 29 no. bedrooms (1,193 sq.m), the construction of 6 no. bedrooms (260 sq.m) and a new link bridge to Block A (20 sq.m); 4) The construction of a new fifth floor incorporating 53 no. bedrooms (1,852 sq.m); 5) The construction of a new sixth floor incorporating 53 no. bedrooms (1,852 sq.m) and 6) All associated site development works. A total of 141 no. bedrooms are proposed.	The Clayton Hotel Dublin Airport, Stockhole Lane, Clonshaugh Road, Clonshaugh, Co. Dublin	GRANT PERMISSION 11th January 2017

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
F16A/0360 Dimpco	The internal first floor modifications to the existing service building, complete with 4 no. new windows to part-side of the existing south elevation.	Airport Road, Cloghran, Co. Dublin.	GRANT PERMISSION 14th November 2016
F16A/0150 OCS One Complete Solutions Ltd.	Continued use of the existing building structure as a transfer waste facility. Waste is temporarily stored on site in a sealed compactor for collection by a licensed collection company.	Unit 39, Airways Industrial Estate, Dublin 17.	GRANT PERMISSION 14th November 2016
F16A/0241 Hugh Jordan & Co.	Circa 256 sq.m. of additional two storey office space within the existing building, new windows to west elevation and new exit door to south elevation	Unit 4, Constellation Road, Airways Industrial Estate, Swords Road, Santry, Dublin 17.	GRANT PERMISSION 29th August 2016
F16A/0082 George Watters	a) The demolition of 1,619sq.m. of existing warehouse (b) the construction of a two storey extension to the east elevation (c) change of use to a heavy and light commercial vehicle workshop, warehouse and test centre with internal storage mezzanine, two storey ancillary office/staff welfare facilities and external yard, together with all associated car parking, site development and landscaping works.	Unit 13, Airways Industrial Estate, Boeing Road, Santry, Dublin 17.	GRANT PERMISSION 8th August 2016
F16A/0241 Hugh Jordan & Co.	Circa 256 sq.m. of additional two storey office space within the existing building, new windows to west elevation and new exit door to south elevation.	Unit 4, Constellation Road, Airways Industrial Estate, Swords Road, Santry, Dublin 17.	GRANT PERMISSION 29th August 2016
F15A/0478 Hewlett Packard Enterprise Ireland Ltd.	The installation of two traffic barriers (one at each vehicular access points) and the erection of new low-level timber fencing (to match existing to south western property boundary to Viscount Road).	29 Airways Industrial Estate, Viscount Road, Santry, Dublin 17.	GRANT PERMISSION 19th January 2016
F14A/0465 Newlands Cross Hotels t/s Bewleys Hotel	Development including new buildings and alterations to Bewleys Hotel Dublin Airport, which was granted permission under previous Register References F03A/0660, F05A/0972, F05A/1489, F05A/1592 and F06A/0231. The application site measures 1.1 hectares and is part of the larger Bewleys site which measures 2.4 hectares. It is located approx.1.5 km south east of Dublin Airport, immediately adjacent to the M1/M50 Interchange and bounded by the road N32 to the south, Agriculture lands to the north and Clonshaugh Road to the east. the development will consist of total new development area of 26,455 sq.m. and will include 17,505	Bewleys Hotel Dubin Airport, Stockhole Lane, Co. Dublin	GRANT PERMISSION 23rd December 2015

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	sq.m. consisting of 367 new bedrooms over two blocks on five to seven floors over ground level. Conference centre and seminar rooms of 3,150 sq.m. at ground floor level. 202 new car spaces at two new basement levels of 5,800 sq.m. The application will also include the change of use of the existing business centre at the first-floor level measuring 1,355 sq.m. into leisure centre. The application also includes new landscaping to the existing site. Car parking will be provided at 230 new surface car park spaces and 202 new car spaces at two underground levels; a total of 432 new car spaces. Previous permission allowed for 917 car spaces and the new total car will be 1349 car spaces.		
F15A/0182 Topaz Energy Ltd.	An extension to the opening hours permitted under application Reg. Ref. F13A/0221 to allow for 24 hour opening of the service station. For the purposes of clarification it is confirmed that the revised opening hours will not apply to the restaurant/drive thru which will continue to operate between the hours already permitted. Permission for retention consists of the retention of as-built alterations to service station approved under application register reference F13A/0221 to include: a) changes to ground floor plan, b) changes to building elevations and c) revised signage details on building.	Topaz Service Station, Clonshaugh Road, Clonshaugh, Co. Dublin.	GRANT PERMISSION 14th October 2015
F15A/0141 Fingleton White	Aviation fuel pipeline from Dublin Port to Dublin Airport. The Proposed Development is in Fingal County Council and Dublin City Council administrative areas. In the Fingal County Council administrative area the route of the pipeline is from the junction of the R139 (formerly N32) and the Clonshaugh Road via the Clonshaugh Rd. to AUL/FAI sports ground, adjacent to the north boundary of AUL/FAI sports ground, under the M1 motorway and via the DAA Long Term Red Carpark, adjacent to Eastlands Car Hire Compound, ALSAA complex, under the Swords Road R132 and via the Corballis Road to a reception station at the existing Fuel Storage Facility, Corballis Road, Dublin Airport. (In Dublin City Council Area, the route of the pipeline is from proposed inlet station at Team CV Ltd., Bond Drive, Dublin Port, Dublin 1 and via Bond Drive, Tolka Quay Road, East Wall Road, under the Tolka River, Alfie Byrne Road, Clontarf Road, Howth Road, Copeland Avenue, Malahide Road (R107) and R139 (formerly N32). A separate application is being lodged concurrently with Dublin City Council in respect of the development proposed in its administrative area). The development will consist of (a) single storey Control Building, ancillary pipework in bunded reception station at the existing Fuel Storage Facility, Corballis Road, Dublin Airport, Co. Dublin (b) 200mm diameter continuously welded steel pipeline, laid generally in the public road, at a depth of circa 1.2m. below surface level except where it will pass under the Mayne River, Cuckoo Stream on Clonshaugh Rd., under the M1 and under the junction of Corballis Road with the	From Dublin Port, Dublin 1 to Dublin Airport, Co. Dublin	GRANT PERMISSION 7th July 2015

Fingal County Council Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	Old Swords Rd. (R132). Length of the pipeline in Fingal County Council administrative area will be circa 3.0 km (total length will be 14.4 km). An Environmental Impact Statement and Natura Impact Statement have been prepared in respect of the application and will be submitted with the planning application.		
F15A/0085 Federal Express Europe Inc.	1) The realignment of existing car parking area to the north western side of unit 3a/b, to include the provision of 16 no. additional car parking spaces (including 5 no. designated customer loading spaces and 3 no. designated wheelchair accessible car parking spaces), 7 no. motorcycle parking spaces and 10 no. bicycle stands; 2) The provision of 1 no. pedestrian access gateway and supplementary planting to infill the existing hedgerow along the north western site boundary facing onto the Swords Road (R132) and all ancillary site works thereto.	Unit 3a/b, Airways Industrial Estate, Constellation Road, Cloghran, Dublin 17.	GRANT PERMISSION 2nd June 2015
F14A/0216 t/a Glasnevin Trust	The construction of a new crematorium consisting of a sub-divisible congregation space, 1 no. cremator and associated mercury abatement equipment space for a second cremator, the provision of new public toilets and staff acommodation. The works will also include the removal of existing public toilets as well as the provision of a substation, car parking and landscaping.	Dardistown Cemetery, Collinstown Cross, Old Airport Road, Cloghran, Co. Dublin.	GRANT PERMISSION 16th December 2014
F08A/1305/E1 Mark Reynolds & Glenn Kilroy	A 325 bedroom hotel with associated spa and leisure facilities, meeting and conference rooms, restaurant, bar and function facilities, plant, lighting and associated facilities, ESB substations, provision of 650 underground and surface car parking spaces with access to the development from the proposed access road and existing adjacent road and roundabout, landscaping and all associated ancillary works. The hotel building's overall height is ten storeys with basement on a site approximately 1.5 kilometres south-east of Dublin Airport, adjacent to the M1/M50 interchange, the N32 and Bewleys Hotel to the south and Clonshaugh Road to the east. Planning permission was previously granted on substantially the same site (under Council Reg. Ref. F04A/1684 and An Bord Pleanala reference PL06F.212020) for a 239 bedroom and 13 suite hotel comprising 16 floors over basement with plant at roof level.	Clonshaugh, Co Dublin	GRANT EXTENSION OF DURATION OF PERM 4th December 2014
F09A/0014 Monica Cusack	Minor internal alterations and the provision of an external fire door and Part M access ramp to the side of existing unit. Retention permission is also sought for the change of use from the approved warehousing/light industrial use to a data storage centre with occasional use offices suites.	Unit 23 Airways Industrial Estate, Santry, Dublin 17	GRANT PERMISSION FOR RETENTION 17th Mar 2009

Site-Specific Planning History

A review of the DCC planning website was undertaken to compile a complete list of planning applications relating to the site. A number of planning applications have been approved on the site which have not proceeded. Table 3 presents a summary of such applications.

Table 3. All planning applications to DCC for the Proposed Development site.

Dublin City Council Planning Application Reference No. (ABP Ref if applicable) & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
3200/20 Clonmont Development Ltd.	RETENTION: Retention Permission for development at a site located at Units 15/16 Business & Technology Park, Clonshaugh, Dublin 17. The development comprises a modification to Permission DCC Ref. 2229/19 (currently under construction) granted for a 2 storey data centre, (with generator yard and all associated works). The development now provides a larger, single storey substation (increased in size from c.34.5 sq.m (as permitted) to c.68.4 sq.m) and located to the south-west of the data centre building as per the parent permission DCC Ref. 2229/19.	Units 15/16 Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17	PERMISSION GRANTED 8th Oct 2020
2229/19 Clonmont Developments Ltd	Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre including data halls, offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the proposed development is c.9,520.5m.	Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17	PERMISSION GRANTED 30st May 2019
5950/07 PL29N.229202 N1 Property Developments Limited	Ten year planning permission for development to create a new Northside Town Centre comprising a mixed use retail, office, residential, restaurant, bar, creche, community and recreational development over two phases on a 30.28 hectare site. Phase 1 includes the demolition of all existing buildings on the Phase 1 site, including Coolock Health Centre and adjacent community buildings, industrial and retail warehouse units and 128no. habitable dwellings at the Cromcastle Court residential scheme. The development includes the construction of the following: two storey 63,728sqm gross (45,000sqm net) retail centre north of the Santry River including service yard, energy centre(1,100sqm) and a bus only link to Clonshaugh Road; 2,553sqm two storey pool and leisure centre and 4,170sqm two storey	Site at Oscar Traynor Road, Clonshaugh Road, Kilmore Road, Cromcastle Road, Cromcastle Park, Kilbarron Road, Barrycourt Road & Clonshaugh Industrial Estate, Dublin 17	Approved by an Bord Pleanala 15th May 2009

Dublin City Council Planning Application Reference No. (ABP Ref if applicable) & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	combined library and community centre north of Oscar Traynor Road; 200sqm single storey sports changing facility west of Clonshaugh Industrial Estate access road; 150sqm single storey pigeon club east of Clonshaugh Road; 5,000sqm five storey medical centre; 850sqm two storey creche facility; 400sqm community building; 66sqm management/security office; 1 no. retail unit (167sqm); 940no apartment and duplex apartment units (148no. one bed; 622no. two bed, 166no. three bed; and 4no. four bed) arranged in two, three, four, five, six and seven storey courtyards (including set back storey on the four, five six and seven storey blocks) located between Oscar Traynor Road, Kilmore Road, Kilbarron Road, Cromcastle Park and Cromcastle Road and including 30no. sheltered units in a three storey development in the grounds of Woodville House, a Protected Structure in a semi-derelict state located east of Kilmore Road which will be renovated and restored to provide communal support facilities for the sheltered housing units; 16no. car parking spaces associated with Woodville House; all residential units are provided with private gardens, terraces, balconies and semi-private courtyards; landscaping to riverside parkland; engineering works to Santry River; two new civic plazas linked by a pedestrian bridge across Oscar Traynor Road; a multi-purpose outdoor games area; temporary accommodation for the Kilmore West recreation centre including the boxing club (350sqm), community centre (880sqm) in the grounds of Scoil Fhursa; road improvements throughout; busways on both sides of Oscar Traynor Road; ESB substations; plant and associated services; 2,340no. basement level car parking spaces located under the development areas, 1,300no. for use by the retail centre, 50no. for the community/library/pool leisure buildings, 940no. for the residential units and 50 no. for the health centre together with 155no. surface residential car parking spaces. Phase 2 comprises the demolition of the existing Northside Shopping Centre; the construction of 11,924sqm gross retail space; 6,200sqm (10no. screens) cinema and family entertainment centre; 1,100sqm sports bar/restaurant; a 7,990sqm 16no. storey office tower with associated 244sqm ground floor and 584sqm first floor tea rooms/restaurant; 400no. residential apartments units (50no. one bed units; 233no. two bed units, 112no. three bed units; 3no. 3 bed live-work units and 2no. 2 bed love-work units) arranged in three, four, five and six storey courtyards (including set back storey on four, five and six storey blocks); 600sqm creche; realignment of Clonshaugh Road to form new cross roads junction with Kilmore Road; a new pedestrian high street with lifts and stairs to basement car park; basement level car parking for 954 cars (151 for retail, creche and sports bar/restaurant use, 500 for residential use, 230 for cinema use; and 73 for office use) accessed from the realigned Clonshaugh Road, Barrycourt Road and via an underground link from the		

Dublin City Council Planning Application Reference No. (ABP Ref if applicable) & Applicant	Summary Description of Development	Location of Development	Outcome & Final Grant Date
	Phase 1 car park west of the existing Clonshaugh Road; 1,815 no. bicycle spaces are distributed throughout the overall scheme; modifications to existing road junctions between Kilmore Road and Kilbarron Road and Cromcastle Road and Oscar Traynor Road; modifications to access to Woodville House; modifications to existing road junction between Oscar Traynor Road and IDA road and intersection between Cromcastle Road and Cromcastle Avenue; civic plaza; landscaping; ESB substations; plant and associated auxillary services and all other associated site development works. The application is accompanied by an Environmental Impact Statement (EIS). The EIS will be available for inspection or purchase for a fee not exceeding the reasonable cost of making a copy at the office of the Planning Authority during its public opening hours.		
2128/00 PL29N.122829 Markland Developments Ltd.,	For a new business and technology park comprising the erection of nine four storey office type buildings (total floor area 34,751 sq.m) with plantrooms over and basement car parking, uses to include those provided for under the Zoning Objective including light industry, data processing, software development, technical consulting uses, research and development, training and publishing, science and technology based industry and offices, with associated administrative offices, training facilities etc. on a heavily landscaped site, entered adjacent to the existing site entrance to its north, at the former 'Little Tikes' premises, located to the south east corner of the IDA Clonshaugh Industrial Estate, facing onto the Santry River linear park and the Oscar Traynor Road to the south, the main entrance road into the Estate to the west, the access road to the site to the north and retail warehouse developments entered from the Clonshaugh Road to the west.	Former 'Little Tikes' premises,, IDA Clonshaugh Industrial Estate,, Clonshaugh, Dublin 17.	GRANT SPLIT PERMISSION 18th July 2001

APPENDIX B (i)

ECOLOGICAL IMPACT ASSESSMENT

Prepared by

Moore Group - Environmental Services

Report for the purposes of Appropriate Assessment Screening

as required under Article 6(3) of the Habitats Directive
(Council Directive 92/43/EEC)

Data Centre Development

Clonshaugh Business & Technology Park

Prepared by: Moore Group – Environmental Services

23 September 2021

On behalf of Colliers Properties LLC
& Dublin City Council

Project Proponent	Colliers Properties LLC
Project	Data Centre Development Clonshaugh Business and Technology Park
Title	Report for the purposes of Appropriate Assessment Screening

Project Number	21224	**Document Ref**	21224 Clonshaugh Data Centre Development AAS1 Rev4	
Revision	**Description**	**Author**		**Date**
Rev4	AWN Edits	G. O'Donohoe		29 September 2021
Moore Archaeological and Environmental Services Limited				

Table of Contents

Abbreviations

AA	Appropriate Assessment
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information System
LAP	Local Area Plan
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage System
WFD	Water Framework Directive

1. Introduction

1.1. General Introduction

This report for the purposes of Appropriate Assessment (AA) Screening has been prepared to support a Planning Application for the Proposed Development (described in Section 3 below). This report contains information required for the competent authority to undertake screening for Appropriate Assessment (AA) on the potential construction and operation of a Data Centre facility comprising two datacentre buildings – Datacentre A and Datacentre B and all associated development at Clonshaugh Business & Technology Park, Dublin 17 (hereafter referred to as the Proposed Development) to significantly affect European sites.

Screening is the process that addresses the first two tests of Article 6(3) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive):

I). whether a plan or project is directly connected to or necessary for the management of the site, and
II). whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

Having regard to the provisions of the Planning and Development Act 2000 (section 177U and 177V), the purpose of a screening exercise under section 177U of the PDA 2000 is to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site.

If it cannot be *excluded* on the basis of objective information that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site then it is necessary to carry out a Stage 2 appropriate assessment.

When screening the project, there are two possible outcomes:

- the project poses no risk of a significant effect and as such requires no further assessment; and
- the project has potential to have a significant effect (or this is uncertain) and AA of the project is necessary.

This report has been prepared by Moore Group - Environmental Services to support an application for planning permission for the Proposed Development to allow Dublin City Council to carry out AA screening in relation to the Proposed Development. The report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has 25 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact

Statements on terrestrial and aquatic habitats for various Data Storage Facilities and Strategic Infrastructure Developments.

1.2. Legislative Background - The Habitats and Birds Directives

It is necessary that the Proposed Development has regard to Article 6 of the Habitats Directive. This is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 to 2015 (referred to as the Habitats Regulations). The Planning and Development Act 2000 (section 177U and 177V) govern the requirement to carry out appropriate assessment per Section 1.1 above.

The Habitats Directive is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a EU context.

The Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds), transposed into Irish law by the Habitats Regulations 2011, is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to as European sites.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to affect Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out a further assessment if required (Appropriate Assessment (AA)). Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest:

> ***Article 6(3):*** *"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 subjected to an 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."*

2. Methodology

The Commission's methodological guidance (EC, 2002 & 2018, see Section 2.1 below) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts is considered.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Proposed Development complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report to support an application for planning permission for the Proposed Development to allow Dublin City Council to carry out AA screening in relation to the Proposed Development to determine whether the Proposed Development, individually or in combination with another plan or project will have a significant effect on a Natura 2000 site.

2.1. Guidance

This report has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).

- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article Guidance Document.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Open Street Maps;
    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2021;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records;
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans;
    - Dublin City Development Plan 2016-2022

3. Description of the Proposed Development

Colliers Properties LLC, intend to apply for planning permission for development on a site at Clonshaugh Business and Technology Park, Dublin 17. The subject site comprises the site of former Units 15 and 16 and the former

Ricoh Building. The site is located to the north of the Santry River and the R104 Oscar Traynor Road, to the west of Clonshaugh Road, and to the south and east of existing estate roads.

The proposed development, for which a seven-year permission is sought, comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works including removal of existing site services and ESB pillar boxes (other buildings previously occupying the site were demolished under Reg. Ref.: 2229/19, a previously permitted data centre development, as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys (with Data Centre A also including two mezzanine levels), with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant and solar panels at roof level;
- Data Centre B (which will be ancillary to Data Centre A) will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level;
- Emergency generators and associated flues will be provided within compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;
- Ancillary structures including a sprinkler tank and pumphouse, security building, MV building, and provision of two additional MV substation rooms to the existing substation on site (c. 115 sq.m additional GFA), which was previously constructed under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking (58 no. spaces) and bicycle parking (24 no. spaces);
- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated and ancillary works including underground foul and storm water drainage network, and utility cables.

The Proposed Development site is located within the boundary of the existing brownfield site, which had been partially cleared and prepared for development by April 2021 . One remaining mixed warehouse and office building (former Ricoh building) in the northeastern section of the site will be demolished as part of the Proposed Development.

The predominant habitat within the site is Spoil and bare ground (ED2). The grassy verges (previously amenity grassland (GA2)) surrounding the central cleared area have become rank and overgrown. The amenity grassland buffer between the main site area and the Santry River is populated by dense grass and tall herbs with scattered trees forming a woodland type of habitat including Horse chestnut, Hybrid Black poplar, White poplar, Aspen, Birch, Willow, Sycamore, Alder and Rowan. The denser area is located to the southwestern corner of the site.

The proposed development site observes a minimum buffer zone of no development of 30m to the Santry River. There are no streams/ditches connecting the site to the Santry river and it is highly unlikely that surface water would reach the Santry River during construction given the distance of removal from the proposed development area and the intervening grassland and woodland buffer.

During Operation, all surface water flows will be collected by the site surface water drainage network and discharge to public storm sewer. No surface water flows will discharge to the foul water network. Petrol interceptors will be provided within the surface water drainage network in accordance with the requirements

of the Greater Dublin Regional Code of Practice. There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage. Based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

The proposed surface water attenuation system is located in the northeast corner of the site. A closed Stormtech attenuation system (or similar) is planned. These features are standard design features and not considered measures for the avoidance of potential effects on downstream European sites.

Figure 1 shows the Proposed Development location and Figure 2 shows a detailed view of the Proposed Development boundary on recent aerial photography. Figure 3 shows the layout of the Proposed Development.

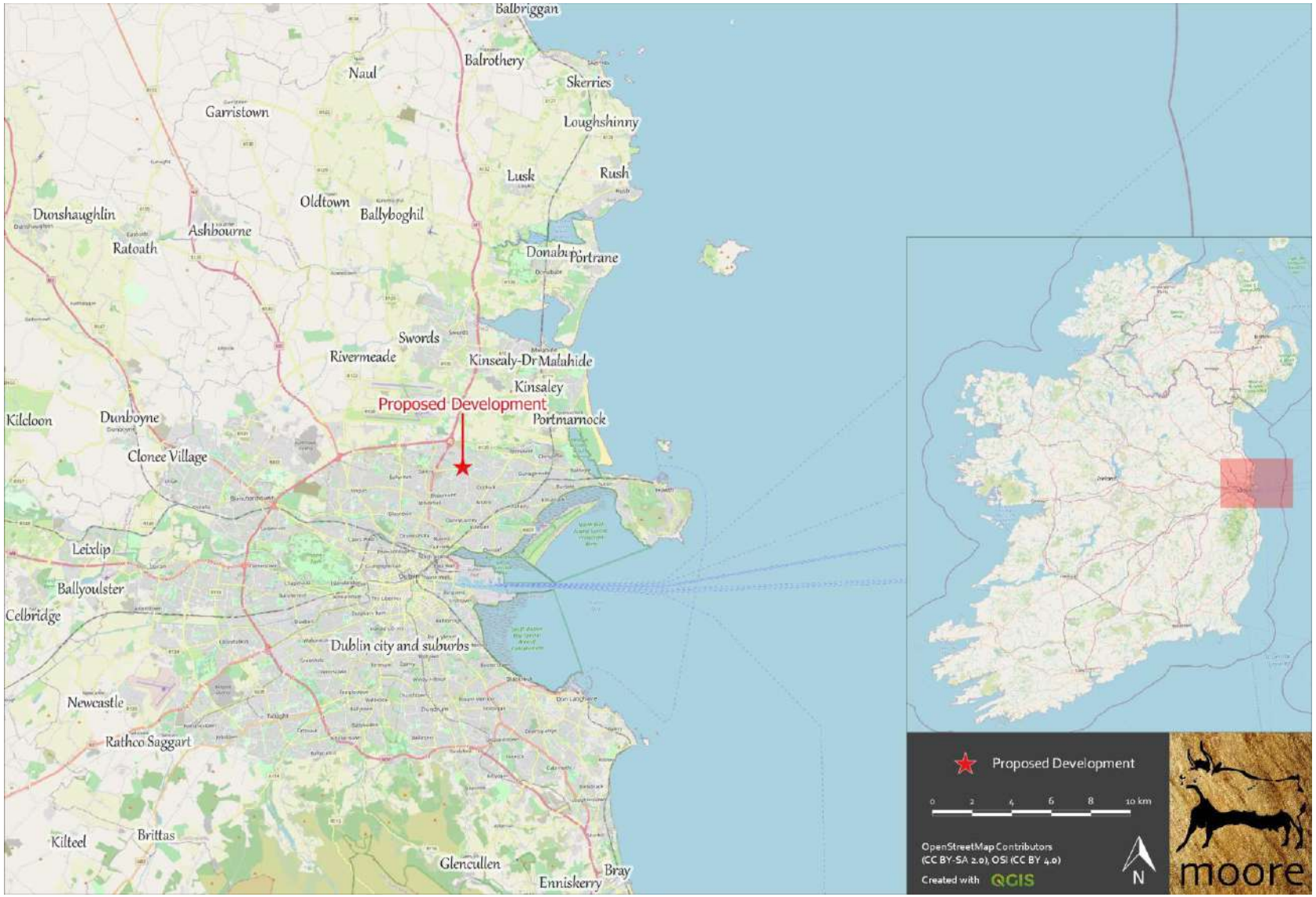


Figure 1. Showing the Proposed Development location at Clonshaugh, Dublin 17.

Figure 2. Showing the Proposed Development boundary on recent aerial photography.

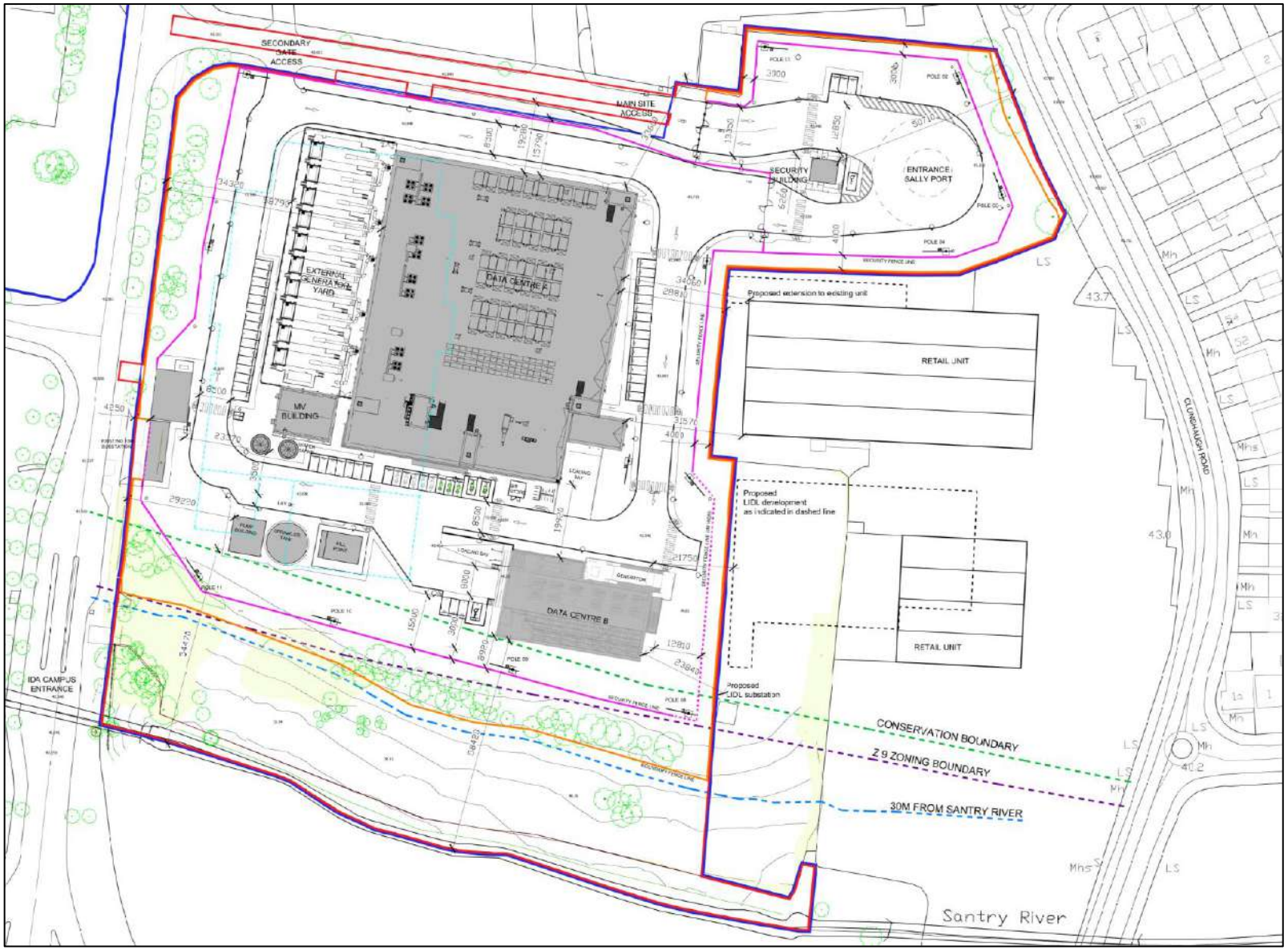


Figure 3. Plan of the Proposed Development.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Affected

The Department of Housing, Planning and Local Government (previously DoEHLG)'s Guidance on Appropriate Assessment (2009) recommends an assessment of European sites within a Zone of Influence (ZoI) of 15km. This distance is a guidance only and a potential Zone of Influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15km).

The Zone of Influence may be determined by connectivity to the Proposed Development in terms of:

- Nature, scale, timing and duration of works and possible impacts, nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Sensitivity and location of ecological features.

The potential for source pathway receptor connectivity is firstly identified and detailed information is then provided on sites with connectivity. European sites that are located within the potential Zone of Influence (following OPR practice note OPR01) of the Proposed Development are listed in Table 1 and presented in Figures 4 and 5, below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on the 20 September 2021.

Table 1 European Sites located within the potential Zone of Influence[1] of the Proposed Development.

Site Code	Site name	Distance (km)[2]
000199	Baldoyle Bay SAC	4.91
000205	Malahide Estuary SAC	6.56
000206	North Dublin Bay SAC	4.33
000210	South Dublin Bay SAC	6.69
004006	North Bull Island SPA	4.31
004016	Baldoyle Bay SPA	5.24
004024	South Dublin Bay and River Tolka Estuary SPA	3.88
004025	Malahide Estuary SPA	6.56

[1] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[2] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

The nearest European sites to the Proposed Development are coastal sites of Dublin and Baldoyle Bays and the Malahide Estuary, including North Dublin Bay SAC & North Bull Island SPA, situated 4.3km to the southeast, and South Dublin Bay and River Tolka Estuary, 3.88km to the south.

The Proposed Development is located within the hydrological catchment of the Santry River which flows 30m to the south of the Proposed Development. Downstream, the waters of the Santry River enter Dublin Bay with its associated European sites.

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the vicinity of the Proposed Development are provided in Table 2 below.

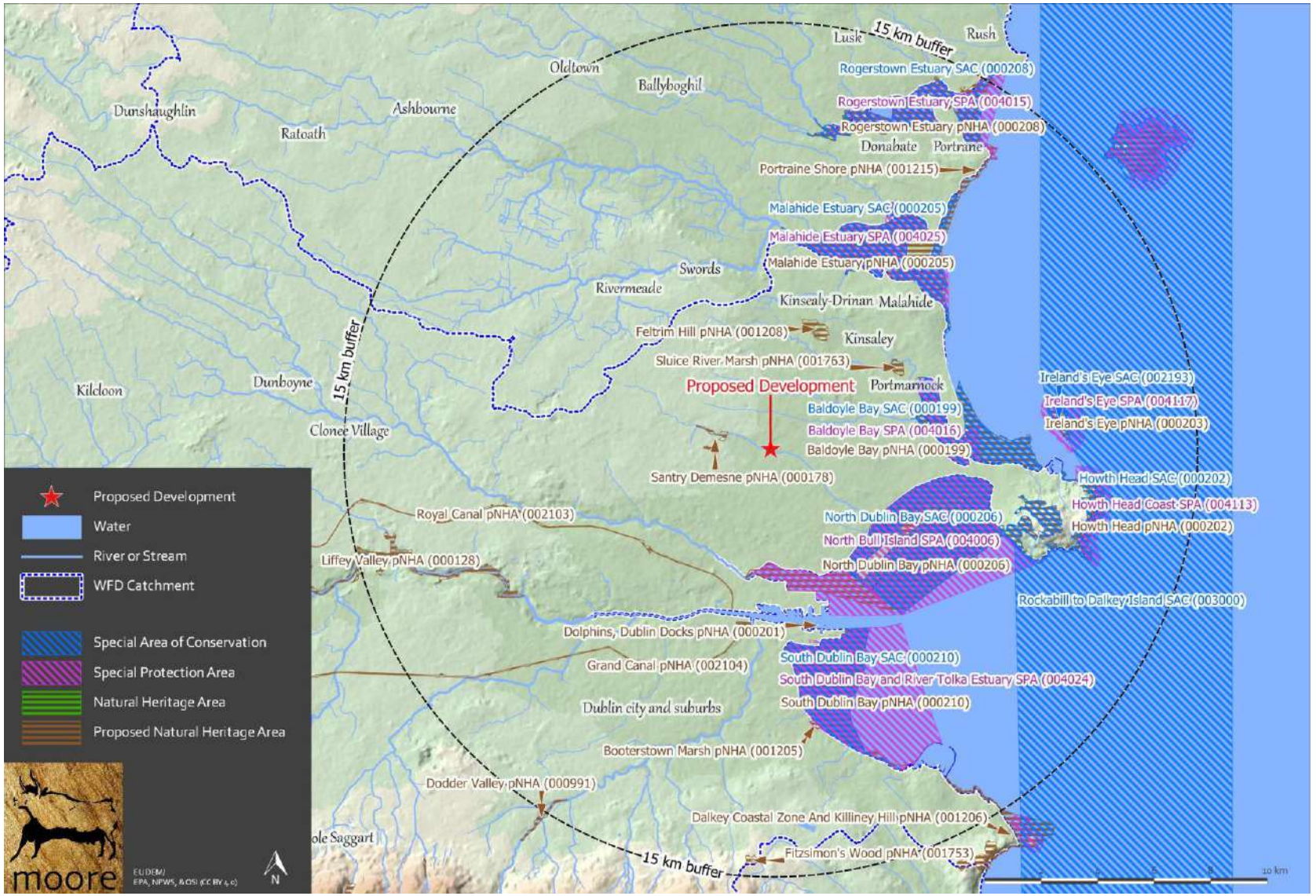


Figure 4. Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Proposed Development.

Figure 5. Detailed view of European sites in the nearer Potential Zone of Influence of the Proposed Development.

Table 2 Identification of relevant European sites using Source-Pathway-Receptor model and compilation of information QIs and conservation objectives.

European site name & Site code	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
Baldoyle Bay SAC (000199) 4 Qualifying Interests https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000199.pdf	4.91km to the east of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N
Malahide Estuary SAC (000205) 7 Qualifying Interests Including Priority Habitat: Fixed coastal dunes with herbaceous vegetation (grey dunes)*2130 https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000205.pdf	6.56km to the north-east of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N
North Dublin Bay SAC (000206) 10 Qualifying Interests Including Priority Habitat: Fixed coastal dunes with herbaceous vegetation (grey dunes)*2130 https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000206.pdf	4.33km to the southeast of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site. There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.	N
South Dublin Bay SAC (000210) 1 Qualifying Interest https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000210.pdf	6.69km to the south of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site. There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact	N

European site name & Site code	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
		on water quality within Dublin Bay.	
North Bull Island SPA (004006) 18 Qualifying Interests https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004006.pdf	4.31km to the southeast of the Proposed Development	No There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay. No Due to distance and the lack of any relevant ex-situ factors of significance to the habitats or species of this site.	N
Baldoyle Bay SPA (004016) 7 Qualifying Interests https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004016.pdf	5.24km to the northeast of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site. No Due to distance and the lack of any relevant ex-situ factors of significance to the habitats or species of this site.	N
South Dublin Bay and River Tolka Estuary SPA (004024) 14 Qualifying Interests https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004024.pdf	3.88km to the south of the Proposed Development	No There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay. No Due to distance and the lack of any relevant ex-situ factors of significance to the habitats or species of this site.	N

European site name & Site code	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
Malahide Estuary SPA (004025) 15 Qualifying Interests https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004025.pdf	6.56km to the northeast of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site. No Due to distance and the lack of any relevant ex-situ factors of significance to the habitats or species of this site.	N

4.2. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas (pNHA) and designated Natural Heritage Areas (NHA) in terms of their role in supporting the species using Natura 2000 sites was undertaken. It was assumed that these supporting roles mainly related to mobile fauna such as mammals and birds which may use pNHAs and NHAs as "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the preparation of this AA Screening report .

There are no other areas of conservation concern that would be affected by the Proposed Development.

There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay. There are no areas of supporting habitat that will be affected by the Proposed Development.

5. Identification of Potential Impacts & Assessment of Significance

The Proposed Development is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Assessment of Likely Significant Effects

The Proposed Development is located within the hydrological catchment of the Santry River, which runs 30m to the south of the Proposed Development. A review of aerial photography, Ordnance Survey Ireland (OSI) mapping and OSI Geographical Information System (GIS) data for rivers and streams indicates that there are no there are no notable surface water features onsite and no direct hydrological pathways to offsite surface water bodies. This was confirmed during fieldwork on 11/08/21.

There is no direct connectivity to Dublin Bay or to any European sites within or outside the potential Zone of Influence. The distance is such that any accidental release would have no impact on the receiving water quality at these Natura sites.

There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

The consideration of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the Proposed Development are presented in Table 3.

Table 3 Assessment of Likely Significant Effects.

Identification of all potential direct and indirect impacts that may result in significant effects on the conservation objectives of a European site, taking into account the size and scale of the project.	
Impacts:	**Significance of Impacts:**
Construction phase e.g. Vegetation clearance Demolition Surface water runoff from soil excavation/infill/landscaping (including borrow pits) Dust, noise, vibration Lighting disturbance Impact on groundwater/dewatering	The Proposed Development site is located on the existing brownfield site which had been cleared for development by April 2021 with the exception of one building which comprises mixed warehouse and office building. There are no openwater conduits to the Santry river from the construction area. Additionally, the proposed development site observes a minimum buffer zone of no development of 30m to the Santry River. There will be no discharges during construction to the Santry River. As outlined in the EIAR Screening and assessments included in the appendices for same, there are no predicted emissions to air, water or the environment during the construction phase that would result in significant effects.

Storage of excavated/construction materials Access to site Pests	
Operational phase e.g. Direct emission to air and water Surface water runoff containing contaminant or sediment Lighting disturbance Noise/vibration Changes to water/groundwater due to drainage or abstraction Presence of people, vehicles and activities Physical presence of structures (e.g. collision risks) Potential for accidents or incidents	All foul and surface water runoff, once the facility is operational, will be contained on site and discharged to urban drainage systems. The Proposed Development includes surface water attenuation and oil interception and all surface water during operation will be contained on the site per the requirements of the Greater Dublin Regional Code of Practice for Drainage Works. As outlined in the EIAR Screening and assessments included in the appendices for same, there are no predicted emissions to air, water or the environment during the operation phase that would result in significant effects. There is no real likelihood of any significant effects on European Sites in the wider catchment area. The facility is located at a distance of removal such that there will be no disturbance to qualifying interest species in any European sites.
In-combination/Other	No likely significant in-combination effects are identified. See section 5.2 below.
Describe any likely changes to the European site:	
Examples of the type of changes to give consideration to include: Reduction or fragmentation of habitat area Disturbance to QI species Habitat or species fragmentation Reduction or fragmentation in species density Changes in key indicators of conservation status value (water quality etc.)	None. The Proposed Development site is not located adjacent or within a European site, therefore there is no risk of habitat loss or fragmentation or any effects on QI habitats or species directly or ex-situ.

Changes to areas of sensitivity or threats to QI Interference with the key relationships that define the structure or ecological function of the site Climate change	
Are 'mitigation' measures necessary to reach a conclusion that likely significant effects can be ruled out at screening?	
No	While best practice construction methods will be included these are not required to avoid or reduce any effects on a European site. These measures are not relied upon to reach a conclusion of no likely significant effects on any European site.

On the basis of the information supplied, which is considered adequate to undertake a screening determination and having regard to:

- the nature and scale of the proposed development,
- the intervening land uses and distance from European sites,
- the lack of direct connections with regard to the Source-Pathway-Receptor model,

It may be concluded that the proposed development, individually or in-combination with other plans or projects, would not be likely to have a significant effect on the above listed European sites or any other European site, in view of the said sites' conservation objectives.

5.2. Assessment of Potential In-Combination Effects

In-combination effects are changes in the environment that result from numerous human-induced, small-scale alterations. In-combination effects can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data gaps in the area where the Proposed Development is located. The database was then queried for developments granted planning permission within 250m of the Proposed Development within the

last three years, these are presented in Table 4 below. Given the brownfield nature of the site and having established that there will be no likely significant emissions to air, water or the environment during construction, this distance was taken as adequate for the consideration of immediate potential In-combination effects. The period of 3 years is considered an appropriate for timescale to measure changes in biological terms with regard to habitats and species.

Table 4. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
4111/18	Planning Application for a new black coloured, powder coated steel boundary fence, including new gates and for all associated site works.	No potential for in-combination effects given the scale and location of the project.
2066/19	Planning permission for demolishing an existing shed at the rear of the existing site and replacing with a proposed new ground floor only detached building to the rear of the existing site to be used as a game's room/gym and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
3803/20	Planning permission for 2 no. 2 storey data centre buildings (each 16,576 sqm), which are 16m in height at the main parapet level. Each building to include: Office administration area, data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage spaces, screened plant and solar panel array at roof level, with rainwater harvesting system to support industrial water requirements. 16 no. emergency generators with emission stacks along with a single emergency house supply generator, all contained in a fenced compound adjacent to each building. Diesel storage tank, fuel filling area and associated plant.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.
2229/19 (N.B. previous application on the subject site)	Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre including data halls, offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the proposed development is c.9,520.5m.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out. The site was subsequently cleared with the exception of one warehouse building.
2443/19	Development will consist of a proposed new dormer roof to the side & rear of the existing house roof. A new ground floor only extension to the rear of the existing house and extending the existing garage 1m at the front connecting both and converting the garage into a granny flat and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2523/19	The development will consist of the repositioning of the drive-thru exit from NE corner of site to SE of site including necessary amendments to landscaping and access. Existing ramped access to be removed and new pedestrian crossing and stepped access to be provided to serve new building entrance on North elevation. One no. loading bay to be removed to allow for repositioned entrance. Outside seating area to be relocated from south of the building to the north of the building. Menu boards, speaker and leader to be moved to the south of the building. New bin store to be constructed to the south of the building.	No potential for in-combination effects given the scale and location of the project.

Planning Ref.	Description of development	Comments
	Windows to the south elevation to be partially opaqued to accommodate new bin store. Southern elevation to receive repositioned 1.8m x 0.6m 'KFC' logo. North elevation to have 3 no. new window openings, a new entrance door and external seating area. Signage will consist of repositioned 1.8m x 1.8m internally illuminated 'Colonels Head' logo with powder-coated aluminium flat panel, non-illuminated vinyl 2.5m x 1.2m 'finger lickin good' graphic and repositioned 1.8 x 0.6m high 'KFC' letters to North elevation. East elevation to have new entrance doors & shop front frame within existing collection window opening and new windows to match existing structure. Red panels to be removed and replaced with grey Trespa panels to match rest of building. Existing door opening to be altered to become fire escape. Existing 'KFC Drive thru' signage to be repositioned and new 3.2m x 3.2m 'Colonel' vinyl graphic applied. West elevation to have yard area panelling removed to allow for external seating area, repositioned menu panel from old collection window and opaque vinyl applied to inside face of existing glazing. Existing 'Drive thru' letters & existing 1m x 1m sign to be repositioned and new 4m x 2m 'finger-lickin good' non illuminated vinyl graphic fitted. The internal layout of the building to be rearranged to suit these changes.	
2769/19	Proposed loft conversion with dormer structure to hipped end of roof and velux windows to rear & front roof profiles at 42 Clonshaugh Road, Clonshaugh, Dublin 17.	No potential for in-combination effects given the scale and location of the project.
3400/19	Planning permission for development on a site of c. 0.025 hectares at Clonshaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building B). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
3529/19	Planning permission for: the construction of (a) an extension of the existing retail unit to create a dedicated modern, ancillary, warehouse area for storage of goods associated with the retail business including a delivery area canopy (b) an internal mezzanine for ancillary offices which would be ancillary to the retail use and all other ancillary works to facilitate the development.	No potential for in-combination effects given the scale and location of the project.
3644/19	Permission is sought for Change of Use from former Liz Delaney's Public House + Club of recreation building to include gym use (Class 11(e) without pool) which includes existing basement = 135 sqm, existing ground floor = 1130 sqm, existing first floor = 611 sqm and single storey extensions at ground floor = 48 sqm and at first floor = 16 sqm, creating total development area = 1940 sqm, minor elevational changes including addition of entrance and relocation of fire escape doors and external works to include rebranding existing and additional signage and provision of new bicycle stands.	No potential for in-combination effects given the scale and location of the project.
3836/19	Development will consist of demolishing an existing canopy and replacing with a proposed new ground floor only extension to the front of the existing house and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
4371/19	(a) Attic conversion, incorporating dormer extension to side and rear, (b) All associated site works.	No potential for in-combination effects given the scale and location of the project.
4782/19	Planning permission for: amendments to the mixed-use development, granted planning permission under PA Ref: 3960/17 and to Pa Ref: 2686/19. The amendments relate to the foodstore and office portion	No potential for in-combination effects given there are no predicted emissions to air,

Planning Ref.	Description of development	Comments
	(Block 3). The numbered amendments below cross reference to the submitted plans. The development consists of the completion of the development subject to the following amendments: (1) Reposition window on canteen on south elevation and new window above exit door on the north elevation of the foodstore (2a) Photovoltaic solar panels on roof of foodstore (2b) photovoltaic solar panels on roof of offices (3) modifications to staff welfare layout, canteen, freezer/chiller area with new reception area servicing offices above. (4) ESB substation omitted. (5) Trolley bay repositioned and design of same revised. (6) Fence line to the north of the site as part of compliance with condition 5 of PA Ref: 2686/19 to include 2m high Palladin Mesh fence with Pyracantha hedging to outer face and fence positioned along the boundary line of the property (7) New access walkway to roof deck (8) Window to be used to access roof deck. (9) Minor parapet level adjustment of foodstore. (10) Electric vehicle charging points/spaces repositioned. (11) Revision to car parking to include 3 additional spaces and revised car parking space surface treatment from permeable paving to asphalt and amendments to the associated car parking drainage proposals. (12) Enclosed bin store relocated to service ramp area. Lidl Ireland Gmbh.	water or the environment during the construction or operational phases that would result in significant effects from the subject proposed development.
4495/19	Development will consist of a proposed new flat roof dormer to the rear of the existing house roof and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2640/20	Planning Permission for a ground floor porch extension to the front (circa 11.3sq.m) with 3 no. roof lights and associated site works at 13 Cromcastle Road, Kilmore West, Dublin 5.	No potential for in-combination effects given the scale and location of the project.
2943/20	The development will consist of: The construction of a new three-storey apartment scheme consisting of the following: ground floor, first floor and a dormer roof second floor. The proposal includes the following; (i) 3 one bedroom apartments; (ii) 6 two-bedroom apartments; (iii) private balconies; (iv) a bin storage area; (v) 10 on-site vehicle parking bays; (vi) 9 bicycle parking bays; (vii) 150.5 sqm landscaped communal open space; (viii) new boundary walls; (ix) provision for all storm water, foul drainage, mains water and electricity supply connections ancillary to the development.	No potential for in-combination effects given there are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects from the subject proposed development.
3200/20	RETENTION: Retention Permission for development at a site located at Units 15/16 Business & Technology Park, Clonshaugh, Dublin 17. The development comprises a modification to Permission DCC Ref. 2229/19 (currently under construction) granted for a 2 storey data centre, (with generator yard and all associated works). The development now provides a larger, single storey substation (increased in size from c.34.5 sq.m (as permitted) to c.68.4 sq.m) and located to the south-west of the data centre building as per the parent permission DCC Ref. 2229/19.	No potential for in-combination effects given the scale and location of the project.
3221/20	Planning permission to convert attic space by raising in part the rear roof pitch within the existing roof profile, to form a single dormer with low-pitch roof over to provide a playroom with toilet for our three children. The pitch to fall to the rear with water collection gutter returned to the side to shed the rainwater onto the exising roof and into the existing surface water system.	No potential for in-combination effects given the scale and location of the project.
3763/20	The development will consist of the construction of a pitched roof and louvered panel walls to the eastern side of the existing fuel storage tank building located on the southern boundary of the site to match the existing building and the installation of 4 no. generators - 2 no. each within the existing recessed plant enclosures on the roof on the northern and southern sides of the building.	No potential for in-combination effects given the scale and location of the project.
3865/20	Planning permission for the demolition of the existing building immediately south of "The Range" store and the construction of a	No potential for in-combination effects given the project was

Planning Ref.	Description of development	Comments
	single storey discount food store (supermarket) with ancillary off-licence sales area. Provision of 75 surface level car parking spaces within the application red line boundary, including two electrical vehicle (EV) charging spaces (parking outside the application red line boundary is operational and therefore does not form part of this application); boundary treatments; 12 cycle stands (space for 24 bicycles); trolley bay canopy; hard and soft landscaping; ESB substation building and external mechanical plant areas; site lighting and connections to drainage and on site drainage infrastructure including attenuation tank; roof mounted photo-voltaic panels; all advertising signage. Access to the proposed development is via the two existing operational access points on the Clonshaugh Road, used by "The Range". All ancillary works to facilitate the development. Lidl Ireland Gmbh.	screened for environmental effects and significant effects were ruled out.
2461/21	Planning permission for conversion of existing attic space comprising of modification of existing roof structure, new gable window, new access stairs and flat roof dormer to the rear.	No potential for in-combination effects given the scale and location of the project.

There are no predicted in-combination effects given that the reasons discussed in the 'Comments' column of Table 4 above and given that the Proposed Development is unlikely to have any adverse effects on any Dublin Bay European sites.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement for regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard. As such, there are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on any European site.

Any new applications for the area surrounding the Proposed Development will be assessed on a case by case basis *initially* by Dublin City Council or if strategic infrastructure development by ABP. which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Conclusion

There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient

along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

There are no predicted effects on any European sites given:

- The distance between the Proposed Development and any European Sites, approximately 4km;
- The lack of direct connectivity between the Proposed Development and any hydrological pathways; there is no direct connectivity between the Proposed Development site and any watercourses that lead to Dublin Bay;
- The Proposed Development is to be connected to the existing public sewer network for the treatment of wastewater.
- There are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects.

It has been objectively concluded by Moore Group Environmental Services that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is unlikely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment in view of their conservation objectives.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment is not, therefore, required.

A finding of no significant effects report is presented in Appendix A in accordance with the EU Commission's methodological guidance (European Commission, 2002).

7. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission Environment DG (2002) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.

European Commission (2007) 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 interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

NPWS (2021) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021

Appendix A

FINDING OF NO SIGNIFICANT EFFECTS REPORT

Finding no significant effects report matrix

Name of project or plan

Proposed Data Centre Development Clonshaugh Business and Technology Park

Name and location of the Natura 2000 site(s)

The nearest European sites to the Proposed Development are coastal sites of Dublin and Baldoyle Bays and the Malahide Estuary, including North Dublin Bay SAC & North Bull Island SPA, situated 4.3km to the southeast, and South Dublin Bay and River Tolka Estuary, 3.88km to the south.

The Proposed Development is located within the hydrological catchment of the Santry River which flows 30m to the south of the Proposed Development. A review of aerial photography, Ordnance Survey Ireland (OSI) mapping and OSI Geographical Information System (GIS) data for rivers and streams indicates that there are no notable surface water features onsite and no direct hydrological pathways to offsite surface water bodies. This was confirmed during fieldwork.

Downstream, the waters of the Santry River enter Dublin Bay with its associated European sites.

Description of the project or plan

Colliers Properties LLC, intend to apply for planning permission for development on a site at Clonshaugh Business and Technology Park, Dublin 17. The subject site comprises the site of former Units 15 and 16 and the former Ricoh Building. The site is located to the north of the Santry River and the R104 Oscar Traynor Road, to the west of Clonshaugh Road, and to the south and east of existing estate roads.

The proposed development, for which a seven-year permission is sought, comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works (other buildings previously occupying the site were demolished under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys (with Data Centre A also including two mezzanine levels), with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant and solar panels at roof level;
- Data Centre B (which will be ancillary to Data Centre A) will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level;
- Emergency generators and associated flues will be provided within compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;
- Ancillary structures including a sprinkler tank and pumphouse, security building, MV building, and provision of two additional MV substation rooms to the existing substation on site (c. 72 sq.m additional GFA), which was previously constructed under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking and bicycle parking spaces;

- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated and ancillary works including underground foul and storm water drainage network, attenuation area, and utility cables.

The Proposed Development site is located within the boundary of the existing brownfield site, which had been cleared and prepared for development by April 2021. One remaining mixed warehouse and office building (former Ricoh building) in the northeastern section of the site will be demolished as part of the Proposed Development.

During operation, all surface water flows will be collected by the site surface water drainage network. No surface water flows will discharge to the foul water network. Petrol interceptors will be provided within the surface water drainage network in accordance with the requirements of the Greater Dublin Regional Code of Practice. The proposed surface water attenuation system is located in the northeast corner of the site. Accordingly a closed Stormtech attenuation system (or similar) is being proposed. These SuDS features are standard design features and not considered measures for the avoidance of potential effects on downstream European sites.

Is the project or plan directly connected with or necessary to the management of the site(s)

No

Are there other projects or plans that together with the projects or plan being assessed could affect the site

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data outages in the area where the Proposed Development is located. The database was then queried for developments granted planning permission within 250m of the Proposed Development within the last three years, these are presented in the Table below. Given the brownfield nature of the site and having established that there will be no emissions to air, water or the environment during construction, this distance was taken as adequate for the consideration of immediate potential In-combination effects. The period of 3 years is considered an appropriate for timescale to measure changes in biological terms with regard to habitats and species.

Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
4111/18	Planning Application for a new black coloured, powder coated steel boundary fence, including new gates and for all associated site works.	No potential for in-combination effects given the scale and location of the project.
2066/19	Planning permission for demolishing an existing shed at the rear of the existing site and replacing with a proposed new ground floor only detached building to the rear of the existing site to be used as a game's room/gym and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
3803/20	Planning permission for 2 no. 2 storey data centre buildings (each 16,576 sqm), which are 16m in height at the main parapet level. Each building to include: Office administration area, data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage spaces, screened plant and solar panel array at roof level, with rainwater harvesting system to support industrial water requirements. 16 no. emergency generators with emission stacks along with a single emergency house supply generator, all contained in a fenced compound adjacent to each building. Diesel storage tank, fuel filling area and associated plant.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.
2229/19 (N.B. previous application on the	Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.

Planning Ref.	Description of development	Comments
subject site)	including data halls, offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the proposed development is c.9,520.5m.	The site was subsequently cleared with the exception of one warehouse building.
2443/19	Development will consist of a proposed new dormer roof to the side & rear of the existing house roof. A new ground floor only extension to the rear of the existing house and extending the existing garage 1m at the front connecting both and converting the garage into a granny flat and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2523/19	The development will consist of the repositioning of the drive-thru exit from NE corner of site to SE of site including necessary amendments to landscaping and access. Existing ramped access to be removed and new pedestrian crossing and stepped access to be provided to serve new building entrance on North elevation. One no. loading bay to be removed to allow for repositioned entrance. Outside seating area to be relocated from south of the building to the north of the building. Menu boards, speaker and leader to be moved to the south of the building. New bin store to be constructed to the south of the building. Windows to the south elevation to be partially opaqued to accommodate new bin store. Southern elevation to receive repositioned 1.8m x 0.6m 'KFC' logo. North elevation to have 3 no. new window openings, a new entrance door and external seating area. Signage will consist of repositioned 1.8m x 1.8m internally illuminated 'Colonels Head' logo with powder-coated aluminium flat panel, non-illuminated vinyl 2.5m x 1.2m 'finger lickin good' graphic and repositioned 1.8 x 0.6m high 'KFC' letters to North elevation. East elevation to have new entrance doors & shop front frame within existing collection window opening and new windows to match existing structure. Red panels to be removed and replaced with grey Trespa panels to match rest of building. Existing door opening to be altered to become fire escape. Existing 'KFC Drive thru' signage to be repositioned and new 3.2m x 3.2m 'Colonel' vinyl graphic applied. West elevation to have yard area panelling removed to allow for external seating area, repositioned menu panel from old collection window and opaque vinyl applied to inside face of existing glazing. Existing 'Drive thru' letters & existing 1m x 1m sign to be repositioned and new 4m x 2m 'finger-lickin good' non illuminated vinyl graphic fitted. The internal layout of the building to be rearranged to suit these changes.	No potential for in-combination effects given the scale and location of the project.
2769/19	Proposed loft conversion with dormer structure to hipped end of roof and velux windows to rear & front roof profiles at 42 Clonshaugh Road, Clonshaugh, Dublin 17.	No potential for in-combination effects given the scale and location of the project.
3400/19	Planning permission for development on a site of c. 0.025 hectares at Clonshaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building B). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works.	No potential for in-combination effects given the scale and location of the project.

Planning Ref.	Description of development	Comments
3529/19	Planning permission for: the construction of (a) an extension of the existing retail unit to create a dedicated modern, ancillary, warehouse area for storage of goods associated with the retail business including a delivery area canopy (b) an internal mezzanine for ancillary offices which would be ancillary to the retail use and all other ancillary works to facilitate the development.	No potential for in-combination effects given the scale and location of the project.
3644/19	Permission is sought for Change of Use from former Liz Delaney's Public House + Club of recreation building to include gym use (Class 11(e) without pool) which includes existing basement = 135 sqm, existing ground floor = 1130 sqm, existing first floor = 611 sqm and single storey extensions at ground floor = 48 sqm and at first floor = 16 sqm, creating total development area = 1940 sqm, minor elevational changes including addition of entrance and relocation of fire escape doors and external works to include rebranding existing and additional signage and provision of new bicycle stands.	No potential for in-combination effects given the scale and location of the project.
3836/19	Development will consist of demolishing an existing canopy and replacing with a proposed new ground floor only extension to the front of the existing house and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
4371/19	(a) Attic conversion, incorporating dormer extension to side and rear, (b) All associated site works.	No potential for in-combination effects given the scale and location of the project.
4782/19	Planning permission for: amendments to the mixed-use development, granted planning permission under PA Ref: 3960/17 and to Pa Ref: 2686/19. The amendments relate to the foodstore and office portion (Block 3). The numbered amendments below cross reference to the submitted plans. The development consists of the completion of the development subject to the following amendments: (1) Reposition window on canteen on south elevation and new window above exit door on the north elevation of the foodstore (2a) Photovoltaic solar panels on roof of foodstore (2b) photovoltaic solar panels on roof of offices (3) modifications to staff welfare layout, canteen, freezer/chiller area with new reception area servicing offices above. (4) ESB substation omitted. (5) Trolley bay repositioned and design of same revised. (6) Fence line to the north of the site as part of compliance with condition 5 of PA Ref: 2686/19 to include 2m high Palladin Mesh fence with Pyracantha hedging to outer face and fence positioned along the boundary line of the property (7) New access walkway to roof deck (8) Window to be used to access roof deck. (9) Minor parapet level adjustment of foodstore. (10) Electric vehicle charging points/spaces repositioned. (11) Revision to car parking to include 3 additional spaces and revised car parking space surface treatment from permeable paving to asphalt and amendments to the associated car parking drainage proposals. (12) Enclosed bin store relocated to service ramp area. Lidl Ireland Gmbh.	No potential for in-combination effects given there are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects from the subject proposed development.
4495/19	Development will consist of a proposed new flat roof dormer to the rear of the existing house roof and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2640/20	Planning Permission for a ground floor porch extension to the front (circa 11.3sq.m) with 3 no. roof lights and associated site works at 13 Cromcastle Road, Kilmore West, Dublin 5.	No potential for in-combination effects given the scale and location of the project.
2943/20	The development will consist of: The construction of a new three-storey apartment scheme consisting of the following: ground floor, first floor and a dormer roof second floor. The proposal includes the following; (i) 3 one bedroom apartments; (ii) 6 two-bedroom apartments; (iii) private balconies; (iv) a bin storage area; (v) 10 on-site vehicle parking bays; (vi) 9 bicycle parking bays; (vii) 150.5 sqm landscaped communal open space; (viii) new boundary walls; (ix)	No potential for in-combination effects given there are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects from

Planning Ref.	Description of development	Comments
	provision for all storm water, foul drainage, mains water and electricity supply connections ancillary to the development.	the subject proposed development.
3200/20	RETENTION: Retention Permission for development at a site located at Units 15/16 Business & Technology Park, Clonshaugh, Dublin 17. The development comprises a modification to Permission DCC Ref. 2229/19 (currently under construction) granted for a 2 storey data centre, (with generator yard and all associated works). The development now provides a larger, single storey substation (increased in size from c.34.5 sq.m (as permitted) to c.68.4 sq.m) and located to the south-west of the data centre building as per the parent permission DCC Ref. 2229/19.	Previous planned development for the site3803
3221/20	Planning permission to convert attic space by raising in part the rear roof pitch within the existing roof profile, to form a single dormer with low-pitch roof over to provide a playroom with toilet for our three children. The pitch to fall to the rear with water collection gutter returned to the side to shed the rainwater onto the exising roof and into the existing surface water system.	No potential for in-combination effects given the scale and location of the project.
3763/20	The development will consist of the construction of a pitched roof and louvered panel walls to the eastern side of the existing fuel storage tank building located on the southern boundary of the site to match the existing building and the installation of 4 no. generators - 2 no. each within the existing recessed plant enclosures on the roof on the northern and southern sides of the building.	No potential for in-combination effects given the scale and location of the project.
3865/20	Planning permission for the demolition of the existing building immediately south of "The Range" store and the construction of a single storey discount food store (supermarket) with ancillary off-licence sales area. Provision of 75 surface level car parking spaces within the application red line boundary, including two electrical vehicle (EV) charging spaces (parking outside the application red line boundary is operational and therefore does not form part of this application); boundary treatments; 12 cycle stands (space for 24 bicycles); trolley bay canopy; hard and soft landscaping; ESB substation building and external mechanical plant areas; site lighting and connections to drainage and on site drainage infrastructure including attenuation tank; roof mounted photo-voltaic panels; all advertising signage. Access to the proposed development is via the two existing operational access points on the Clonshaugh Road, used by "The Range". All ancillary works to facilitate the development. Lidl Ireland Gmbh.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.
2461/21	Planning permission for conversion of existing attic space comprising of modification of existing roof structure, new gable window, new access stairs and flat roof dormer to the rear.	No potential for in-combination effects given the scale and location of the project.

There are no predicted in-combination effects given that the reasons discussed in the 'Comments' column of the Table above and given that the Proposed Development is unlikely to have any adverse effects on any European sites.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement for regard to the Habitats Directive. The development

cannot have received planning permission without having met the consenting authority requirement in this regard. There are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on any European site.

Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by Dublin City Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

THE ASSESSMENT OF SIGNIFICANCE OF EFFECTS

Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

A review of aerial photography, Ordnance Survey Ireland (OSI) mapping and OSI Geographical Information System (GIS) data for rivers and streams indicates that there are no watercourses in the vicinity of the Proposed Development site. This was confirmed during fieldwork.

There is no direct connectivity to Dublin or Baldoyle Bays, or to any European sites within or outside the potential Zone of Influence.

Explain why these effects are not considered significant.

There are no predicted effects on any European sites given:

- The distance between the Proposed Development and any European Sites, approximately 4km;
- The lack of direct connectivity between the Proposed Development and any hydrological pathways; there is no connectivity between the Proposed Development site and any watercourses that lead to Dublin Bay;
- The Proposed Development is to be connected to the existing public sewer network for the treatment of wastewater.
- There are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects.

List of agencies consulted: provide contact name and telephone or e-mail address

The requirement for Appropriate Assessment Screening was determined during pre-planning discussion with Dublin City Council.

Response to consultation

N/A.

DATA COLLECTED TO CARRY OUT THE ASSESSMENT

Who carried out the assessment

Moore Group Environmental Services.

Sources of data

NPWS database of designated sites at www.npws.ie

National Biodiversity Data Centre database http://maps.biodiversityireland.ie

Level of assessment completed

Desktop Assessment. Fieldwork was carried out as part of the EcIA process.

Where can the full results of the assessment be accessed and viewed

Dublin City Council Planning web portal.

OVERALL CONCLUSIONS

There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient

along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

There are no predicted effects on any European sites given:

- The distance between the Proposed Development and any European Sites, approximately 4km;
- The lack of connectivity between the Proposed Development and any hydrological pathways; there is no connectivity between the Proposed Development site and any watercourses that lead to Dublin Bay;
- The Proposed Development is to be connected to the existing public sewer network for the treatment of wastewater.
- There are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects.

It has been objectively concluded by Moore Group Environmental Services that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is unlikely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment in view of their conservation objectives.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment is not, therefore, required.

APPENDIX B (ii)

APPROPRIATE ASSESSMENT SCREENING REPORT

Prepared by

Moore Group - Environmental Services

Proposed Data Centre Development
on a Site at Clonshaugh Business & Technology Park
Ecological Impact Assessment




Prepared By:

Moore Group -
Environmental Services

On behalf of:
Colliers Properties LLC

Job Number 21224
September 2021

Project Proponent	Colliers Properties LLC
Project	Proposed Data Centre Development on a Site at Clonshaugh Business & Technology Park
Title	Proposed Data Centre Development on a Site at Clonshaugh Business & Technology Park Ecological Impact Assessment

Project Number	21224	**Document Reference**	21224 Clonshaugh Data Centre EcIA Rev5	
Revision	**Description**		**Author**	**Date**
Rev5	AWN Edits		G. O'Donohoe	30 September 2021
Moore Archaeological and Environmental Services Limited				

TABLE OF CONTENTS **PAGE**

1. INTRODUCTION

Moore Group was commissioned by AWN Consulting to undertake a Habitat Survey and EcIA of the site of a Proposed Data Centre Development on a Site at Clonshaugh Business & Technology Park, Dublin 17. The report also includes the results of a Bat Survey of a warehouse building to be demolished on site.

This report was compiled by Ger O'Donohoe of Moore Group providing information on habitats in the study area. Ger O'Donohoe M.Sc. is the principal ecologist with Moore Group and has over 25 years' experience in ecological impact assessment. He graduated from GMIT in 1993 with a B.Sc. in Applied Freshwater & Marine Biology and subsequently worked in environmental consultancy while completing an M.Sc. in Environmental Sciences, graduating from Trinity College, Dublin in 1999. His primary role in Moore Group is as Principal Ecologist in the management and compilation of Environmental Impact Assessments and undertaking Ecological Impact Assessments of the terrestrial and aquatic environments of any particular development. He has completed several Reports for AA Screening, Appropriate Assessments and Biodiversity Surveys in regard to Data Storage Facilities and Strategic Infrastructure Developments. He has over 15 years' experience of carrying out bat surveys and has completed the Bat Conservation Ireland, Bat Detector Workshop which is the standard training for the carrying out of bat surveys in Ireland and follows the Bat Conservation Ireland 'Bat Survey Guidelines' (Aughney *et al.*, 2008). In addition, Ger is an active member of the Galway Bat Group and Bat Conservation Ireland, which monitors bat populations in Ireland, and facilitates the education of bat communities to the public.

The report provides information on ecological features if present within the study areas, of particular significance, primarily designated habitats and species, including habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare flora listed in the Flora Protection Order along with other semi-natural habitats of conservational value.

The following important ecological receptors were considered in planning and designing the project, and in assessing its likely ecological effects:

- Sites with nature conservation designations, including proposed NHAs, the reasons for their designation, and their conservation objectives, where available;
- Annex IV (Habitats Directive) species of fauna and flora, and their breeding sites and resting places, which are strictly protected under the European Communities (Birds and Natural Habitats) Regulations, 2011;
- Other species of fauna and flora which are protected under the Wildlife Acts, 1976-2012;
- *'Protected species and natural habitats'*, as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including:

- Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur);
- Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur);

- Other habitats of ecological value in a national to local context, including rocky habitats in the general area;
- Stepping stones and ecological corridors encapsulated by Article 10 of the Habitats Directive.

The report has been compiled in compliance with the European Communities Legal requirements and follows EPA Draft Guidelines on Information to be contained in an EIAR (EPA, 2017) on Transport Infrastructure Ireland (TII) guidance and Chartered Institute of Environment & Ecology (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland outlined in Section 2.

The European Habitats Directive 92/43/EEC (Article 6) indicates the need for plans and projects to be subject to Habitats Directive Assessment (also known as Appropriate Assessment) if the plan or project not directly connected with or necessary to the management of a Natura 2000 site (which includes SACs and SPAs) but which has the potential to have implications on a site's conservation objectives. These implications can be significant effects either individually or in combination with other plans or projects. To this end a Report for AA Screening has been provided a separate document as part of the planning application and pertinent information on European sites include in this report as appropriate. The site location is presented in Figure 1 below.

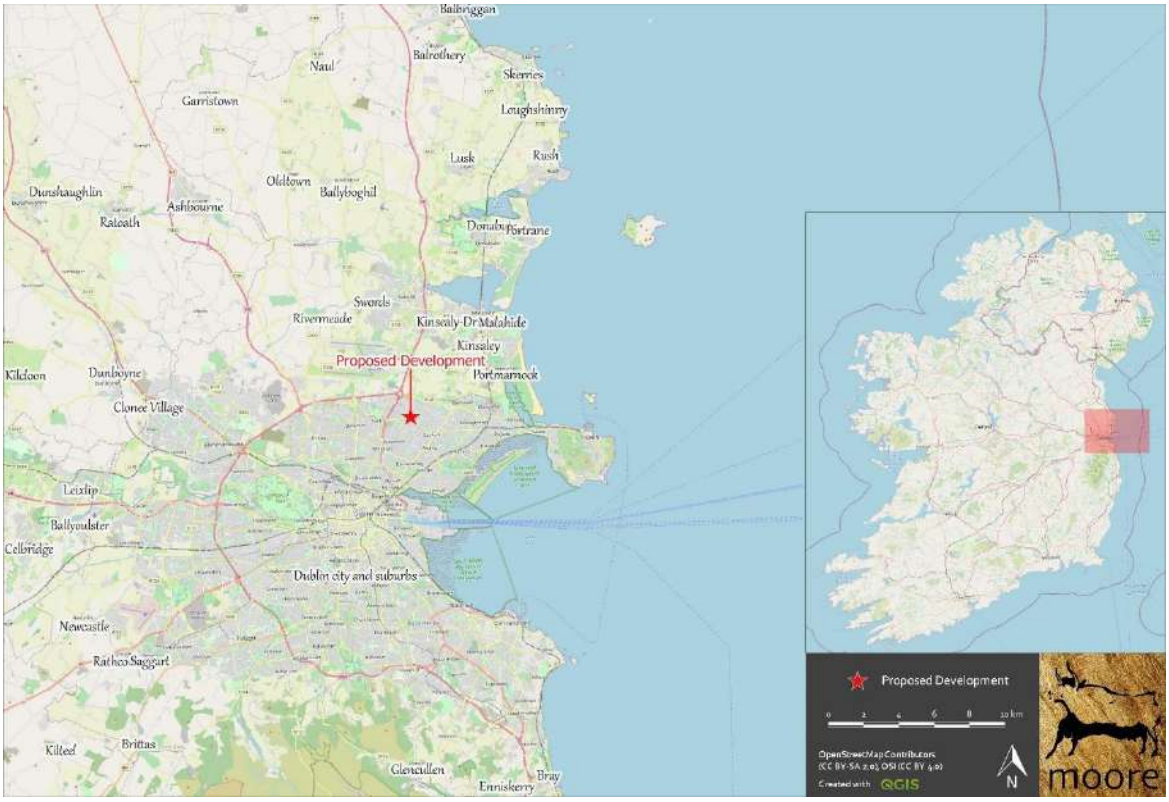


Figure 1. Showing the site location at Clonshaugh, north Dublin City.

2. ASSESSMENT METHODOLOGY

2.1. POLICY & LEGISLATION

2.1.1. EU Habitats Directive

The "*Habitats Directive*" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "*Special Conservation Area*" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for "*Appropriate Assessment*" of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive.

The European Habitats Directive 92/43/EEC (Article 6) indicates the need for plans and projects to be subject to a Habitats Directive Assessment (also known as Appropriate Assessment) if the plan or project is not directly connected with or necessary to the management of a Natura 2000 site (which includes SACs and SPAs) but which has the potential to have implications on a site's conservation objectives. These implications can be significant effects either individually or in combination with other plans or projects.

2.1.2. EU Birds Directive

The "*Birds Directive*" (Council Directive 79/409/EEC as amended by Directive 2009/147/EC) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I indicates Annex I bird species as listed on the Birds Directive. A "*Special Protection Area*" or SPA, is a designation under The Birds Directive.

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites and any plan or project that has the potential to impact upon a Natura 2000 site requires appropriate assessment.

2.1.3. Wildlife Acts 1976 - 2012

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976. The aims of the wildlife act according to the National Parks and Wildlife Service are "*... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to*

provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims." All bird species are protected under the act. The Wildlife (Amendment) Act of 2000 amended the original Act to improve the effectiveness of the Act to achieve its aims.

2.2. SURVEY METHODOLOGY

2.2.1. Desk Study

The assessment was carried out in three stages, firstly through desktop assessment to determine existing records in relation to habitats and species present in the study areas. This included research on the NPWS metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the development area.

2.2.2. Field Study

The second phase of the assessment involved site visits to establish the existing environment in the footprint of the proposed development area. Areas which were highlighted during desktop assessment were investigated in closer detail according to the Heritage Council Best Practice Guidance for Habitat Survey and Mapping (Smith *et al*., 2011). Habitats in the proposed development area were classified according to the Heritage Council publication "*A Guide to Habitats in Ireland*" (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of "*An Irish Flora"* (Parnell & Curtis, 2012).

Habitats were surveyed on the 29 July and 11 August 2021 by conducting a study area walkover covering the main ecological areas identified in the desktop assessment. The survey dates are toward the end of the optimal botanical survey period. However, they are considered adequate given the existing brownfield status of the site. A photographic record was made of features of interest.

Signs of mammals such as badgers and otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries. The course of the nearby Santry river was surveyed for signs of large mammals.

An internal bat survey of a warehouse building and offices to be demolished was undertaken on the 11 August 2021 to establish presence/absence of roosting bats. The survey involved a thorough examination of walls and windowsills for signs of bat droppings, staining or scratch marks and extended into buildings with accessible attic spaces such as the staff accommodation wing, boiler house and maintenance sheds. The survey continued inside each accessible area and into loft spaces using a high-powered torch; Gowen & Bradshaw AT131 LED 330 Lumens.

The surveys undertaken are in line with recommendations of the Bat Conservation Trust 'Good Practice Guidelines', 3rd edition, 2016 (Collins, J (ed)(2016) and Irish Wildlife Manual No. 25' (Kelleher, C. & Marnell, F. 2006).

Birds were surveyed using standard transect methodology and signs were recorded where encountered during the field walkover surveys.

Amphibians were noted if present during fieldwork. A specific survey for newts was not included as there are no wetland areas or suitable habitats for newts on site.

2.2.3. Data Sources & Guidance

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Open Street Maps;
    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2021;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records;
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans;
    - Dublin City Development Plan 2016-2022

2.2.4. Site Evaluation and Impact Assessment

The final part of the assessment involves an evaluation of the study area and determination of the potential impacts on the habitats of the study area. This part of the assessment forms the basis for Impact Assessment and is based on the following guidelines and publications:

- Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine September 2018 Version 1.1 - Updated September 2019 (CIEEM, 2019);
- EPA Draft Guidelines on Information to be contained in an EIAR (EPA, 2017);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- Assessment of plans and projects significantly affecting Natura 2000 sites (EC, 2002);
- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007).

The Guidelines for Assessment of Ecological Impacts of National Road Schemes (TII formerly NRA, 2009) outlines the methodology for evaluating ecological impacts of the project in the present report. According to the TII Guidelines, the Ecological Study should address:

- Designated conservation areas and sites proposed for designation within the zone(s) of influence of any of the Project options,
- All the main inland surface waters (e.g. rivers, streams, canals, lakes and tanks) that are intersected by any of the route corridor options, including their fisheries value and any relevant designations,
- Aquifers and dependent systems and turloughs and their subterranean water systems,
- Any known or potentially important sites for rare or protected flora or fauna that occur along or within the zone(s) of influence of any of the route options,
- Any other sites of ecological value, that are not designated, along or in close proximity to any of the route corridor options,
- Any other relevant conservation designations or programmes (e.g. catchment management schemes, habitat restoration or creation projects, community conservation projects, etc.),
- Any other features of particular ecological or conservation significance along any of the route options.

The TII Guidelines set out a method of evaluating the importance of sites identified and in turn the evaluation of the significance of impacts. The Evaluation Scheme is presented in Appendix 1. Impact Assessment is then based on CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland, 2019.

3. PROJECT DESCRIPTION

Colliers Properties LLC, intend to apply for planning permission for development on a site at Clonshaugh Business and Technology Park, Dublin 17. The subject site comprises the site of former Units 15 and 16 and the former Ricoh Building. The site is located to the north of the Santry River and the R104 Oscar Traynor Road, to the west of Clonshaugh Road, and to the south and east of existing estate roads.

The proposed development, for which a seven-year permission is sought, comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works including removal of existing site services and ESB pillar boxes (other buildings previously occupying the site were demolished under Reg. Ref.: 2229/19, a previously permitted data centre development, as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys (with Data Centre A also including two mezzanine levels), with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant and solar panels at roof level;
- Data Centre B (which will be ancillary to Data Centre A) will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level;
- Emergency generators and associated flues will be provided within compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;
- Ancillary structures including a sprinkler tank and pumphouse, security building, MV building, and provision of two additional MV substation rooms to the existing substation on site (c. 115 sq.m additional GFA), which was previously constructed under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking (58 no. spaces) and bicycle parking (24 no. spaces);
- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated and ancillary works including underground foul and storm water drainage network, and utility cables.

The Proposed Development site is located within the boundary of the existing brownfield site, which had been cleared and prepared for development by April 2021. One remaining mixed warehouse and

office building (former Ricoh building) in the northeastern section of the site will be demolished as part of the Proposed Development.

The predominant habitat within the site is Spoil and bare ground (ED2). The grassy verges (previously amenity grassland (GA2)) surrounding the central cleared area have become rank and overgrown. The amenity grassland buffer between the main site area and the Santry River is populated by dense grass and tall herbs with scattered trees forming a woodland type of habitat including Horse chestnut, Hybrid Black poplar, White poplar, Aspen, Birch, Willow, Sycamore, Alder and Rowan. The denser area is located to the southwestern corner of the site.

The proposed development site observes a minimum buffer zone of no development of 30m to the Santry River. There will be no direct or indirect discharges during construction to the Santry River.

There are no streams or ditches discharging from the construction area to the Santry river and it is highly unlikely that surface water would reach the Santry River during construction given the distance of removal from the proposed development area and the intervening grassland and woodland buffer.

During operation, all surface water flows will be collected by the site surface water drainage network. No surface water flows will discharge to the foul water network. Petrol interceptors will be provided within the surface water drainage network in accordance with the requirements of the Greater Dublin Regional Code of Practice.

The proposed surface water attenuation system is located in the northeast corner of the site. Accordingly, a closed Stormtech attenuation system (or similar) is being proposed. These SuDS features are standard design features and not considered measures for the avoidance of potential effects on downstream European sites. There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage. Based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

Figure 2 shows a detailed view of the existing site on high resolution aerial photography. Figure 3 shows the layout of the proposed development.

Figure 2. Showing the Proposed Development boundary on recent aerial photography (GE April 2021).

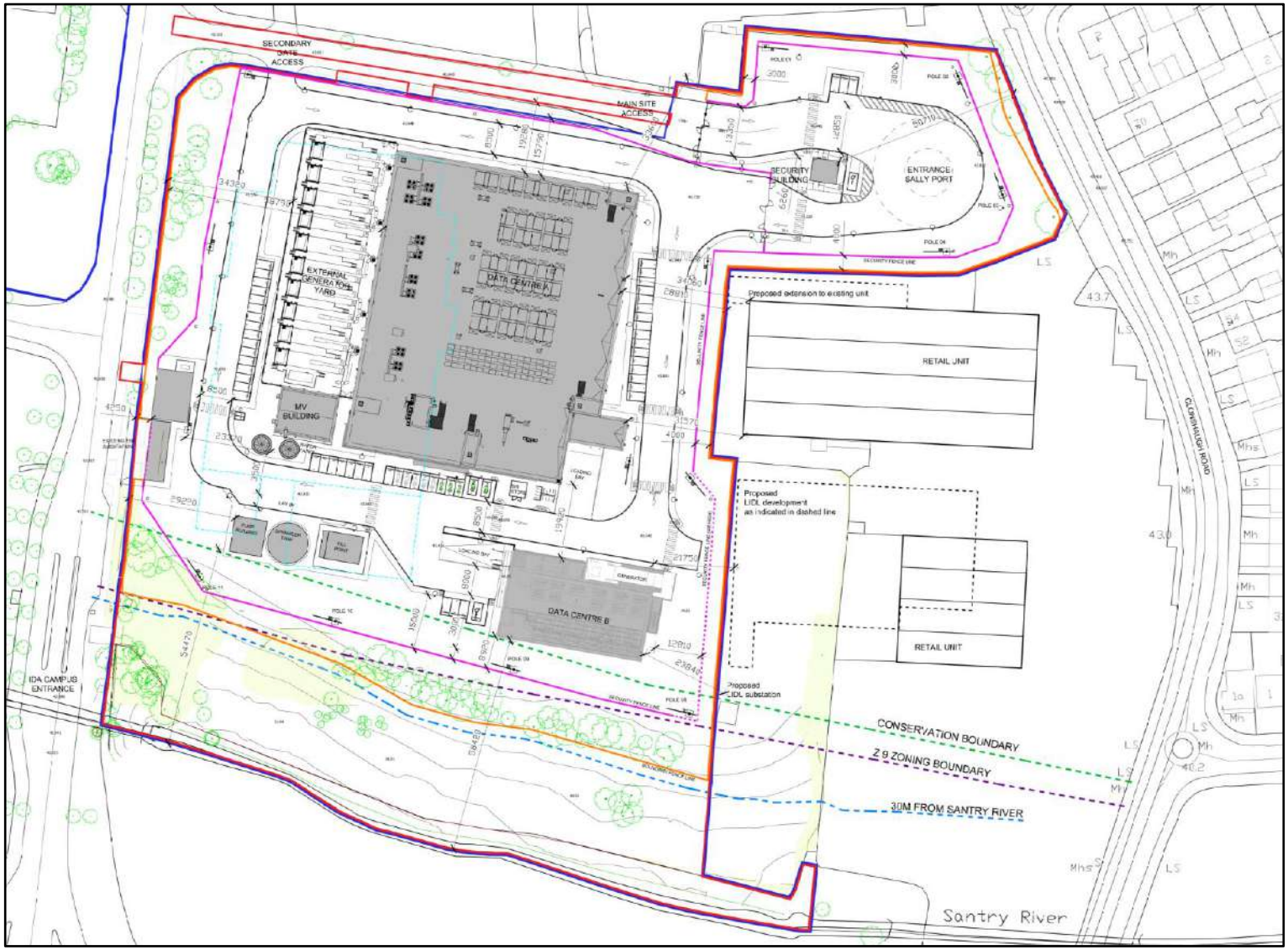


Figure 3. Plan of the Proposed Development.

4. EXISTING ENVIRONMENT

4.1. DESIGNATED CONSERVATION AREAS

The Department of Housing, Planning and Local Government (previously DoEHLG)'s Guidance on Appropriate Assessment (2009) recommends an assessment of European sites within a Zone of Influence (ZoI) of 15km. This distance is a guidance only and a potential Zone of Influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source- Pathway-Receptor framework and not by arbitrary distances (such as 15km).

The Zone of Influence may be determined by connectivity to the Proposed Development in terms of:

- Nature, scale, timing and duration of works and possible impacts, nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Sensitivity and location of ecological features.

The nearest European sites to the Proposed Development are coastal sites of Dublin and Baldoyle Bays and the Malahide Estuary, including North Dublin Bay SAC & North Bull Island SPA, situated 4.3km to the southeast, and South Dublin Bay and River Tolka Estuary, 3.88km to the south, see Table 1 below.

Table 1 European Sites located within the potential Zone of Influence[1] of the Proposed Development (following OPR practice note OPR01).

Site Code	Site name	Distance (km)[2]
000199	Baldoyle Bay SAC	4.91
000205	Malahide Estuary SAC	6.56
000206	North Dublin Bay SAC	4.33
000210	South Dublin Bay SAC	6.69
004006	North Bull Island SPA	4.31
004016	Baldoyle Bay SPA	5.24
004024	South Dublin Bay and River Tolka Estuary SPA	3.88
004025	Malahide Estuary SPA	6.56

[1] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[2] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

The Proposed Development is located within the hydrological catchment of the Santry River which flows 30m to the south of the Proposed Development. Downstream, the waters of the Santry River enter Dublin Bay with its associated European sites, see Figures 4 and 5 below.

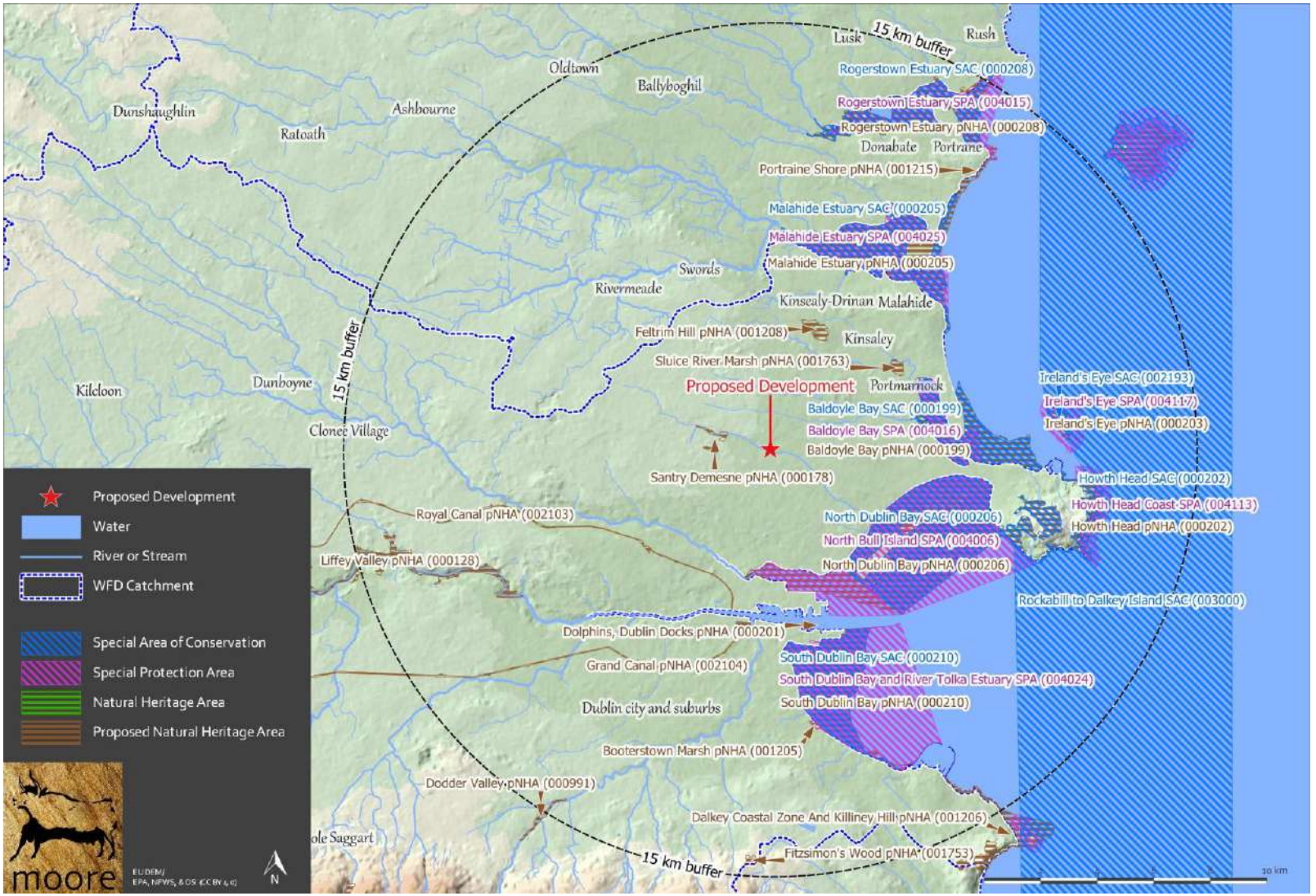


Figure 4. Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Proposed Development.

Figure 5. Detailed view of European sites in the nearer Potential Zone of Influence of the Proposed Development.

4.2. HABITAT DESCRIPTIONS

There are no records of rare plants in a search with a custom polygon from the National Biodiversity Data Centre covering the Proposed Development site and surrounding green areas to the south of the Santry River (site accessed 20/09/21). No rare or protected plants were recorded during fieldwork.

The Proposed Development site is located within the boundary of the existing brownfield site, which had been cleared and prepared for development by April 2021 . One remaining mixed warehouse and office building (BL3) in the northeastern section of the site will be demolished as part of the Proposed Development.

The predominant habitat within the site is Spoil and bare ground (ED2). The grassy verges (previously amenity grassland (GA2)) surrounding the central cleared area have become rank and overgrown.

Species present are predominantly ruderal and include: Cocksfoot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), Rye grasses (*Lolium* spp.), Nettle (*Urtica diocia*), Thistles, (*Cirsium arvense, C. vulgaris*), Broad dock (*Rumex obtusifolius*), Ragwort (*Senecio jacobaea*), Broad plantain (*Plantago major*), Stitchwort (*Stellaria holostea*), Dandelion (*Taraxacum officinale* agg.) along with Sowthistles (*Sonchus asper and S. oleraceus*) and Cleavers (*Galium aparine*).

The amenity grassland buffer between the main site area and the Santry River is populated by dense grass and tall herbs with scattered trees forming a woodland type of habitat including Horse chestnut, Hybrid Black poplar, White poplar, Aspen, Birch, Willow, Sycamore, Alder and Rowan. The woodland was likely planted as a buffer between the estate and the Santry River and forms a rough line not strictly a treeline or a woodland, it is a mosaic of scattered trees and parkland merging to woodland. The denser area is located to the southwestern corner of the site where White Poplar has recolonised regularly, typical of this species. A tree survey is provided separately with planning documentation.

There were no third schedule invasive species recorded at the proposed development site. Butterfly bushes (*Buddleia davidii*) were common, of low concern and can be removed with site waste.

Figure 6. Habitat map based on recent aerial photography (April 2021).

4.1. FAUNA

4.1.1. Mammals

Otters

There are no otter habitats in the study area and no potential for otters on the site or on the Santry River. The river is culverted under several section of urban north Dublin and has no fisheries value and much reduced otter habitat availability.

Badgers

There are no badger setts in the study area and no potential for badgers on the site. The field boundaries were surveyed and no setts were recorded.

Bats

The NBDC database was consulted for details on bat records held for the site and the surrounding area. The database was consulted on the 20/09/2021 for details on historical records from the site, both in a surrounding 100m polygon. There are no records of bat species within this grid.

Previous surveys as part of the adjacent granted Lidl application (Inis Environmental Consultants Ltd.) have also shown that there have been low levels of only one species in the area, Liesler's bats (*Nyctalus leisleri*) particularly along the general route of the Santry River.

The present bat survey concentrated on the single remaining warehouse/office building to be demolished. However, after a thorough search of all rooms and accessible roof spaces, no evidence of bats was found.

Trees to be removed on the site boundary include juvenile and semi-mature Horse chestnut and Birch which were surveyed for bat roost potential and found to have none.

Given the lack of bat roosting potential and design of the proposed development to include a buffer zone outside the existing trees to the south of the proposed development and the maintenance of an unlit green corridor along the Santry River, it was determined that a night time bat detector was not necessary as adequate information was available to form an opinion on potential impact on bats.

4.1.2. Birds

All nesting birds are protected under the Wildlife Acts. A list of breeding bird species recorded during fieldwork in 2021 is presented in Table 2 below.

Table 2 Birds recorded during fieldwork in July and August 2021.

Birds	Scientific name	BWI Status	Habitat Type
Magpie	*Pica pica*	Green	Anywhere in lowland areas
Feral pigeon	*Columba livia f. domestica*	Green	Towns, Gardens, hedges
Woodpigeon	*Columba palumbus*	Green	Gardens, woods, hedges
Wren	*Troglodytes troglodytes*	Green	Gardens, woods, hedges

There were no records of nesting birds in the remaining building to be demolished and the warehouse building type is not suitable for nesting Swallows, Owls or Swifts.

5. ASSESSMENT OF IMPACTS

5.1. SITE EVALUATION

Due cognisance of features of the landscape which are of major importance for wild flora and fauna, such as those with a "*stepping stone*" and ecological corridors function, as referenced in Article 10 of the Habitats Directive were considered in this assessment.

Following a detailed literature review, desktop assessment and field survey the footprint of the proposed development site can be categorised into three habitat types:

- Spoil and bare ground (ED2).
- Buildings and artificial surfaces (BL3)
- A mosaic of woodland verge and scattered trees and parkland.

There were no rare or protected species recorded on the site and there were no records of invasive species.

The habitats under the footprint of the proposed development are of low local ecological value.

There are no surface water conduits to the Santry river and it is highly unlikely that surface water would reach the Santry River during construction.

Additionally, the proposed development site observes a minimum buffer zone of no development of 30m to the Santry River. There will be no discharges during construction to the Santry River.

The ecological value of the site was assessed following the guidelines set out in the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (CIEEM, 2019) and according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004). Judgements on the evaluation were made using geographic frames of reference*, e.g.* European, National, Regional or Local.

5.2. IMPACT ASSESSMENT

5.2.1. Direct Impacts

Habitats

There will be no development in the ecological corridor of the Santry River and no impacts on habitats including trees, grassland or tall herbs in this area. The Proposed Development site is located within the boundary of the existing brownfield site which had been cleared for development by April 2021 with the exception of one mixed warehouse and office building.

There are no surface water conduits to the Santry river and it is highly unlikely that surface water would reach the Santry River during construction.

Additionally, the proposed development site observes a minimum buffer zone of no development of 30m to the Santry River. There will be no discharges during construction to the Santry River.

There are no predicted emissions to air, water or the environment during the construction phase that would result in significant effects.

All foul and surface water runoff, once the facility is operational, will be contained on site and discharged to urban drainage systems.

The Proposed Development includes surface water attenuation and oil interceptors and all surface water during operation will be contained on the site per the requirements of the Greater Dublin Regional Code of Practice for Drainage Works.

There is no likelihood of any significant effects on European Sites in the wider catchment area based on:

- the facility is located at a distance of removal such that there will be no disturbance to qualifying interest species in any European sites.
- there are no predicted emissions to air, water or the environment during the operational phase that would result in significant effects.

Fauna

Otters

There will be no direct or indirect impact on otters.

Badgers

There will be no direct or indirect impact on badgers.

Bats

There will be no impacts on roosting or commuting bats. The proposed development is set back from the ecological corridor of the Santry River by a buffer zone of at least 30m affording a zone of no development and no lighting which would affect bats.

Birds

There are no predicted impacts on birds. As a precaution any mature trees to be removed will be felled outside the bird nesting season of March 1st to August 31st.

5.2.2. Indirect Impacts

As a precaution the design of lighting (lighting plan provided with planning documentation) on the upper and inner site area will follow the Bat Conservation Trust in partnership with the Institution for Lighting Professionals (ILP) Best Practice Guidance (BTC & ILP, 2018) on considering the impact on bats when designing lighting schemes.

The following best practice measures will be included in the lighting design:

- Incorporate specialist bollard or low-level downward directional luminaires;
- Where low-level downward directional luminaires are not appropriate, installation of luminaires with warm white spectrum LEDs (<2700 Kelvin) to reduce blue light, with peak wavelengths higher than 550nm.
- Mounted luminaires should not tilt upward, with an upward light ratio of 0% and with good optical control;
- Incorporate cowls to lighting throughout the proposed development site to spill away from the site boundaries;
- Maximise the separation distance between light mast locations and vegetated features at the southern boundary of the site.

5.2.3. Cumulative Impacts

Cumulative impacts or in-combination effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data gaps in the area where the Proposed Development is located. The database was then queried for developments granted planning permission within 250m of the Proposed Development within the last three years, these are presented in Table 3 below. Given the brownfield nature of the site and having established that there will be no emissions to air, water or the environment during construction, this distance was taken as adequate for the consideration of immediate potential in-combination effects. The period of 3 years is considered an appropriate for timescale to measure changes in biological terms with regard to habitats and species.

Table 3. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
4111/18	Planning Application for a new black coloured, powder coated steel boundary fence, including new gates and for all associated site works.	No potential for in-combination effects given the scale and location of the project.
2066/19	Planning permission for demolishing an existing shed at the rear of the existing site and replacing with a proposed new ground floor only detached building to the rear of the existing site to be used as a game's room/gym and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2229/19 (N.B. previous application on	Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre including data halls,	No potential for in-combination effects given the project was screened for

Planning Ref.	Description of development	Comments
the subject site)	offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the proposed development is c.9,520.5m.	environmental effects and significant effects were ruled out. The site was subsequently cleared with the exception of one warehouse building.
2443/19	Development will consist of a proposed new dormer roof to the side & rear of the existing house roof. A new ground floor only extension to the rear of the existing house and extending the existing garage 1m at the front connecting both and converting the garage into a granny flat and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2523/19	The development will consist of the repositioning of the drive-thru exit from NE corner of site to SE of site including necessary amendments to landscaping and access. Existing ramped access to be removed and new pedestrian crossing and stepped access to be provided to serve new building entrance on North elevation. One no. loading bay to be removed to allow for repositioned entrance. Outside seating area to be relocated from south of the building to the north of the building. Menu boards, speaker and leader to be moved to the south of the building. New bin store to be constructed to the south of the building. Windows to the south elevation to be partially opaqued to accommodate new bin store. Southern elevation to receive repositioned 1.8m x 0.6m 'KFC' logo. North elevation to have 3 no. new window openings, a new entrance door and external seating area. Signage will consist of repositioned 1.8m x 1.8m internally illuminated 'Colonels Head' logo with powder-coated aluminium flat panel, non-illuminated vinyl 2.5m x 1.2m 'finger lickin good' graphic and repositioned 1.8 x 0.6m high 'KFC' letters to North elevation. East elevation to have new entrance doors & shop front frame within existing collection window opening and new windows to match existing structure. Red panels to be removed and replaced with grey Trespa panels to match rest of building. Existing door opening to be altered to become fire escape. Existing 'KFC Drive thru' signage to be repositioned and new 3.2m x 3.2m 'Colonel' vinyl graphic applied. West elevation to have yard area panelling removed to allow for external seating area, repositioned menu panel from old collection window and opaque vinyl applied to inside face of existing glazing. Existing 'Drive thru' letters & existing 1m x 1m sign to be repositioned and new 4m x 2m 'finger-lickin good' non illuminated vinyl graphic fitted. The internal layout of the building to be rearranged to suit these changes.	No potential for in-combination effects given the scale and location of the project.
2769/19	Proposed loft conversion with dormer structure to hipped end of roof and velux windows to rear & front roof profiles at 42 Clonshaugh Road, Clonshaugh, Dublin 17.	No potential for in-combination effects given the scale and location of the project.
3400/19	Planning permission for development on a site of c. 0.025 hectares at Clonshaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building B). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
3529/19	Planning permission for: the construction of (a) an extension of the existing retail unit to create a dedicated modern, ancillary, warehouse area for storage of goods associated with the retail business including a	No potential for in-combination effects given the scale and

Planning Ref.	Description of development	Comments
	delivery area canopy (b) an internal mezzanine for ancillary offices which would be ancillary to the retail use and all other ancillary works to facilitate the development.	location of the project.
3644/19	Permission is sought for Change of Use from former Liz Delaney's Public House + Club of recreation building to include gym use (Class 11(e) without pool) which includes existing basement = 135 sqm, existing ground floor = 1130 sqm, existing first floor = 611 sqm and single storey extensions at ground floor = 48 sqm and at first floor = 16 sqm, creating total development area = 1940 sqm, minor elevational changes including addition of entrance and relocation of fire escape doors and external works to include rebranding existing and additional signage and provision of new bicycle stands.	No potential for in-combination effects given the scale and location of the project.
3836/19	Development will consist of demolishing an existing canopy and replacing with a proposed new ground floor only extension to the front of the existing house and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
4371/19	(a) Attic conversion, incorporating dormer extension to side and rear, (b) All associated site works.	No potential for in-combination effects given the scale and location of the project.
4782/19	Planning permission for: amendments to the mixed-use development, granted planning permission under PA Ref: 3960/17 and to Pa Ref: 2686/19. The amendments relate to the foodstore and office portion (Block 3). The numbered amendments below cross reference to the submitted plans. The development consists of the completion of the development subject to the following amendments: (1) Reposition window on canteen on south elevation and new window above exit door on the north elevation of the foodstore (2a) Photovoltaic solar panels on roof of foodstore (2b) photovoltaic solar panels on roof of offices (3) modifications to staff welfare layout, canteen, freezer/chiller area with new reception area servicing offices above. (4) ESB substation omitted. (5) Trolley bay repositioned and design of same revised. (6) Fence line to the north of the site as part of compliance with condition 5 of PA Ref: 2686/19 to include 2m high Palladin Mesh fence with Pyracantha hedging to outer face and fence positioned along the boundary line of the property (7) New access walkway to roof deck (8) Window to be used to access roof deck. (9) Minor parapet level adjustment of foodstore. (10) Electric vehicle charging points/spaces repositioned. (11) Revision to car parking to include 3 additional spaces and revised car parking space surface treatment from permeable paving to asphalt and amendments to the associated car parking drainage proposals. (12) Enclosed bin store relocated to service ramp area. Lidl Ireland Gmbh.	No potential for in-combination effects given there are no predicted emissions to air, water or the environment during the construction or operational phases that would result in significant effects from the subject proposed development.
4495/19	Development will consist of a proposed new flat roof dormer to the rear of the existing house roof and all ancillary works.	No potential for in-combination effects given the scale and location of the project.
2640/20	Planning Permission for a ground floor porch extension to the front (circa 11.3sq.m) with 3 no. roof lights and associated site works at 13 Cromcastle Road, Kilmore West, Dublin 5.	No potential for in-combination effects given the scale and location of the project.
2943/20	The development will consist of: The construction of a new three-storey apartment scheme consisting of the following: ground floor, first floor and a dormer roof second floor. The proposal includes the following; (i) 3 one bedroom apartments; (ii) 6 two-bedroom apartments; (iii) private balconies; (iv) a bin storage area; (v) 10 on-site vehicle parking bays; (vi) 9 bicycle parking bays; (vii) 150.5 sqm landscaped communal open space;	No potential for in-combination effects given there are no predicted emissions to air, water or the

Planning Ref.	Description of development	Comments
	(viii) new boundary walls; (ix) provision for all storm water, foul drainage, mains water and electricity supply connections ancillary to the development.	environment during the construction or operational phases that would result in significant effects from the subject proposed development.
3200/20	RETENTION: Retention Permission for development at a site located at Units 15/16 Business & Technology Park, Clonshaugh, Dublin 17. The development comprises a modification to Permission DCC Ref. 2229/19 (currently under construction) granted for a 2 storey data centre, (with generator yard and all associated works). The development now provides a larger, single storey substation (increased in size from c.34.5 sq.m (as permitted) to c.68.4 sq.m) and located to the south-west of the data centre building as per the parent permission DCC Ref. 2229/19.	No potential for in-combination effects given the scale and location of the project.
3221/20	Planning permission to convert attic space by raising in part the rear roof pitch within the existing roof profile, to form a single dormer with low-pitch roof over to provide a playroom with toilet for our three children. The pitch to fall to the rear with water collection gutter returned to the side to shed the rainwater onto the existing roof and into the existing surface water system.	No potential for in-combination effects given the scale and location of the project.
3763/20	The development will consist of the construction of a pitched roof and louvered panel walls to the eastern side of the existing fuel storage tank building located on the southern boundary of the site to match the existing building and the installation of 4 no. generators - 2 no. each within the existing recessed plant enclosures on the roof on the northern and southern sides of the building.	No potential for in-combination effects given the scale and location of the project.
3803/20	Planning permission for 2 no. 2 storey data centre buildings (each 16,576 sqm), which are 16m in height at the main parapet level. Each building to include: Office administration area, data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage spaces, screened plant and solar panel array at roof level, with rainwater harvesting system to support industrial water requirements. 16 no. emergency generators with emission stacks along with a single emergency house supply generator, all contained in a fenced compound adjacent to each building. Diesel storage tank, fuel filling area and associated plant.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.
3865/20	Planning permission for the demolition of the existing building immediately south of "The Range" store and the construction of a single storey discount food store (supermarket) with ancillary off-licence sales area. Provision of 75 surface level car parking spaces within the application red line boundary, including two electrical vehicle (EV) charging spaces (parking outside the application red line boundary is operational and therefore does not form part of this application); boundary treatments; 12 cycle stands (space for 24 bicycles); trolley bay canopy; hard and soft landscaping; ESB substation building and external mechanical plant areas; site lighting and connections to drainage and on site drainage infrastructure including attenuation tank; roof mounted photo-voltaic panels; all advertising signage. Access to the proposed development is via the two existing operational access points on the Clonshaugh Road, used by "The Range". All ancillary works to facilitate the development. Lidl Ireland Gmbh.	No potential for in-combination effects given the project was screened for environmental effects and significant effects were ruled out.
2461/21	Planning permission for conversion of existing attic space comprising of modification of existing roof structure, new gable window, new access stairs and flat roof dormer to the rear.	No potential for in-combination effects given the scale and location of the project.

There are no predicted in-combination effects given that the reasons discussed in the 'Comments' column of Table 4 above and given that the Proposed Development is unlikely to have any adverse effects on the surrounding environment.

The adjacent granted Lidl development was specifically reviewed and best practice guidance on bats has been included in the subject proposed development design to reflect that of the granted development.

6. CONCLUSIONS

There are no significant impacts predicted from the proposed development on habitats, flora, fauna or biodiversity.

The best practice measures proposed for nesting birds during construction and the design of lighting during operation for bats are proven best practice and once these measures are employed, there will be no residual impacts on Birds or Bats.

Should best practice guidelines for the prevention of invasive species spread be adhered to, no potential for the spread or introduction of high impact invasive species are foreseen as a result of this Scheme.

7. REFERENCES

CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK And Ireland Terrestrial, Freshwater, Coastal and Marine September 2018 Version 1.1 - Updated September 2019.

Collins, J (ed)(2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

EPA (2017) EPA Draft Guidelines on Information to be contained in an EIAR; EPA, August 2017.

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.

European Commission (2007) 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 interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC.

Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council.

Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Nairn, R. and J. Fossitt (2004) The Ecological Impacts of Roads, and an Approach to their Assessment for National Road Schemes. In: J. Davenport and J.L Davenport (eds) The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains, 98-114. Dublin. Royal Irish Academy.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2021) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data

NRA (2008) Ecological Surveying Techniques for Protected Flora & Fauna. Available at: http://www.nra.ie/Environment/

NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority. Available at: http://www.nra.ie/Environment/

Parnell, J. and T. Curtis (2012) Webb's An Irish Flora. Cork University Press.

Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Appendix 1

TII Evaluation of Habitats

Ecological valuation: Examples

International Importance:

- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Proposed Special Protection Area (pSPA).
- Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.[4]
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level)[5] of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[6]

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)[7] of the following:
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing 'viable areas'[8] of the habitat types listed in Annex I of the Habitats Directive.

County Importance:

- Area of Special Amenity.[9]
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)[10] of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP,[11] if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)[12] of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

Appendix 2

Site Photos

Photo 1. View of the site looking east with the remaining building to be demolished indicated.

Photo 2. View of the site looking west with remaining juvenile and semi-mature trees.

Photo 3. View of the site looking south toward the Santry River corridor.

Photo 4. View of the site looking northeast toward the Santry River corridor.

APPENDIX C

NOISE ASSESSMENT REPORT

Prepared by

AWN Consulting Ltd

PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS AND TECHNOLOGY PARK

NOISE ASSESSMENT

awnconsulting
A Trinity Consultants Company

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

Technical Report Prepared For

Colliers Properties LLC

Technical Report Prepared By

Damian Kelly BSc (Hons) MSc MIOA

Our Reference

DK/21/12378NR01

Date of Issue

29 September 2021

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812

Document History

Document Reference		Original Issue Date	
DK/21/112378NR01		29 September 2021	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Damian Kelly	Mike Simms
Title	Director (Acoustics)	Senior Acoustic Consultant
Date	29 September 2021	29 September 2021

EXECUTIVE SUMMARY

AWN has been commissioned to prepare a review of a proposed site for the location of the datacentre project. The site in question involves redevelopment of lands in the IDA Business & Technology Park, Dublin 17. The immediate boundaries of the site are shared with other commercial operations. The closest residential noise sensitive locations to the site are located to the east of the site along the Clonshaugh Road, to the south west on the far side of the Oscar Traynor Road and to the west. The following conclusions are presented in relation to this noise assessment:

- The existing noise environment in the vicinity of the nearest noise sensitive locations is dictated by local and distant road traffic movements with a degree of existing plant noise becoming more apparent during night-time periods.

- A review of best practice guidance has identified the following noise criteria that are considered likely to be appropriate in terms of any planning application progressed in relation to the site (note that these criteria assume that site noise has no tonal or impulsive characteristics):

  Day to Day Operation (Noise Sensitive) – **55dB $L_{Aeq,15min}$** (daytime) and **44dB $L_{Aeq,15min}$** (night time)
  (Ref. BS4142)
  Day to Day Operation (Commercial) – **55dB $L_{Aeq,15min}$**
  (Ref. BS8233)
  Emergency Operation (Noise Sensitive) – **55dB $L_{Aeq,15min}$**
  (Ref. EPA: NG4)

- Noise predictions for the following scenarios have been presented and commented upon in the following sections:

Scenario A	Day to Day Operations
Scenario B	Emergency Operations
Scenario C	Generator Testing

- The noise model predictions conclude the following:

  Scenario A: Day to Day Operations – The figures presented in this report indicate that the predicted noise levels at the various noise sensitive locations identified in the vicinity of the site satisfy the adopted criteria outlined in the relevant sections of this assessment.

  Scenario B: Emergency Operations – Generators with noise levels of the order of 85 dB(A) at 1m will be required in order to reduce noise emissions from site in line with the noise criteria that would be applicable to nearby properties for emergency operations.

  Scenario C: Generator Testing – The modelling has indicated that noise emissions associated with generator testing is within the adopted daytime criterion when these activities will take place.

- Construction noise and vibration will typically be considered through the applications of suitable limits as discussed in the body of this report.

CONTENTS

1.0 INTRODUCTION

AWN has been commissioned to prepare a review of the Proposed Development which involves the development on lands in the IDA Business & Technology Park, Dublin 17. The immediate boundaries of the site are shared with other commercial operations. The closest residential noise sensitive locations to the site are located to the east of the site along the Clonshaugh Road, to the south west on the far side of the Oscar Traynor Road and to the west. Figure 1 below illustrates the site location in the context of the surrounding environment.

Figure 1 Site Location & Context

The following methodology has been followed in order to prepare this assessment:

- Review of noise survey data of existing noise environment in the vicinity of the site in order to assist to establish likely and suitable noise criteria;
- Identify the nearest noise sensitive locations to the proposed site;
- Review of local and best practice guidance in relation to noise that may dictate noise conditions that will be applied to site operations;
- Confirm assumptions in relation to noise sources proposed for the site based on similar projects and limited data to hand at this early stage, and;
- Develop of a 3D noise model and production of noise contours for day to day, generator testing and emergency scenarios.

Appendix A presents a glossary of the acoustic terminology used in this report.

2.0 EXISTING NOISE ENVIRONMENT

A review of environmental noise surveys conducted by AWN and CLV Consulting in support of a previous planning application for the site in question has been undertaken. The survey was completed in December 2018. No significant changes in the noise environment have occurred between the survey date and the current application and it is therefore considered to be representative of the current noise environment. One of the purposes of the survey was to quantify the existing noise environment at nearby noise sensitive locations in light of existing site noise emissions. The surveys were conducted in general accordance with guidance contained ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*. Details of this survey are presented in the following sections.

2.1 Choice of Measurement Locations

Noise measurements were conducted at four positions in the vicinity of the site.

Location	Description	Photo
A	Is located in the vicinity of the nearest residential dwellings to the east along the Clonshaugh Road.	
B	Is located in the vicinity of the nearest residential dwellings to the south that back onto the Oscar Traynor Road.	
C	Is located in the vicinity of the nearest commercial units to the east.	
D	Located at the boundary of the IDA Business Park that adjoins the Larch Hill development to the west of the siteThis location is considered to be indicative of the noise environment experienced at residences within the Larch Hill estate.	

Table 1 Measurement Locations & Descriptions

These locations are shown on Figure 2.

Figure 2 Noise Monitoring Locations

2.2 Procedure

Measurements were conducted at the locations noted above. Sample periods for the noise measurements were typically 15 minutes. The results were noted onto a Survey Record Sheet immediately following each sample and were also saved to the instrument memory for later analysis if required. Survey personnel noted the primary noise sources contributing to noise build-up.

Unattended measurements were 15 minutes in duration and were saved directly to the installed sound level meter for later analysis.

2.3 Measurement Parameters

The survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

Another parameter that will be commented upon in this report is the L_{ArT}.

$L_{Ar\,T}$ The L_{Aeq} during a specified time interval, plus specified adjustments for tonal character and impulsiveness of the sound.

It should be noted for this assessment it has been assumed that detailed design will be carried out in order that there will be no tonal or impulsive noise emissions from the development. Therefore, in this instance L_{Aeq} is equal to $L_{Ar\,T}$.

2.4 Survey Results

2 4.1 Location A

The survey results for Location A are given in Table 2 below.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		L_{Aeq}	L_{AF10}	L_{AF90}
Day	14:20 – 14:35	64	67	57
	15:30 – 15:45	64	67	57
	16:35 – 16:50	65	68	56
Night	23:00 – 23:15	61	65	48
	00:05 – 00:20	58	60	43
	01:10 – 01:25	55	57	41

Table 2 Summary of Results for Location A

During daytime monitoring periods, the sources of noise noted in the area were local traffic along Clonshaugh Road as well as occasional vehicular movements at the

adjacent commercial buildings and intermittent (but significant) aircraft movements. Daytime noise levels were in the range 64 to 65 dB L_{Aeq} and 56 to 57 dB L_{A90}.

The night-time noise measurements at this location were again dominated by local traffic along Clonshaugh Road, intermittent aircraft movements and wind generated noise. Noise levels were in the range 55 to 61 dB L_{Aeq} and 41 to 48 dB L_{A90}.

2.4.2 Location B

The survey results for Location B are given in Table 3 below.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		L_{Aeq}	L_{AF10}	L_{AF90}
Day	14:45 – 15:00	64	66	58
	15:55 – 16:10	63	65	56
	17:00 – 17:15	64	67	57
Night	23:20 – 23:35	56	59	51
	00:25 – 00:40	53	57	48
	01:30 – 01:45	52	52	45

Table 3 Summary of Results for Location B

The daytime noise levels at this location local were influenced almost exclusively by traffic along the Oscar Traynor Road as well as intermittent (but significant) aircraft movements and some birdsong. Noise levels were in the range 63 to 64 dB L_{Aeq} and 56 to 58 dB L_{A90}.

The night-time noise measurements at this location were again dominated by traffic along the Oscar Traynor Road, intermittent aircraft movements and wind generated noise. Noise levels were in the range 52 to 56 dB L_{Aeq} and 45 to 51 dB L_{A90}.

2.4.3 Location C

The survey results for Location C are given in Table 4.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		L_{Aeq}	L_{AF10}	L_{AF90}
Day	15:10 – 15:25	56	57	51
	16:15 – 16:30	57	58	51
	17:25 – 17:40	54	55	51
Night	23:45 – 00:00	52	53	52
	00:50 – 01:05	51	52	51
	01:50 – 02:05	51	52	51

Table 4 Summary of Results for Location C

The daytime noise levels at this location local were controlled primarily by road traffic on the nearby road networks, building services noise from the adjacent industrial park buildings and intermittent (but significant) aircraft movements. Noise levels were in the range 54 to 57 dB L_{Aeq} and of the order of 51 dB L_{A90}.

Road traffic noise from adjacent road networks, building services noise, intermittent aircraft movements and wind generated noise dominated the noise environment during night-time periods. Noise levels were in the range 51 to 52 dB L_{Aeq} and 51 to 52 dB L_{A90}.

2 4.4 Location D

The survey results for Location D are given in Table 5 below.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		L_{Aeq}	L_{AF10}	L_{AF90}
Night-time	23:10 – 23:25	51	50	46
	00:31 – 00:46	49	51	46
	01:35 – 01:50	49	51	45

Table 5 Summary of Results for Location D

Night-time noise levels were influenced by distant road traffic movements along the Oscar Traynor Road, M1 and M50 motorways, occasional local vehicle movements and wind-generated noise on nearby foliage. Ambient noise levels were in the range of 49 to 51dB L_{Aeq}. Background noise levels were in the range 45 to 46dB L_{A90}.

3.0 NEAREST NOISE-SENSITIVE LOCATIONS

Figure 3 identifies the nearest noise sensitive locations to the proposed site.

Noise Sensitive Location	Calculation Height (m)	National Grid Reference (ITM)	
		North	East
R01	4	718,674	740,333
R02	4	718,707	740,261
R03	4	718,733	740,124
R04	4	718,559	739,929
R05	4	718,393	740,023
R06	4	718,316	740,044
R07	4	718,197	740,073
R08	4	717,951	740,175
R09	4	717,958	740,250
R10	4	717,878	740,322

Table 6 Review of Assessment Locations

Figure 3 Nearest Noise Sensitive Locations

4.0 RELEVANT GUIDANCE

The relevant local authority, Dublin City Council (DCC), does not have any standard noise conditions listed in the *Dublin Agglomeration Environmental Noise Action Plan December 2018 – November 2023 – Volume 1: Dublin City Council*. Therefore, consideration has been given to the following best practice and national guidance.

4.1 EPA – NG4

In order to establish whether the noise sensitive locations in the vicinity of the site would be considered 'low background noise' areas as defined in the Environmental Protection Agency (EPA) publication *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4 2016) guidance, the noise levels measured during the environmental noise survey need to satisfy the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Evening Period ≤35dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30dB L_{A90}.

Determining Appropriate Noise Criteria

Table 9 below outlines the noise emission limit criteria detailed in the NG4 document.

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00hrs)	Night Noise Criterion, dB L_{Aeq} (23:00 to 07:00hrs)
Areas of Low Background Noise	45dB	40dB	35dB
All Other Areas	55dB	50dB	45dB

Table 9 NG4 Approach for Determining Appropriate Noise Criteria

Based on a review of the noise data to hand in the vicinity of the development site, the noise sensitive locations in the vicinity of the site are not defined as areas of low background noise as per the NG4 guidance. In this instance a 45dB $L_{Aeq,T}$ night-time criterion would be applied to day to day operations of the site.

Note that if the development were designed to this noise level, plant noise would be clearly audible at number of noise sensitive locations in close proximity of the development.

Note the following statements from NG4:

> *"Where there may be a question as to the bona fides of the complaint or any residual dispute following an initial investigation, an objective assessment should be undertaken in accordance with the guidance set out in BS 4142: 2014: Methods for rating and assessing industrial and commercial sound.*
>
> *In situations where there are reasonable grounds for annoyance and/or licence limits are exceeded, prompt remedial action should be taken by the licensee and BAT should be used to resolve the problem and to minimise the noise impact."*

Therefore, while a site may be compliant with the EPA limits, the above would imply that a BS 4142 assessment may still confirm the validity of a complaint. Therefore consideration should also be given to this guidance.

4.2 BS 4142:2014

BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* is the industry standard method for analysing building services plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the EPA NG4 document indicates that this assessment methodology should be used in the assessment of complaints associated with a site's operations. Whilst the current site will not operate under and EPA/IED licence, the guidance contained therein needs to be given due regard.

For an appropriate BS 4142 assessment, it is necessary to compare the measured external background sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinguishable against the residual acoustic environment, BS 4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that *If the intermittency us readily is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.* The following definitions as discussed in BS 4142 as summarised below:

"*ambient sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
"*residual sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
"*specific sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
"*rating level, $L_{Ar,T}$*"	specific sound level plus any adjustment for the characteristic features of the sound.
"*background sound level, $L_{A90,T}$"*	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time

weighting F and quoted to the nearest whole number of decibels.

In order to establish an *initial estimate* of impact, BS 4142 states the following:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.

a. *Typically, the greater this difference, the greater the magnitude of the impact.*
b. *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c. *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
d. *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS 4142 as representing a methodology to '*obtain an initial estimate'* of impact. It is important to note that BS 4142 also comments that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'*. BS 4142 provides a list of potential pertinent factors that can influence the *'initial estimate'*. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS 4142 as summarised above.

Based on the noise monitoring summarised in Section 3.0, and considering the guidance contained in BS 4142 Table 8 outlines the relevant noise criteria at the nearest noise sensitive locations. It is assumed that noise emissions are not tonal or impulsive in nature.

Location	Period	Average Background Noise Level dB L_{A90}	Target Criterion dB $L_{Aeq,15min}$
A	Day (07:00 to 23:00hrs)	57	55 Note B
	Night (23:00 to 07:00hrs)	44	44
B	Day (07:00 to 23:00hrs)	57	55 Note B
	Night (23:00 to 07:00hrs)	48	45 Note B
C	Day (07:00 to 23:00hrs)	51	55 Note C
	Night (23:00 to 07:00hrs)	51	55 Note C
D	Day (07:00 to 23:00hrs)	--	--
	Night (23:00 to 07:00hrs)	46	45 Note B

Table 8 Target Design Criteria
Note A During periods where people are preparing to sleep
Note B Adopted criterion limited to 55 dB(A) during daytime and/or 45 dB(A) during night-time in line with best practice.
Note C See Section 4.3.

Based on the review it is proposed that the design criterion of typically 55 dB $L_{Aeq,15min}$ during the daytime and 44 dB $L_{Aeq,15min}$ during night-time be adopted at the façades of nearby residential properties. These criteria are considered to be approximately

equivalent to the existing background noise level and adverse impacts would not be considered likely should noise emissions be controlled to this level. Considering the L_{AF90} levels measured during various surveys it is considered that the above represents a robust design criteria.

4.3 Commercial Properties

A number of commercial / industrial properties are located in the vicinity of the site. In terms of noise emissions from the site it is considered that an appropriate noise criterion at these locations is 55 dB $L_{Aeq,15min}$.

4.4 Emergency Operation

In order to provide continuity of service, a number of standby generators are proposed as part of the current proposal. These generators will only operate in a situation where there is a failure in the electricity supply from the national grid. Section 4.4.1 of the Environmental Protection Agency (EPA) document "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*" (NG4 - 2016) contains the following comments in relation to emergency plant items:

> *'In some instances, …sites will have certain items of emergency equipment (e.g. standby generators) that will only operate in urgent situations (e.g. grid power failure). Depending upon the context, it may be deemed permissible for such items of equipment to give rise to exceedances in the noise criteria/limits during limited testing and emergency operation only. If such equipment is in regular use for any purposes other than intermittent testing, it is subject to the standard limit values for the site'.*

It is therefore considered that the proposed noise criterion of 55 dB $L_{Aeq,T}$ on these emergency units is appropriate. Generators will be designed and mitigated in order to achieve this design goal at nearby residential noise sensitive locations.

4.5 Recommended Criteria

Following review of relevant guidance, the following noise criteria are proposed for the development:

Day to Day Operation (Noise Sensitive) – **55dB $L_{Aeq,15min}$** (daytime) and **44dB $L_{Aeq,15min}$** (night time)
(Ref. BS4142)
Day to Day Operation (Commercial) – **55dB $L_{Aeq,15min}$**
(Ref. BS8233)
Emergency Operation (Noise Sensitive) – **55dB $L_{Aeq,15min}$**
(Ref. EPA: NG4)

Note plant noise emissions are to be designed such that they are not tonal and do not have impulsive characteristics at the nearest noise sensitive locations.

5.0 NOISE MODEL

The following sections outline the noise assumptions made in the preparation of this assessment.

5.1 Source Sound Power Data

The noise modelling completed uses the following noise data in relation to various items of plant associated with the overall site development. Plant items will be selected in order to achieve the stated noise levels and or appropriate attenuation will be incorporated into the design of the plant/building in order that the plant noise emission levels are achieved on site (including any system regenerated noise).

Building	Source	L_w – Octave Band Centre Frequency								dB (A)
		63	125	250	500	1k	2k	4k	8k	
DC A	Exhaust Fans [A]	83	83	89	85	78	75	72	65	86
	Condensers [B]	94	87	85	77	74	68	59	50	81
	AHU Supply [C]	58	69	52	53	47	45	44	42	57
	AHU Breakout [C]	65	70	67	67	65	67	54	32	71
	AHU Exhaust [C]	73	80	73	82	83	78	77	68	86
	AHU Breakout [C]	63	68	63	65	62	63	52	25	68
	Generator Inlet [D]	105	91	74	64	63	60	56	70	81
	Generator Outlet [D]	93	94	83	64	61	56	65	76	81
	Generator Wall [D]	97	93	91	78	80	58	47	51	86
	Generator Roof [D]	98	94	91	79	81	59	48	52	86
DC B	Condensers [E]	99	85	83	82	78	74	68	61	84
	AHU Supply [F]	58	69	52	53	47	45	44	42	57
	AHU Breakout [F]	65	70	67	67	65	67	54	32	71
	AHU Exhaust [F]	73	80	73	82	83	78	77	68	86
	AHU Breakout [F]	63	68	63	65	62	63	52	25	68
	Generator Inlet [G]	104	98	87	76	59	61	58	82	86
	Generator Outlet [G]	99	97	85	72	67	67	65	83	86
	Generator Wall [G]	102	102	93	82	71	66	56	61	89
	Generator Roof [G]	102	102	93	82	71	66	56	61	89

Table 9 L_w levels Utilised in Noise Model

Note A Based on data supplied by the developer.
Note B Based on data supplied by the developer..
Note C Based on data supplied by the developer.
Note D Based on supplied Cummins data for a 75 dB(A) at 1m generator set Corrected to obtained sound power levels based on dimensions of units detailed on MCA drawings.
Note E Based on data supplied by the developer.
Note F Based on data supplied by the developer.
Note G Based on data supplied by the developer. Based on supplied Cummins data for a 75 dB(A) at 1m generator set Corrected to obtained sound power levels based on dimensions of units detailed on MCA drawings.

Figure 4 presents a 3D render of the noise model for the fully developed site.

5.2 Modelling Calculation Parameters[1]

Prediction calculations for plant noise have been conducted in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*.

Ground attenuation factors of 0.5 have been assumed. No metrological corrections were assumed for the calculations. The atmospheric attenuation outlined in Table 12 has been assumed for all calculations.

Temp (ºC)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.4

Table 12 Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

Figure 4 3D Render of Developed Noise Model – View of Site

[1] See Appendix B for further discussion of calculation parameters.

6.0 NOISE PREDICTIONS & ASSESSMENT

Noise predictions for the following scenarios have been presented and commented upon in the following sections:

Scenario A Day to Day Operations
Scenario B Emergency Operations
Scenario C Generator Testing

6.1 Day to Day Operations – Scenario A

Figure 5 presents the predicted noise contour for the development considering day to day operations during daytime (07:00 to 23:00 hrs) and night-time periods (23:00 to 07:00 hrs).

Table 13 reviews the predicted noise levels against the design criteria adopted for this assessment.

Ref.	Scenario A dB $L_{Aeq,15min}$	Adopted Criterion dB $L_{Aeq,15min}$	Excess (dB)
R01	42	55 – Daytime 44 – Night	--
R02	43		--
R03	40		--
R04	38		--
R05	39		--
R06	39		--
R07	37		--
R08	33		--
R09	34		--
R10	34		--

Table 13 Review of Predicted Noise Levels – Scenario A

Based on day to day operations, the modelling indicates the predicted noise levels from the site are within the relevant adopted criteria at the nearest noise sensitive locations.

Figure 5 Scenario A – Day to Day Operations Noise Contour – Extent of 35 dB(A) Contour

6.2 Emergency Operations

Figure 6 presents the predicted noise contour for the proposed development considering emergency operations (i.e. Scenario B). The extent of the 45 dB $L_{Aeq,15min}$ contour is presented.

Table 14 reviews the predicted noise levels against the design criteria adopted for this assessment.

Ref.	Scenario B dB $L_{Aeq,15min}$	Adopted Criterion dB $L_{Aeq,15min}$	Excess (dB)
R01	44	55	--
R02	45		--
R03	45		--
R04	40		--
R05	46		--
R06	46		--
R07	45		--
R08	42		--
R09	43		--
R10	43		--

Table 14 Review of Predicted Noise Levels – Scenario B

Based on emergency operations the modelling indicates the predicted noise levels from the site are within the adopted criterion at all locations.

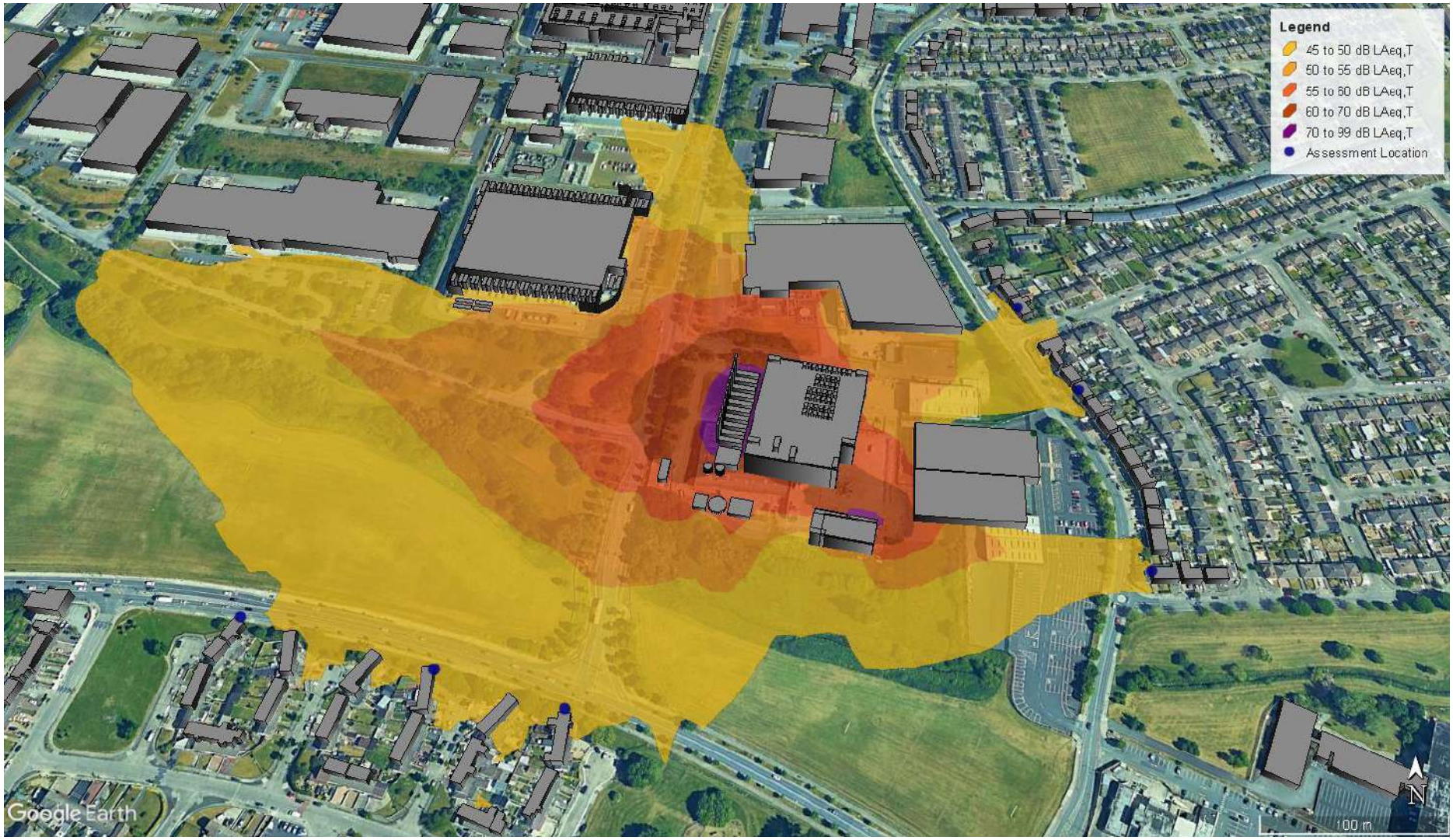


Figure 6 Scenario B – Emergency Operations Noise Contour – Extent of 45dB(A) Contour

6.3 Generator Testing

Figure 7 presents the predicted noise contour for the proposed development considering generator testing during daytime periods.

Table 15 reviews the predicted noise levels against the design criteria adopted for this assessment.

Ref.	Scenario C dB $L_{Aeq,15min}$	Adopted Criterion dB $L_{Aeq,15min}$	Excess (dB)
R01	43	55	--
R02	43		--
R03	40		--
R04	38		--
R05	41		--
R06	41		--
R07	39		--
R08	36		--
R09	37		--
R10	36		--

Table 15 Review of Predicted Noise Levels – Scenario C

Based on generator testing operations, the modelling indicates the predicted noise levels from the site are within the adopted criterion at all locations.

Figure 7 Scenario C – Generator Testing Operations Noise Contour – Extent of 45dB(A) Contour

7.0 CONSTRUCTION NOISE & VIBRATION

Construction noise and vibration will typically be considered through the applications of suitable limits as discussed in the following sections.

7.1 Construction Noise

Overall acceptable levels of construction noise are set out in the Transport Infrastructure Ireland (TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[2], which should not be exceeded at noise sensitive locations during the construction phase of the development. Table 16 sets out these levels.

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Table 16 Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Note * Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

In exceptional circumstances there may be a requirement that certain construction works are carried out during evening and night-time periods. In these instances, the relevant evening (60 dB L_{Aeq1hr}) and night time (50 dB $L_{Aeq,1hr}$) will apply.

Therefore, based on the above the following construction noise criteria are proposed for the site in relation to day to day works during the stated construction hours:

70 dB $L_{Aeq,1hr}$ at noise sensitive location
75dB $L_{Aeq,1hr}$ at commercial property

7.2 Construction Vibration

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, rock breaking and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up 2.5 mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

[2] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385: 1993: *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;
- British Standard BS 5228-2: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Vibration*.

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. Below these values minor cosmetic damage is unlikely. Where continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values may need to be reduced by up to 50%. BS 5288-2 also comments that important buildings which are difficult to repair might require special consideration on a case by case basis.

The Transport Infrastructure Ireland (TII) document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* also contains information on the permissible construction vibration levels as follows:

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10 Hz	10 to 50 Hz	50 to 100 Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Table 17 Allowable Vibration during Construction Phase

8.0 CUMULATIVE COMMENTARY

8.1 Change in Existing Noise Level

The '*Guidelines for Environmental Noise Impact Assessment*' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the proposed development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 18 below and is based on an example scale within the IEMA guidelines. The corresponding significance of impact presented in the Draft '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, 2017) is also presented.

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in the table below provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of operational noise.

Noise Level Change dB(A)	Subjective Response	Impact Guidelines for Noise Impact Assessment Significance (Institute of Acoustics)	Impact Guidelines on the Information to be contained in EIA Reports (EPA)
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Not Significant
3.0 – 4.9	Noticeable	Moderate	Slight, Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Very Significant, Profound

Table 18 Operational Noise Impact Scale

Tables 19 and 20 present the predicted changes in existing noise levels associated with the Proposed Development for Scenario A (Day to Day Operations) at the nearest residential noise sensitive locations to the site for day and night-time periods.

Ref.	Daytime (07:00 – 23:00 hrs)				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	42	57	57.1	+0.1	Not Significant
R02	43	57	57.2	+0.2	Not Significant
R03	40	57	57.1	+0.1	Not Significant
R04	38	57	57.1	+0.1	Not Significant
R05	39	57	57.1	+0.1	Not Significant
R06	39	57	57.1	+0.1	Not Significant
R07	37	57	57	0	Imperceptible
R08	33	50	50.1	+0.1	Not Significant
R09	34	50	50.1	+0.1	Not Significant
R10	34	50	50.1	+0.1	Not Significant

Table 19 Review of Predicted Changes in Existing Noise Levels – Day

Review of the predicted increases in noise level at the nearest residential noise sensitive locations conclude that the associated impact is 'Not Significant' at all locations for daytime periods.

Ref.	Night (23:00 – 07:00 hrs)				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	42	44	46.1	2.1	Not Significant
R02	43	44	46.5	2.5	Not Significant
R03	40	44	45.5	1.5	Not Significant
R04	38	48	48.4	0.4	Not Significant
R05	39	48	48.5	0.5	Not Significant
R06	39	48	48.5	0.5	Not Significant
R07	37	48	48.3	0.3	Not Significant
R08	33	46	46.2	0.2	Not Significant
R09	34	46	46.3	0.3	Not Significant
R10	34	46	46.3	0.3	Not Significant

Table 20 Review of Predicted Changes in Existing Noise Levels – Night

Review of the predicted increases in noise level at the nearest residential noise sensitive locations conclude that the associated impact is 'Not Significant' at all locations for night periods.

8.2 Other Permitted Developments

A review of other permitted developments (Appendix A of overall screening report) in the area identifies the following:

Planning Ref: 3865/20 Lidl Ireland GmbH	Planning permission for the demolition of the existing building immediately south of "The Range" store and the construction of a single storey discount food store (supermarket) with ancillary off-licence sales area. Provision of 75 surface level car parking spaces within the application red line boundary, including two electrical vehicle (EV) charging spaces (parking outside the application red line boundary is operational and therefore does not form part of this application); boundary treatments; 12 cycle stands (space for 24 bicycles); trolley bay canopy; hard and soft landscaping; ESB substation building and external mechanical plant areas; site lighting and connections to drainage and on site drainage infrastructure including attenuation tank; roof mounted photo-voltaic panels; all advertising signage. Access to the proposed development is via the two existing operational access points on the Clonshaugh Road, used by "The Range". All ancillary works to facilitate the development.	Property adjacent and generally south of "The Range" store, Clonshaugh Road, Coolock, Dublin 17, D17 TY30	GRANT PERMISSION 3rd June 2021

Review of the planning file associated with the above scheme confirms that a detailed noise assessment was not completed however the development will be expected to be designed and operated to comply with typical Dublin City Council noise guidance and criteria.

Considering the above, and the robust noise criteria adopted as part of the assessment presented here, the cumulative noise and vibration impacts are not considered significant.

During construction of the proposed development it is anticipated that construction work on the proposed development site will be an audible noise source for certain periods / activities at certain locations.

Any construction being completed at other sites within the study area, whilst potentially significant in their own right, as a matter of good practice, would be expected to control impacts on nearest noise sensitive locations to these sites within appropriate limits. Once these best practice criteria are implemented there should be no significant cumulative impact with permitted, planned or existing developments as a result of the proposed development.

9.0 CONCLUSIONS

The following conclusions are presented in relation to this noise assessment:

- The existing noise environment in the vicinity of the nearest noise sensitive locations is dictated by local and distant road traffic movements with a degree of existing plant noise becoming more apparent during night-time periods.

- A review of best practice guidance has identified the following noise criteria that are considered likely to be appropriate in terms of any planning application progressed in relation to the site (note that these criteria assume there are no tonal or impulsive characteristics):

  Day to Day Operation (Noise Sensitive) – **55 dB $L_{Aeq,15min}$** (daytime) and **44 dB $L_{Aeq,15min}$** (night time)
  (Ref. BS4142)
  Day to Day Operation (Commercial) – **55 dB $L_{Aeq,15min}$**
  (Ref. BS8233)
  Emergency Operation (Noise Sensitive) – **55 dB $L_{Aeq,15min}$**
  (Ref. EPA: NG4)

- Noise predictions for the following scenarios have been presented and commented upon in the following sections:

  Scenario A Day to Day Operations
  Scenario B Emergency Operations
  Scenario C Generator Testing

- The noise model predictions conclude the following:

  Scenario A: Day to Day Operations – The figures presented in this report indicate that the predicted noise levels at the various noise sensitive locations identified in the vicinity of the site satisfy the adopted criteria outlined in the relevant sections of this assessment.

  Scenario B: Emergency Operations – Generators with noise levels of the order of 85 dB(A) at 1m will be required in order to reduce noise emissions from site in line with the noise criteria that would be applicable to nearby properties for emergency operations.

  Scenario C: Generator Testing – The modelling has indicated that noise emissions associated with generator testing is within the adopted daytime criterion when these activities will take place.

- Construction noise and vibration will typically be considered through the applications of suitable limits as discussed in the body of this report.

APPENDIX A
GLOSSARY OF ACOUSTIC TERMINOLOGY

ambient noise — The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.

background noise — The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).

broadband — Sounds that contain energy distributed across a wide range of frequencies.

dB — Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 µPa).

dB L_{pA} — An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

Hertz (Hz) — The unit of sound frequency in cycles per second.

impulsive noise — A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.

$L_{Aeq,T}$ — This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.

L_{AFN} — The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.

L_{AFmax} — is the instantaneous slow time weighted maximum sound level measured during the sample period (usually referred to in relation to construction noise levels).

$L_{Ar,T}$ — The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and impulsiveness of the sound.

L_{AF90} — Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.

L_{AT}(DW) equivalent continuous downwind sound pressure level.

L_{fT}(DW) equivalent continuous downwind octave-band sound pressure level.

L_{day} L_{day} is the average noise level during the day time period of 07:00hrs to 19:00hrs

L_{night} L_{night} is the average noise level during the night-time period of 23:00hrs to 07:00hrs.

low frequency noise LFN - noise which is dominated by frequency components towards the lower end of the frequency spectrum.

noise Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.

noise sensitive location NSL – Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.

octave band A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.

rating level See $L_{Ar,T}$.

sound power level The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m^2 where:

$$Lw = 10Log\frac{P}{P_0}\ \text{dB}$$

Where: p is the rms value of sound power in pascals; and
P_0 is 1 pW.

sound pressure level The sound pressure level at a point is defined as:

$$Lp = 20Log\frac{P}{P_0}\ \text{dB}$$

specific noise level A component of the ambient noise which can be specifically identified by acoustical means and may be associated with a specific source. In BS 4142, there is a more precise definition as follows: 'the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval ($L_{Aeq,\,T}$)'.

tonal	Sounds which cover a range of only a few Hz which contains a clearly audible tone i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being 'tonal'.
$^1/_3$ octave analysis	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one–third of an octave each.

APPENDIX B
NOISE MODELLING DETAILS & ASSUMPTIONS

Noise Model

A 3D computer-based prediction model has been prepared in order to quantify the noise level associated with the proposed building. This section discusses the methodology behind the noise modelling process.

DGMR iNoise

Proprietary noise calculation software has been used for the purposes of this modelling exercise. The selected software, iNoise, calculates noise levels in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*.

iNoise is a proprietary noise calculation package for computing noise levels in the vicinity of noise sources. Predictor calculates noise levels in different ways depending on the selected prediction standard. In general, however, the resultant noise level is calculated taking into account a range of factors affecting the propagation of sound, including:

- the magnitude of the noise source in terms of A weighted sound power levels (L_{WA});
- the distance between the source and receiver;
- the presence of obstacles such as screens or barriers in the propagation path;
- the presence of reflecting surfaces;
- the hardness of the ground between the source and receiver;
- Attenuation due to atmospheric absorption; and
- Meteorological effects such as wind gradient, temperature gradient and humidity (these have significant impact at distances greater than approximately 400m).

Brief Description of ISO9613-2: 1996

ISO9613-2:1996 calculates the noise level based on each of the factors discussed previously. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level, L_{AT}(DW), for the following conditions:

- wind direction at an angle of ±45° to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately 1ms^{-1} and 5ms^{-1}, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well-developed moderate ground based temperature inversion, such as commonly occurs on clear calm nights.

The basic formula for calculating $L_{AT}(DW)$ from any point source at any receiver location is given by:

$$L_{fT}(DW) = LW + Dc - A \qquad \textbf{Eqn. A}$$

Where:
$L_{fT}(DW)$ is an octave band centre frequency component of $L_{AT}(DW)$ in dB relative to $2x10^{-5}$Pa;
L_W is the octave band sound power of the point source;
D_c is the directivity correction for the point source;
A is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The estimated accuracy associated with this methodology is shown in Table B1 below:

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

Table B1 Estimated Accuracy for Broadband Noise of $L_{AT}(DW)$

* h is the mean height of the source and receiver. † d is the mean distance between the source and receiver.
N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

Input Data and Assumptions

The noise model has been constructed using data from various source as follows:

Site Layout The general site layout has been obtained from the drawings forwarded by MCA.
Local Area The location of noise sensitive locations has been obtained from a combination of site drawings provided by MCA and others obtained from Ordinance Survey Ireland (OSI).
Heights The heights of buildings on site have been obtained from site drawings forwarded by MCA. Off-site buildings have been assumed to be 8m high with the exception of industrial buildings where a default height of 15m has been assumed.
Contours Due to the lack of contour information off the proposed site a flat ground model has been assumed for this study.

Modelling Calculation Parameters[3]

Prediction calculations for plant noise have been conducted in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*.

Ground attenuation factors of 0.5 have been assumed. No metrological corrections were assumed for the calculations. The atmospheric attenuation outlined in Table B2 has been assumed for all calculations.

Temp (ºC)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.4

Table B2 Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

[3] See Appendix C for further discussion of calculation parameters.

APPENDIX C – NOISE MODEL PARAMETERS

Prediction calculations for noise emissions have been conducted in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*. The following are the main aspects that have been considered in terms of the noise predictions presented in this instance.

Directivity Factor: The directivity factor (D) allows for an adjustment to be made where the sound radiated in the direction of interest is higher than that for which the sound power level is specified. In this case the sound power level is measures in a down wind direction, corresponding to the worst case propagation conditions and needs no further adjustment.

Ground Effect: Ground effect is the result of sound reflected by the ground interfering with the sound propagating directly from source to receiver. The prediction of ground effects is inherently complex and depend on source height receiver height propagation height between the source and receiver and the ground conditions. The ground conditions are described according to a variable defined as G, which varies between 0.0 for hard ground (including paving, ice concrete) and 1.0 for soft ground (includes ground covered by grass trees or other vegetation) Our predictions have been carried out using various source height specific to each plant item, a receiver heights of 1.6m for single storey properties and 4m for double. An assumed ground factor of G = 0.5 has been applied off site. Noise contours presented in the assessment have been predicted to a height of 4m in all instances.

Geometrical Divergence This term relates to the spherical spreading in the free-field from a point sound source resulting in attenuation depending on distance according to the following equation:

$$A_{geo} = 20 \times \log(\text{distance from source in meters}) + 11$$

Atmospheric Absorption Sound propagation through the atmosphere is attenuated by the conversion of the sound energy into heat. This attenuation is dependent on the temperature and relative humidity of the air through which the sound is travelling and is frequency dependent with increasing attenuation towards higher frequencies. In these predictions a temperature of 10°C and a relative humidity of 70% have been used, which give relativity low levels of atmosphere attenuation and corresponding worst case noise predictions.

Temp (°C)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.4

Table C1 Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

Barrier Attenuation The effect of any barrier between the noise source and the receiver position is that noise will be reduced according to the relative heights of the source, receiver and barrier and the frequency spectrum of the noise.

APPENDIX D

AIR QUALITY AND CLIMATE ASSESSMENT

Prepared by

AWN Consulting Ltd

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

AIR QUALITY AND CLIMATE ASSESSMENT FOR THE PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS & TECHNOLOGY PARK, DUBLIN 17

Technical Report Prepared For

Colliers Properties LLC

Technical Report Prepared By

Dr. Edward Porter C Chem MRSC MIAQM

Our Reference

EP/21/12378AR01

Date Of Issue

27 September 2021

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: +353 21 438 7400
F: +353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812
Directors: F Callaghan, C Dilworth,
T Donnelly, E Porter
Associate Director: D Kelly

Document History

Document Reference		Original Issue Date	
EP/21/12378AR01		27 September 2021	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Checked by
Signature		
Name	Dr. Edward Porter	Ciara Nolan
Title	Director (Air Quality)	Air Quality Consultant
Date	27 September 2021	27 September 2021

EXECUTIVE SUMMARY

This report presents an air quality assessment for a proposed data centre development at a site in Clonshaugh Business & Technology Park, Dublin 17. This assessment was carried out to determine the potential air quality impacts for the proposed development. There will be a total of 12 no. backup emergency diesel generators which will provide power to the site when power from the grid is not available including 10 emergency backup generators for Data Centre A, one house generator in Data Centre A and one emergency backup generator in Data Centre B. Air dispersion modelling of nitrogen dioxide (NO_2) emissions was carried out using the United States Environmental Protection Agency's regulated model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of NO_2 at a variety of locations beyond the site boundary.

This assessment was carried out to determine the ambient air quality impact of the site and any air quality constraints that may be present. It was determined that as the proposed diesel generators will be used solely for emergency operation (i.e. less than 200 hours per year) the emission limit values outlined in the Medium Combustion Plant Directive are not applicable to the diesel generators on site.

A number of modelling scenarios were investigated for the purposes of this assessment. Both normal day-to-day testing operations were considered as well as emergency operations. Emergency operation was based on 200 emergency hours modelled according to the USEPA methodology.

An iterative stack height assessment was undertaken to determine the minimum stack height required for dispersion purposes. It was found that a stack height of 25m for the 10 Data Centre A generators and the house generator with a stack height of 16m for the Data Centre B generator was sufficient for dispersion of pollutants.

Construction Phase

Due to the low volume of construction stage traffic associated with the proposed project, a detailed air quality and climate assessment was screened out as there is no potential for significant impacts to air quality or climate. Impacts to air quality during the construction phase are considered localised, ***short-term***, and ***imperceptible***. Impacts to climate are considered ***short-term*** and ***imperceptible*** and will not impact Ireland's ability to meet its GHG targets under Regulation (EU) 2018/842.

In terms of construction dust impacts, the concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. The CEMP will set out minimisation measures to ensure nuisance dust arising from demolition, site clearance and construction activities is prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the proposed development.

There is low potential for fugitive dust generation during construction due to the low sensitivity of the receiving environment and scale of the proposed works. The predicted impact of the construction works on air quality as a result of dust emissions will therefore be ***short-term*** and ***imperceptible***.

On the basis of the above with regard to the evidence set out within this report, the potential effects on Air Quality and Climate are ***negative***, ***imperceptible,*** and ***short term*** for the construction phase. There are no likely significant effects in terms of Air Quality and Climate, and it would not warrant preparation of an EIA on these grounds.

Weekly Testing & Emergency Operations

The scenarios modelled for this assessment also include the following types of testing of the back-up generators:

- Test 1: Testing once per week of all 12 no. back-up generators at 25% load for a maximum of 30 minutes each, one generator at a time, sequentially;
- Test 2: All 12 no. back-up generators will be periodically tested on an individual basis at 90% load for a maximum of four hours per year; and
- All testing is assumed to only occur between 8am and 5pm, Monday to Friday.

The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 53% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 68% of the annual limit value at the worst-case off-site receptor. The UK EA assessment methodology determined that, in any year, the diesel generators do not have any limitation on runtimes with the modelling results indicating no likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level).

Cumulative Assessment

This scenario involved the testing of the 12 no. main diesel generators associated with Data Centre A and Data Centre B in addition to 200 emergency hours of operation averaged over the year as per the USEPA methodology in addition to the modelling of the nearby data centre facilities to the west of the facility and the data centre complex approximately 700m north-west of the facility.

The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 73% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 78% of the annual limit value at the worst-case off-site receptor.

The UK EA assessment methodology determined that in any year, the diesel generators can run for 122 hours before there is a likelihood of an exceedance of the 1-hour ambient air quality standard at the nearest residential receptor (at a 98th percentile confidence level). This is based on the emergency operation of the 10 no. diesel generators.

Conclusion

The modelling study has concluded that provided the stacks are built to a height of 25m for the 10 Data Centre A generators and house generator with a stack height of 16m for the Data Centre B generator and hour generator and the emission envelope assumed for this study is complied with, that emissions from the diesel generators will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health.

On the basis of the above, with regard to the evidence set out within this report, the potential effects on Air Quality are ***negative***, ***imperceptible,*** and ***long term*** for the operational phase. There are no likely significant effects in terms of Air Quality and Climate, and it would not warrant preparation of an EIA on these grounds.

CONTENTS

Page

1.0 INTRODUCTION

This report presents an air quality assessment for a proposed data centre development at a site in Clonshaugh Business & Technology Park, Dublin 17. This assessment was carried out to determine the potential air quality impacts for the proposed development. There will be a total of 12 no. emergency backup diesel generators: 10 emergency backup generators associated with Data Centre A, one emergency backup generator associated with Data Centre B and one emergency backup house generator associated with Data Centre A, which will provide power to the site when power from the grid is not available. Air dispersion modelling of nitrogen dioxide (NO_2) emissions was carried out using the United States Environmental Protection Agency's regulated model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of NO_2 at a variety of locations beyond the site boundary.

The assessment was carried out the determine the ambient air quality impact of the site and any air quality constraints that may be present. It was determined that as the proposed diesel generators will be used solely for emergency operation (i.e. less than 500 hours per year) the emission limit values outlined in the Medium Combustion Plant Directive are not applicable to the diesel generators on site.

Information supporting the conclusions has been detailed in the following sections. The assessment methodology and study inputs are presented in Section 2 and Section 3. Background pollutant concentrations are summarised in Section 4. The process emissions and modelling inputs for on-site plant are presented in Section 5. The dispersion modelling results are presented in Section 6, the cumulative assessment is presented in Section 7 and the assessment summaries are presented in Section 8. The model formulation is detailed in Appendix I and a review of the meteorological data used is detailed in Appendix II.

2.0 ASSESSMENT CIRTERIA

2.1 Ambient Air Quality & Climate Standards & Guidelines

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC (see Table 1). The ambient air quality standards applicable for NO_2 are outlined in this Directive.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The standards outlined in Table 1 have been used in the current assessment to determine the potential impact of NO_2 emissions from the facility on ambient air quality.

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide (NO_2)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Table 1 Ambient Air Quality Standards

2.1.1 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined in section 9.2.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/(m^2*day) be applied to the site boundary of quarries. This limit value shall be implemented with regard to dust impacts from construction of the Proposed Development.

2.1.2 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% below 2005 levels), 65 kt for NO_X (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH_3 (1% reduction) and 10 kt for $PM_{2.5}$ (18% reduction).

European Commission Directive 2001/81/EC and the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National EPA Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. The data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X. Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25.5 kt for SO_2 (65% on 2005 levels), 66.9 kt for NO_X (49% reduction on 2005 levels), 56.9 kt for NMVOCs (25% reduction on 2005 levels), 112 kt for NH_3 (1% reduction on 2005 levels) and 15.6 kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 10.9 kt (85% below 2005 levels) for SO_2, 40.7 kt (69% reduction) for NO_x, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for NH_3 and 11.2 kt (41% reduction) for $PM_{2.5}$.

2.1.3 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002. For the purposes of the European Union burden sharing agreement under Article 4 of the of the Doha Amendment to the Kyoto Protocol, in December 2012, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 20% below the 2005 level over the period 2013 to 2020 (UNFCCC, 2012).

The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP25) took place in Madrid, Spain from the 2nd to 13th December 2019 and focused on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement is currently ratified by 187 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress has also been made on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In relation to the EU 20-20-20 targets for CO_2, Ireland has a target of a 20% reduction in non-Emission Trading Scheme (non-ETS) greenhouse gas emissions by 2020

relative to the 2005 levels. Latest Environmental Protection Agency (EPA) figures taken from 'Ireland's Final Greenhouse Gas Emissions 1990 – 2019' indicate that Ireland has exceeded its 2019 target by 6.85 Mt CO_2eq. Projections to 2020 also look to be in exceedance of the initial targets.

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, alumina manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture. Ireland's obligation under the Regulations is a 30% reduction in non-ETS GHG emissions by 2030 relative to its 2005 levels. The ETS is a "*cap and trade*" system where an EU-wide limit, or cap, is set for participating installations. Thus, the geographical location of a given development within the EU is not relevant as there is only one EU-wide target which is applicable to the ETS and thus the cumulative direct and indirect climate assessment of relevance in this context is the GHG emissions associated with the EU under the ETS. On an EU-wide basis, the ETS market in 2019 was approximately 1,390 million tonnes CO_{2eq}.

Following on from the recently published European Climate Law (EU, 2021), and as part of the EU's "*Fit for 55*" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2020, the Effort Sharing Regulation is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021).

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) was enacted (the 2015 Act). The purpose of the 2015 Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the 2015 Act as the '*national transition objective*'. The 2015 Act makes provision for a national mitigation plan, and a national adaptation framework.

The 2015 Act adaptation plan, referred to as the '*national climate change adaptation framework*', which is required to be submitted to Government for approval every five years, outlines a range of objectives to:

- Specify the national strategy for the adaptation measures in different sectors which reduces the vulnerability of the State to the negative effects of climate change and to avail of the positive effects of climate change that may occur; and

- Take into account any existing obligations of the State under the law of the EU or any international agreement.

In addition, the 2015 Act provided for the establishment of the Climate Change Advisory Council (hereafter referred to as the Advisory Council) with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures

required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

In June 2020, the Government published the Programme for Government – Our Shared Future (Government of Ireland 2020). In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policy changes will include the acceleration of the electrification of the transport system, including electric bikes, electric vehicles and electric public transport, alongside a ban on new registrations of petrol and diesel cars from 2030. In addition, there will be a policy to ensure an unprecedented model shift in all areas by a reorientation of investment to walking, cycling and public transport.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019. The General Scheme was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP. The Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) was published in July 2021.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'*. The 2021 Climate Act will also '*provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy'*. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The Act has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'.

The Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) outlines a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035;
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;

- To request all local authorities to prepare climate action plans for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and
- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

3.0 ASSESSMENT METHODOLOGY

Emissions from the facility have been modelled using the AERMOD dispersion model (Version 21112) which has been developed by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2021) and following guidance issued by the EPA (EPA, 2020a). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources and has replaced ISCST3 as the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 2017). The model has more advanced algorithms and gives better agreement with monitoring data in extensive validation studies (USEPA, 2017). An overview of the AERMOD dispersion model is outlined in Appendix I.

The air dispersion modelling input data consisted of information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and five years of appropriate hourly meteorological data. Using this input data the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

The modelling aims to achieve compliance with the guidance outlined within the EPA *AG4 Guidance for Air Dispersion Modelling* (EPA, 2020a) for the maximum permissible process contribution: "*When modelling a facility, the uncertainty in the model should be considered. If the facility is operated continually at close to the maximum licenced mass emission rate (i.e. maximum concentration and maximum volume flow) the process contribution (PC) should be less than 75% of the ambient air quality standard and less than this where background levels account for a significant fraction of the ambient air quality standard*".

This approach allows for inherent uncertainty in air dispersion modelling to be taken into account in order to avoid a risk of exceeding the air quality standards. The modelling assessment has aimed to achieve a process contribution that is less than 75% of the ambient air quality standard under normal day-to-day operational scenarios modelled. This criteria is not applicable to emergency operations as outlined in Appendix K of the EPA AG4 guidance (EPA, 2020a).

Throughout this study a worst-case approach was taken where possible. This will most likely lead to an over-estimation of the levels that will arise in practice. The worst-case assumptions are outlined below:

- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Conservative background concentrations were used in the assessment;
- The effects of building downwash, due to on-site buildings, has been included in the model.

3.1 Air Dispersion Modelling Methodology

The United States Environmental Protection Agency (USEPA) approved AERMOD dispersion model has been used to predict the ground level concentrations (GLC) of compounds emitted from the principal emission sources on-site.

The modelling incorporated the following features:

- Two receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised "hot-spots" were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid measured 10 x 10 km with the site at the centre and with concentrations calculated at 200m intervals. A smaller denser grid measured 2.0 x 2.0 km with the site at the centre and concentrations calculated at 50m intervals. Boundary receptor locations were also placed along the boundary of the site, at 20m intervals, giving a total of 4,342 calculation points for the model.

- Discrete receptors were also added to the model to represent nearby residential receptors.

- All on-site buildings and significant process structures were mapped into the computer to create a three dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.

- Detailed terrain has been mapped into the model using SRTM data with 30m resolution. The site is located in an area of complex terrain. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2019a).

- Hourly-sequenced meteorological information has been used in the model. Meteorological data over a five year period (Dublin Airport 2016 – 2020) was used in the model (see Figure 1 and Appendix II) (Met Eireann, 2021).

- The source and emissions data, including stack dimensions, gas volumes and emission temperatures have been incorporated into the model.

3.2 Terrain

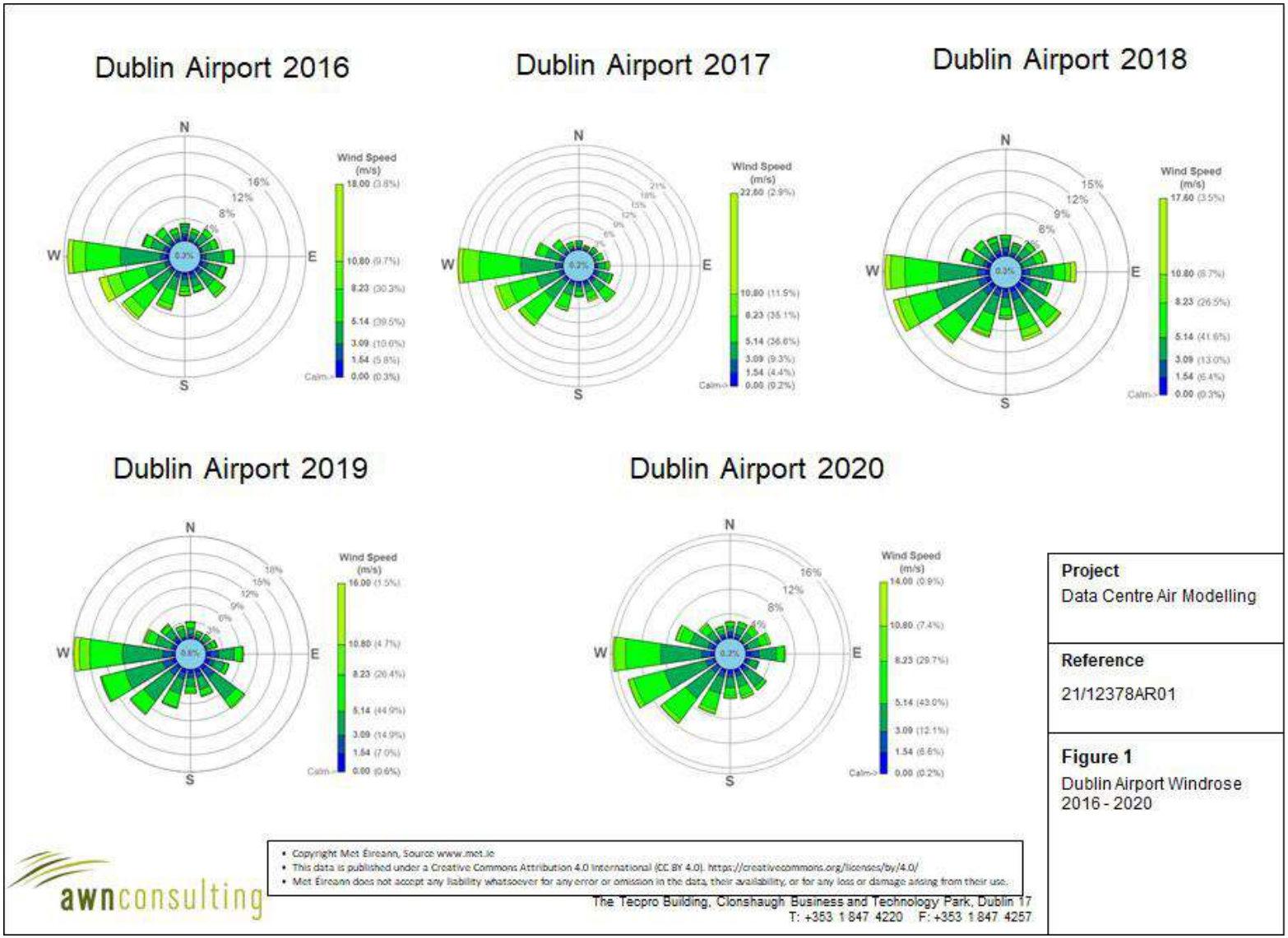
The AERMOD air dispersion model has a terrain pre-processor AERMAP (USEPA, 2019a) which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from SRTM. This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, H_{crit}, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (H_c). As outlined in the AERMOD model formulation (USEPA, 2021) a plume embedded in the flow below H_c tends to remain horizontal; it might go around the hill or impact on it. A plume above H_c will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model “captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted” (USEPA, 2021).

3.3 Meteorological Data

The selection of the appropriate meteorological data has followed the guidance issued by the USEPA (USEPA, 2017, 2019b). A primary requirement is that the data used should have a data capture of greater than 90% for all parameters. Dublin Airport meteorological station, which is located approximately 2.5 km north-west of the site, collects data in the correct format and has a data collection of greater than 90%. Long-term hourly observations at Dublin Airport meteorological station provide an indication of the prevailing wind conditions for the region (see Figure 1 and Appendix II). Results indicate that the prevailing wind direction is westerly to south-westerly in direction over the period 2016 – 2020. The mean wind speed is approximately 5.5 m/s over the period 2016 - 2020.


Dublin Airport 2016
Dublin Airport 2017
Dublin Airport 2018
Dublin Airport 2019
Dublin Airport 2020
N
E
S
W
Wind Speed (m/s)
Calm
Project
Data Centre Air Modelling
Reference
21/12378AR01
Figure 1
Dublin Airport Windrose 2016 - 2020
awnconsulting
Copyright Met Éireann, Source www.met.ie
This data is published under a Creative Commons Attribution 4.0 International (CC BY 4.0). https://creativecommons.org/licenses/by/4.0/
Met Éireann does not accept any liability whatsoever for any error or omission in the data, their availability, or for any loss or damage arising from their use.
The Tecpro Building, Clonshaugh Business and Technology Park, Dublin 17
T: +353 1 847 4220 F: +353 1 847 4257

3.4 Geophysical Considerations

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2021). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2019b) to enable the calculation of the appropriate parameters. The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and albedo and to a distance of 1km for surface roughness in line with USEPA recommendations (USEPA, 2017) as outlined in Appendix II.

In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published (USEPA, 2017). The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Dublin Airport) rather than the installation;
- Surface roughness should use a default 1km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around the site, the land use should be sub-divided by sectors with a minimum sector size of 30º;
- Bowen ratio and albedo should be based on a 10km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

AERMOD has an associated pre-processor, AERSURFACE (USEPA, 2008) which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET (Alaska DOEC, 2008). This approach has been applied to the current site with full details provided in Appendix II.

3.5 Building Downwash

When modelling emissions from an industrial installation, stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800m).

The USEPA has defined the “Good Engineering Practice” (GEP) stack height as the building height plus 1.5 times the lesser of the building height or maximum projected

building width. It is generally considered unlikely that building downwash will occur when stacks are at or greater than GEP (USEPA, 1985).

When stacks are less than this height, building downwash will tend to occur. As the wind approaches a building it is forced upwards and around the building leading to the formation of turbulent eddies. In the lee of the building these eddies will lead to downward mixing (reduced plume centreline and reduced plume rise) and the creation of a cavity zone (near wake) where re-circulation of the air can occur. Plumes released from short stacks may be entrained in this airflow leading to higher ground level concentrations than in the absence of the building.

The Plume Rise Model Enhancements (PRIME) (Schulman et al, 2000) plume rise and building downwash algorithms, which calculates the impact of buildings on plume rise and dispersion, have been incorporated into AERMOD. The building input processor BPIP-PRIME produces the parameters which are required in order to run PRIME. The model takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10º intervals). The model determines the change in plume centreline location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model.

Given that the stacks are less than 2.5 times the lesser of the building height or maximum projected building width, building downwash will need to be taken into account and the PRIME algorithm run prior to modelling with AERMOD. The dominant building for each relevant stack will vary as a function of wind direction and relative building heights.

4.0 BACKGROUND CONCENTRATIONS OF POLLUTANTS

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities (EPA, 2020b). The most recent annual report on air quality "*Air Quality in Ireland 2019*" (EPA, 2020b) details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Clonshaugh is categorized as Zone A (EPA, 2020b).

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2020b), at suburban Zone A background locations in Rathmines, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 - 22 µg/m^3 in 2019 (see Table 2). Sufficient data is available for the station in Swords to observe long-term trends since 2015, with annual average results ranging from 13 – 16 µg/m^3. The 1-hour concentrations, measured as a 99.8th percentile were also in compliance with the 1-hour limit value of 200 µg/m^3. Based on these results, an estimate of the current background NO_2 concentration in the region of the proposed development is 15 µg/m^3.

In relation to the annual average background, the ambient background concentration was added directly to the process concentration with the short-term peaks assumed to have an ambient background concentration of twice the annual mean background concentration.

The methodology for converting NO_X to NO_2 was based on the ozone limiting method (OLM) approach based on an initial NO_2/NO_X ratio of 0.1 and a background ozone level of 50 µg/m^3 based on a review of EPA data for similar Zone A locations (EPA, 2020b).

Year	Ballyfermot	Rathmines	Swords
2015	16	18	13
2016	17	20	16
2017	16	17	14
2018	17	20	16
2019	20	22	15
Average	**17**	**19**	**15**

Table 2 Annual Mean NO_2 Concentrations In Zone A Locations (µg/m^3)

5.0 CONSTRUCTION PHASE

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions as a result of excavation works, infilling and landscaping activities and storage of soil in stockpiles. This leads to the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m (IAQM, 2014). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

Construction traffic would be expected to be the dominant source of greenhouse gas emissions as a result of the Proposed Development. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate.

Initial commissioning activities will involve testing of the back-up generators on site in a similar manner to the operational phase testing, i.e. the first testing sequence will be commissioning of the standby generators. Therefore, it is predicted that the initial commissioning tests will result in an ***imperceptible*** impact to air quality in the ***short-term***.

It is important to note that the potential impacts associated with the construction phase of the Proposed Development are short-term in nature. When the dust minimisation measures detailed in the mitigation section (see Section 9.6) of this chapter are implemented, fugitive emissions of dust from the site will not be significant and will pose no nuisance at nearby receptors. Due to the duration and nature of the construction activities, CO_2 and N_2O emissions from construction vehicles and machinery will have a ***short-term*** and ***imperceptible*** impact on climate.

6.0 OPERATIONAL PHASE

It is proposed to have a total of 12 no. backup emergency diesel generators on site. An iterative stack height assessment was undertaken to determine the minimum stack height required for dispersion purposes. It was found that a stack height of 25m for the Data Centre A and the house generator, with a stack height of 16m for the Data Centre B generator, was sufficient for dispersion of pollutants.

6.1 Emergency Operations

The emergency back-up diesel generators will operate in an emergency scenario when there is a power outage. In addition, testing of the generators will be required. The following types of testing of the back-up generators will be undertaken:

- Test 1: Testing once per week of all 12 no. back-up generators at 25% load for a maximum of 30 minutes each, one generator at a time, sequentially;
- Test 2: All 12 no. back-up generators will be periodically tested on an individual basis at 90% load for a maximum of four hours per year; and
- All testing is assumed to only occur between 8am and 5pm, Monday to Friday.

There are two methodologies used to determine the impact from the operation of the diesel generators on ambient air quality. Both methodologies from the USEPA and UK EA have been used in this assessment, this follows the guidance outlined in Appendix K of the Irish EPA document AG4 (EPA, 2020a). Emission details can be seen in Table 3.

USEPA Guidance suggests that for emergency operations, an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). As a result, the maximum hourly emission rates from the diesel generators were reduced by $\frac{200}{8760}$ and the diesel generators were modelled over a period of one full year.

A second methodology has been published by the UK Environment Agency. The consultation document is entitled "*Diesel Generator Short-Term NO_2 Impact Assessment*" (UKEA, 2016). The methodology is based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value (18 exceedances are allowable per year before the air standard is deemed to have been exceeded). The assessment assumes a hypergeometric distribution to assess the likelihood of exceedance hours coinciding with the emergency operational hours of the diesel generators. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined. The guidance suggests that the 95th percentile confidence level should be used to indicate if an exceedance is likely. More recent guidance (UKEA, 2019) has recommended this probability should be multiplied by a factor of 2.5 and therefore the 98th percentile confidence level should be used to indicate if an exceedance is likely. The guidance suggests that the assessment should be conducted at the nearest residential receptor or at locations where people are likely to be exposed and that there should be no running time restrictions on these generators when providing power on site during an emergency.

Both the methodology advised in the USEPA guidance as well as the approach described in the UK EA guidance have been applied for the emergency scenario modelled in this study to ensure a robust assessment of predicted air quality impacts from the diesel generators. This also follows the guidance outlined in Appendix K of the EPA AG4 guidance (EPA, 2020a).

Stack Reference	Exit Diameter (m)	Cross Sectional Area (m^2)	Temp (K)	Volume Flow Rate (Nm^3/hr at 15% Ref. O_2)	Exist Velocity (m/sec actual)	NO_X Concentration (mg/Nm^3 at 15% O_2 Ref.)	Mass Emission (g/s)
Diesel generators – Testing (100% load)(4)	0.35	0.096	765.15	20,780	27.12	726	4.19
Diesel generators – Emergency Operations (90% load)	0.35	0.096	768.15	19,050	96.7	668	3.54 Note 2 / 0.081 Note 3

Note 1 For the purposes of this assessment normalised conditions are 273.15 K, 101.3 Pa, dry gas and 15% O_2

Note 2 Maximum emission rate used to model the hypergeometric distribution at the 98th%ile confidence level

Note 3 Reduced emission rates based on USEPA protocol used to model emissions during emergency operation based on 200 hours of operation

Note 4 Test 1 will involve testing of all 12 generators at 25% load for 30 minutes sequentially whilst for Test 2 all 12 no. back-up generators will be periodically tested on an individual basis at 90% load for a maximum of four hours per year. Testing will be conducted between the hours of 08:00 – 17:00 Monday - Friday.

Table 3 Emission Details – Data Centre Diesel Generators

7.0 RESULTS

An iterative stack height assessment was undertaken to determine the minimum stack height required for dispersion purposes. It was found that a stack height of 25m for Data Centre A generators and the Data Centre A house generator, with a stack height of 16m for the Data Centre B generator, is sufficient for dispersion of pollutants.

7.1 Emergency Operations Scenario (USEPA Methodology)

This scenario involved modelling the 12 emergency backup generators for 200 emergency hours as per the USEPA guidance (USEPA, 2011).

The NO_2 modelling results at the worst-case off-site receptor are detailed in Table 4. The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 53% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 68% of the annual limit value at the worst-case off-site receptor.

The geographical variations in ground level NO_2 concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in Figures 2 and 3. The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility.

Pollutant / Year	Background (µg/m^3)	Averaging Period	Process Contribution (µg/m^3)	Predicted Environmental Concentration (µg/m^3)	Standard (µg/m^3) Note 1
NO_2 / 2016	30	99.8th%ile of 1-hr means	74.6	104.6	200
	15	Annual Mean	10.4	25.4	40
NO_2 / 2017	30	99.8th%ile of 1-hr means	74.2	104.2	200
	15	Annual Mean	12.3	27.3	40
NO_2 / 2018	30	99.8th%ile of 1-hr means	73.2	103.2	200
	15	Annual Mean	9.9	24.9	40
NO_2 / 2019	30	99.8th%ile of 1-hr means	76.0	106.0	200
	15	Annual Mean	11.5	26.5	40
NO_2 / 2020	30	99.8th%ile of 1-hr means	74.1	104.1	200
	15	Annual Mean	10.9	25.9	40

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011)

Table 4 Dispersion Model Results for Nitrogen Dioxide (NO_2) – Emergency Operations Scenario

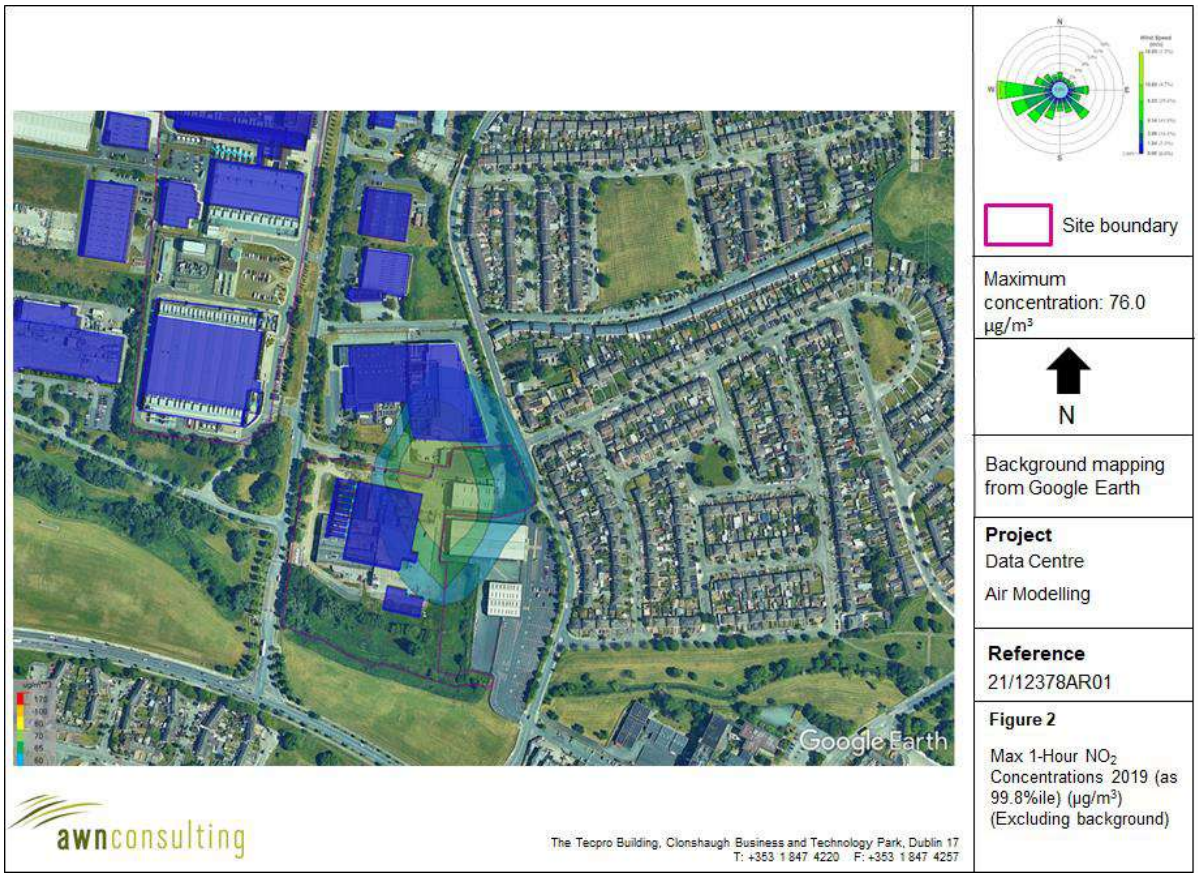
7.2 Emergency Operations Scenario (UK EA Methodology)

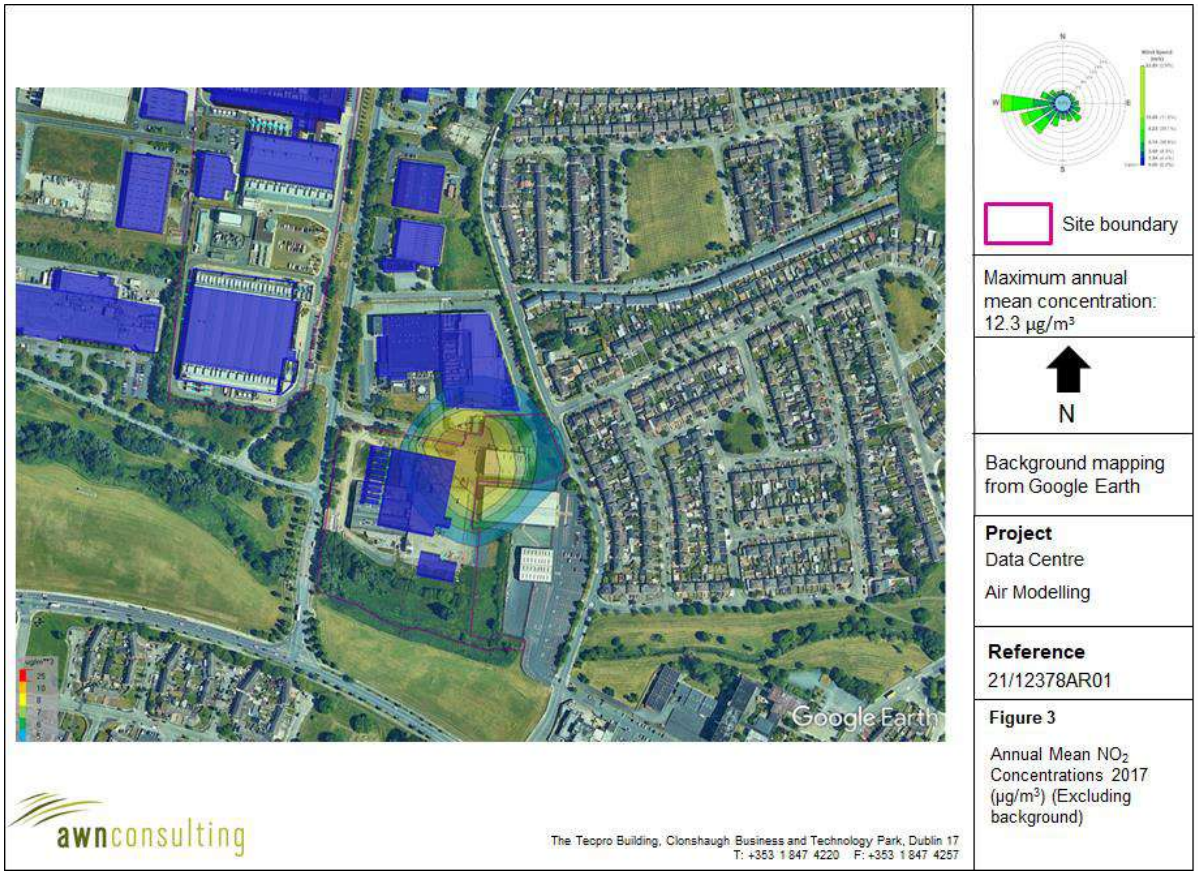
This assessment involved modelling the continuous operation of 10 no. emergency backup diesel generators at 90% load for a full year based on the UK EA methodology (UKEA, 2019). The methodology, based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value assuming a hypergeometric distribution, has been undertaken at the worst-case residential / sensitive receptor. The cumulative hypergeometric distribution of 19 and more hours per year was computed and the probability of an exceedance determined. The results have been compared to the 98th percentile confidence level to indicate if an exceedance is likely at various operational hours for the diesel generators. The results (Table 5 and Figure 4) indicate that in the worst-case year, the diesel generators can operate with no limitation on runtimes with the modelling results indicating no likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level).

Pollutant / Year / Scenario	Hours of operation (Hours) (98th%ile) Allowed Prior To Exceedance Of Limit Value	UK Guidance – Probability Value = 0.02 (98th%ile)Note 1
NO_2 / 2016	8,760	**0.02**
NO_2 / 2017	8,760	
NO_2 / 2018	8,760	
NO_2 / 2019	8,760	
NO_2 / 2020	8,760	

Note 1 Guidance Outlined In UK EA publication "Emissions from specified generators - Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators" (EA, 2019)

Table 5 Hypergeometric Statistical Results at Worst-case Residential Receptor – Emergency Operations Scenario





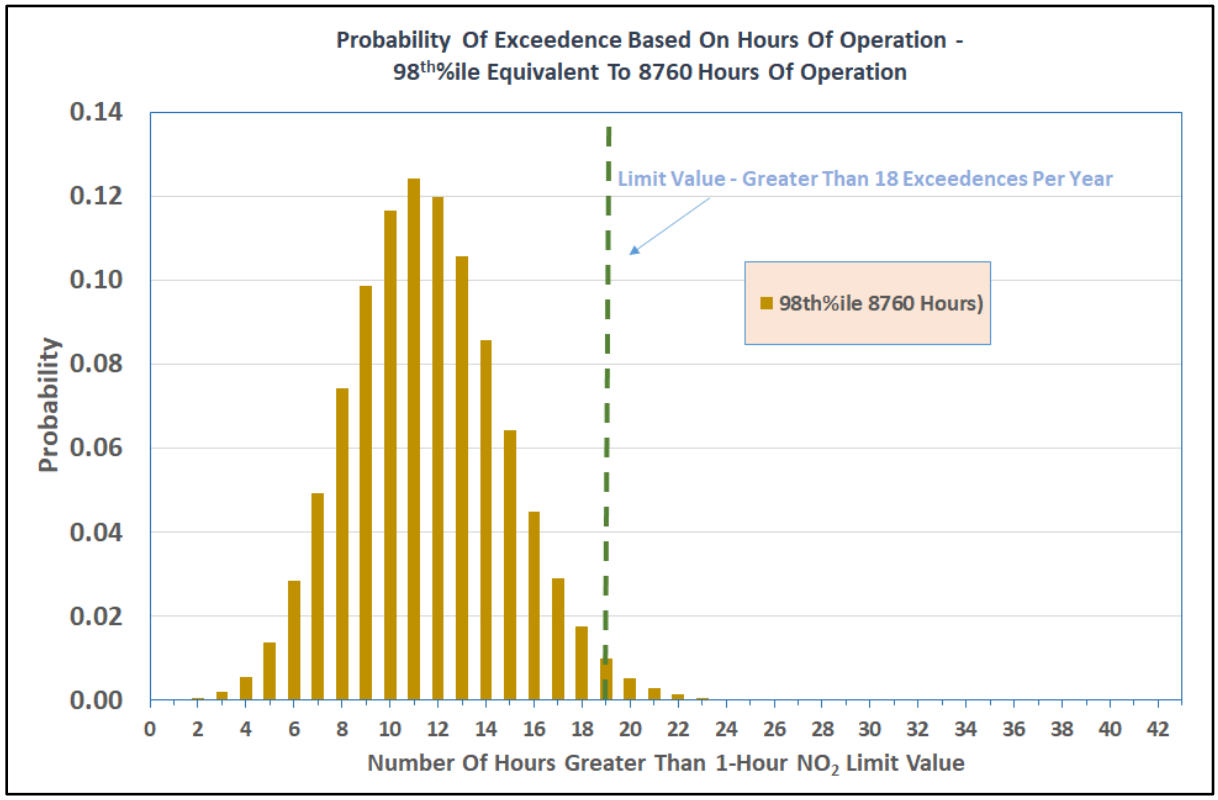


Figure 4 Probability of Exceedance of 1-Hour NO_2 Ambient Air Quality Limit Value based on Hours of Operation for Emergency Generators for Proposed Development.

8.0 GHG & REGIONAL AIR EMISSIONS

The CO_2 emissions from electricity to operate the facility will not be significant in relation to Ireland's national annual CO_2 emissions. A Report titled 'Energy Related CO_2 Emissions In Ireland 2005 – 2018 (2019 Report)' published by the Sustainable Energy Authority of Ireland (SEAI, 2020) states the average CO_2 emission factor for electricity generated in Ireland was 325 gCO_2/kWh in 2019. This average CO_2 emission factor is based on the national power generating portfolio. On the basis that the Proposed Development will consume 16.8MW of power per data storage building, this equates to 589 GWh annually for the Data Centre based on the assumption of the national fuel mix. This translates to approximately 47,830 tonnes of CO_2eq per year which will have an ***indirect***, ***long-term, negative*** and ***slight*** impact on climate.

Latest Environmental Protection Agency (EPA) figures taken from 'Ireland's Final Greenhouse Gas Emissions 1990 – 2019' indicate that total CO_2 generation in Ireland was of the order of 59.78 million tonnes CO_2eq in 2019. The Proposed Development would contribute approximately 0.08% of Ireland's national annual CO_2 emissions assuming an electrical supply from a typical national grid source mix. This equates to an overall, indirect, long-term, negative and slight cumulative impact to climate.

As the Proposed Development is over 20 MW, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading Scheme (ETS). Electricity providers form part of the ETS and thus greenhouse gas emissions from these electricity generators are not included when determining compliance with the targeted 30% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision target. Thus, any necessary increase in electricity generation due to data centre demand will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision. On an EU-wide basis, where the ETS market in 2019 was approximately 1,390 million tonnes CO_2eq, the impact of the emissions associated with the Proposed Development will be less than 0.003% of the total EU-wide ETS market which is imperceptible.

Directive (EU) 2016/2284 "*On The Reduction Of National Emissions Of Certain Atmospheric Pollutants And Amending Directive 2003/35/EC And Repealing Directive 2001/81/EC*" was published in December 2016. The Directive will apply the 2010 National Emission Ceiling Directive limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. The targets are set out in Section 2.1.2 of this Report.

Assuming that 16.8MW is generated using the national fuel mix, the NO_X emissions associated with this electricity over the course of one year (i.e. 147 GWh based on 16.8MW for 8,760 hours per annum) will equate to 49 tonnes per annum which is 0.08% of the National Emission Ceiling limit for Ireland from 2020. Similarly, SO_2 emissions associated this electricity over the course of one year (147 GWh) will equate to 19 tonnes per annum which is 0.04% of the National Emission Ceiling limit for Ireland from 2020. Additionally, NMVOC emissions associated this electricity over the course of one year (147 GWh) will equate to 56 tonnes per annum which is 0.10% of the National Emission Ceiling limit for Ireland from 2020. Thus, the NO_X, SO_2 and NMVOC indirect emissions associated with the operation of the Proposed Development are ***indirect***, ***long-term, negative*** and ***imperceptible*** with regards to regional air quality.

9.0 CUMULATIVE ASSESSMENT

This scenario involved the testing of the 12 no. main diesel generators associated with the data centre on a weekly basis in addition to 200 emergency hours of operation averaged over the year as per the USEPA methodology in addition to the modelling of the nearby data centre facilities to the west of the facilities and the data centre complex approximately 700m north-west of the facility (DUB 74/84/94/104).

Cumulative Impact Assessment Results

USEPA Methodology

The NO_2 modelling results at the worst-case location at and beyond the site boundary are detailed in Table 6 based on the operation of the back-up diesel generators for 200 hours per year using the USEPA methodology (USEPA, 2011). In addition to this the scheduled weekly testing, and quarterly maintenance testing, of all back-up generators, emergency operations and scheduled testing of existing diesel generators associated with an existing data storage facilities located approximately 200m west of the Proposed Development and 700m north-west of the Proposed Development have also been considered. The results indicate that the ambient ground level concentrations are within the relevant air quality standards for NO_2. For the worst-case year modelled, emissions from all back-up generators lead to an ambient NO_2 concentration (including background) which is 73% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 78% of the annual limit value at the worst-case off-site receptor.

The geographical variations in ground level NO_2 concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in Figures 5 and 6. The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility.

Pollutant / Year	Background (µg/m^3)	Averaging Period	Process Contribution (µg/m^3)	Predicted Environmental Concentration (µg/m^3)	Standard (µg/m^3) Note 1
NO_2 / 2016	30	99.8th%ile of 1-hr means	111.6	141.6	200
	15	Annual Mean	14.3	29.3	40
NO_2 / 2017	30	99.8th%ile of 1-hr means	116.4	146.4	200
	15	Annual Mean	16.1	31.1	40
NO_2 / 2018	30	99.8th%ile of 1-hr means	114.0	144.0	200
	15	Annual Mean	13.6	28.6	40
NO_2 / 2019	30	99.8th%ile of 1-hr means	114.4	144.4	200
	15	Annual Mean	14.6	29.6	40
NO_2 / 2020	30	99.8th%ile of 1-hr means	114.3	144.3	200
	15	Annual Mean	14.8	29.8	40

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011)

Table 6 NO_2 Dispersion Model Results – Cumulative Impact Scenario

In conclusion, the results of the cumulative impact scenario are in compliance with the relevant ambient air quality limit values at all locations at or beyond the site boundary. This results in a long-term, slight, negative impact to air quality.

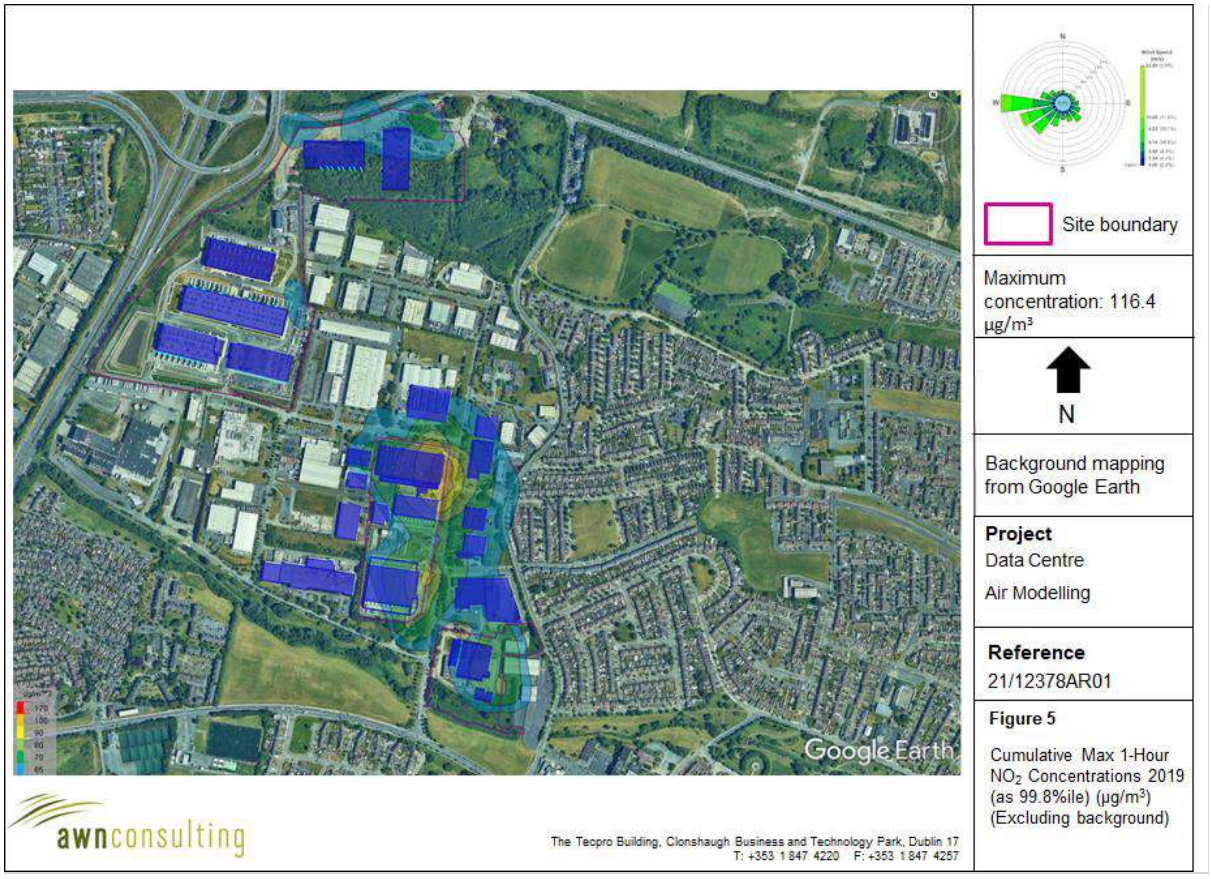
9.2 Cumulative Emergency Operations Scenario (UK EA Methodology)

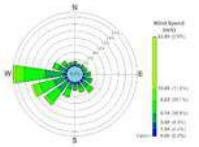
This assessment involved modelling the continuous operation of 12 no. main diesel generators at their maximum emission rate for a full year based on the UK EA methodology and the continuous operation of the existing diesel generators associated with existing data storage facilities located approximately 200m west of the Proposed Development and 700m north-west of the Proposed Development have also been considered (UKEA, 2019). The methodology, based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value assuming a hypergeometric distribution, has been undertaken at the worst-case residential / sensitive receptor. The cumulative hypergeometric distribution of 19 and more hours per year was computed and the probability of an exceedance determined. The results have been compared to the 98th percentile confidence level to indicate if an exceedance is likely at various operational hours for the diesel generators. The results (Table 7) indicate that in the worst-case year, the diesel generators can operate for 122 hours per year before there is a likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level).

Pollutant / Year / Scenario	Hours of operation (Hours) (98th%ile) Allowed Prior To Exceedance Of Limit Value	UK Guidance – Probability Value = 0.02 (98th%ile)[Note 1]
NO_2 / 2016	135	**0.02**
NO_2 / 2017	128	
NO_2 / 2018	156	
NO_2 / 2019	125	
NO_2 / 2020	122	

Note 1 Guidance Outlined In UK EA publication "Emissions from specified generators - Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators" (EA, 2019)

Table 7 Hypergeometric Statistical Results at Worst-case Residential Receptor – Cumulative Emergency Operations Scenario





Site boundary

Maximum annual mean concentration: 16.1 µg/m³

N

Background mapping from Google Earth

Project
Data Centre
Air Modelling

Reference
21/12378AR01

Figure 6

Cumulative Annual Mean NO_2 Concentrations 2017 (µg/m³) (Excluding background)

awnconsulting
The Tecpro Building, Clonshaugh Business and Technology Park, Dublin 17
T: +353 1 847 4220 F: +353 1 847 4257

10.0 MITIGATION MEASURES

10.1 Construction Phase

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' (USEPA, 1997); and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

The CEMP will set out minimisation measures to ensure nuisance dust arising from demolition, site clearance and construction activities is prevented where possible and managed in accordance with best practice and any subsequent planning conditions relevant to the proposed development.

Site Management
The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 1 for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor all subcontractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;

- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;

- Community engagement shall be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;

- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;

- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein; and

- The procedures put in place will be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted on a monthly basis as a minimum.

The dust minimisation measures will be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;

- Access gates to the site will be located at least 10m from sensitive receptors where possible;

- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential

site traffic only.

Land Clearing / Earth Moving
Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and

- During periods of very high winds (gales), activities likely to generate significant dust emissions shall be postponed until the gale has subsided.

Storage Piles
The location and moisture content of storage piles are important factors which determine their potential for dust emissions. The following measures will be implemented to minimise dust formation from storage piles:

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles will be located downwind of sensitive receptors;

- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and

- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads
Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust; and

- At the main site traffic exits, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures
The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;

- The development of a documented system for managing site practices with regard to dust control;

- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and

- The specification of effective measures to deal with any complaints received.

10.2 Operational Phase

The stack heights of the back-up diesel generators for the Proposed Development have been designed in an iterative fashion to ensure that an adequate height has been selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards beyond the site boundary (including background concentrations). No additional mitigation measures are proposed for the operational phase of the Proposed Development.

11.0 ASSESSMENT SUMMARY

The assessment was carried out to determine the ambient air quality impact of the site and any air quality constraints that may be present. It was determined that as the proposed diesel generators will be used solely for emergency operation (i.e. less than 500 hours per year) the emission limit values outlined in the Medium Combustion Plant Directive are not applicable to the diesel generators on site.

A number of modelling scenarios were investigated for the purposes of this assessment. Both normal day-to-day testing operations were considered as well as emergency operations. Emergency operations was based on 200 emergency hours modelled according to the USEPA methodology.

An iterative stack height assessment was undertaken to determine the minimum stack height required for dispersion purposes. It was found that a stack height of 25m for the 10 Data Centre A generators and the house generator with a stack height of 16m for the Data Centre B generator was sufficient for dispersion of pollutants.

Weekly Testing & Emergency Operations

The scenarios modelled for this assessment also include the following types of testing of the back-up generators:

- Test 1: Testing once per week of all 12 no. back-up generators at 25% load for a maximum of 30 minutes each, one generator at a time, sequentially;
- Test 2: All 12 no. back-up generators will be periodically tested on an individual basis at 90% load for a maximum of four hours per year; and
- All testing is assumed to only occur between 8am and 5pm, Monday to Friday.

The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 53% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 68% of the annual limit value at the worst-case off-site receptor.

The UK EA assessment methodology determined that in any year, the diesel generators can operate for a full year with no likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level).

Cumulative Assessment

This scenario involved the testing of the 12 no. main diesel generators associated with the data centre on a weekly basis in addition to 200 emergency hours of operation averaged over the year as per the USEPA methodology in addition to the modelling of the nearby data centre facilities to the west of the facility and the data centre complex approximately 700m north-west of the facility.

The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 73% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 78% of the annual limit value at the worst-case off-site receptor.

The UK EA assessment methodology determined that, in any year, the diesel generators can run for 122 hours before there is a likelihood of an exceedance of the 1-hour ambient air quality standard at the nearest residential receptor (at a 98th percentile confidence level). This is based on the emergency operation of the 10 no. diesel generators.

Conclusion

The modelling study has concluded that provided the stacks are built to a height of 25m for the Data Centre A generators and a stack height of 16m for the Data Centre B generator and the emission envelope assumed for this study is complied with then emissions from the diesel generators will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health.

REFERENCES

Alaska Department of Environmental Conservation (2008) ADEC Guidance re AERMET Geometric Means (http://dec.alaska.gov/air/ap/modeling.htm)

BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites

COM(2021) 555 Final Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement (dated 14/07/2021)

COM(2021) 551 Final Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757

DEHLG (2004) National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

DEHLG (2007) Update and Revision of the National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

EEA (2014) NEC Directive Status Reports 2013

EPA (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

EPA (2020a) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)

Environmental Protection Agency (2020b) Air Quality in Ireland 2019 (& earlier reports)

European Council (2014) European Council (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14

European Parliament & European Council (2018) Regulation On Binding Annual Greenhouse Gas Emission Reductions By Member States From 2021 To 2030 Contributing To Climate Action To Meet Commitments Under The Paris Agreement And Amending Regulation (EU) No 525/2013, 2018/842

Framework Convention on Climate Change (1999) Ireland - Report on the in-depth review of the second national communication of Ireland

Framework Convention on Climate Change (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft

Government of Ireland (2015) Climate Action and Low Carbon Development Act

Government of Ireland (2019) Climate Action Plan 2019

Government of Ireland (2020) Programme for Government – Our Shared Future

Government of Ireland (2021) Climate Action and Low Carbon Development (Amendment) Act 2021

Institute of Air Quality Management (2014) Guidance on the Assessment of Dust from Demolition and Construction

Iqbal (1983) An Introduction To Solar Radiation

Met Éireann (2021) Met Éireann Website: www.met.ie

Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')

Schulman, L.L; Strimaitis, D.G.; Scire, J.S. (2000) Development and evaluation of the PRIME plume rise and building downwash model. Journal of the Air & Waste Management Association, 50, 378-390.

The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings

USEPA (1985) Good Engineering Practice Stack Height (Technical Support Document For The Stack Height Regulations) (Revised)

USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated)

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

USEPA (2008) AERSURFACE User's Guide

USEPA (2011) Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard

USEPA (2017) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1

USEPA (2019a) AERMAP Users Guide

USEPA (2019b) User's Guide to the AERMOD Meteorological Preprocessor (AERMET)

USEPA (2021) AERMOD Description of Model Formulation and Evaluation

UK Environment Agency (2016) Air Quality Modelling and Assessment Unit – Diesel Generator Short Term NO_2 Impact Assessment

UK Environment Agency (2019) Emissions from specified generators - Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators

UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

APPENDIX I

Description of the AERMOD Model

The AERMOD dispersion model has been developed in part by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2021). The model is a steady-state Gaussian model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement on the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources.

Improvements over the ISCST3 model include the treatment of the vertical distribution of concentration within the plume. ISCST3 assumes a Gaussian distribution in both the horizontal and vertical direction under all weather conditions. AERMOD with PRIME, however, treats the vertical distribution as non-Gaussian under convective (unstable) conditions while maintaining a Gaussian distribution in both the horizontal and vertical direction during stable conditions. This treatment reflects the fact that the plume is skewed upwards under convective conditions due to the greater intensity of turbulence above the plume than below. The result is a more accurate portrayal of actual conditions using the AERMOD model. AERMOD also enhances the turbulence of night-time urban boundary layers thus simulating the influence of the urban heat island.

In contrast to ISCST3, AERMOD is widely applicable in all types of terrain. Differentiation of the simple versus complex terrain is unnecessary with AERMOD. In complex terrain, AERMOD employs the dividing-streamline concept in a simplified simulation of the effects of plume-terrain interactions. In the dividing-streamline concept, flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. Extensive validation studies have found that AERMOD (precursor to AERMOD with PRIME) performs better than ISCST3 for many applications and as well or better than CTDMPLUS for several complex terrain data sets.

Due to the proximity to surrounding buildings, the PRIME (Plume Rise Model Enhancements) building downwash algorithm has been incorporated into the model to determine the influence (wake effects) of these buildings on dispersion in each direction considered. The PRIME algorithm takes into account the position of the stack relative to the building in calculating building downwash. In the absence of the building, the plume from the stack will rise due to momentum and/or buoyancy forces. Wind streamlines act on the plume leads to the bending over of the plume as it disperses. However, due to the presence of the building, wind streamlines are disrupted leading to a lowering of the plume centreline.

When there are multiple buildings, the building tier leading to the largest cavity height is used to determine building downwash. The cavity height calculation is an empirical formula based on building height, the length scale (which is a factor of building height & width) and the cavity length (which is based on building width, length and height). As the direction of the wind will lead to the identification of differing dominant tiers, calculations are carried out in intervals of 10 degrees.

In PRIME, the nature of the wind streamline disruption as it passes over the dominant building tier is a function of the exact dimensions of the building and the angle at which the wind approaches the building. Once the streamline encounters the zone of influence of the building, two forces act on the plume. Firstly, the disruption caused by the building leads to increased turbulence and enhances horizontal and vertical dispersion. Secondly, the streamline descends in the lee of the building due to the reduced pressure and drags the plume (or part of) nearer to the ground, leading to higher ground level concentrations. The model calculates the descent of the plume as a function of the building shape and, using a numerical plume rise model, calculates the change in the plume centreline location with distance downwind.

The immediate zone in the lee of the building is termed the cavity or near wake and is characterised by high intensity turbulence and an area of uniform low pressure. Plume mass captured by the cavity region is re-emitted to the far wake as a ground-level volume source. The volume source is located at the base of the lee wall of the building, but is only evaluated near the end of the near wake and beyond. In this region, the disruption caused by the building downwash gradually fades with distance to ambient values downwind of the building.

AERMOD has made substantial improvements in the area of plume growth rates in comparison to ISCST3. ISCST3 approximates turbulence using six Pasquill-Gifford-Turner Stability Classes and bases the resulting dispersion curves upon surface release experiments. This treatment, however, cannot explicitly account for turbulence in the formulation. AERMOD is based on the more realistic modern planetary boundary layer (PBL) theory which allows turbulence to vary with height. This use of turbulence-based plume growth with height leads to a substantial advancement over the ISCST3 treatment.

Improvements have also been made in relation to mixing height. The treatment of mixing height by ISCST3 is based on a single morning upper air sounding each day. AERMOD, however, calculates mixing height on an hourly basis based on the morning upper air sounding and the surface energy balance, accounting for the solar radiation, cloud cover, reflectivity of the ground and the latent heat due to evaporation from the ground cover. This more advanced formulation provides a more realistic sequence of the diurnal mixing height changes.

AERMOD also has the capability of modelling both unstable (convective) conditions and stable (inversion) conditions. The stability of the atmosphere is defined by the sign of the sensible heat flux. Where the sensible heat flux is positive, the atmosphere is unstable whereas when the sensible heat flux is negative the atmosphere is defined as stable. The sensible heat flux is dependent on the net radiation and the available surface moisture (Bowen Ratio). Under stable (inversion) conditions, AERMOD has specific algorithms to account for plume rise under stable conditions, mechanical mixing heights under stable conditions and vertical and lateral dispersion in the stable boundary layer.

AERMOD also contains improved algorithms for dealing with low wind speed (near calm) conditions. As a result, AERMOD can produce model estimates for conditions when the wind speed may be less than 1 m/s, but still greater than the instrument threshold.

APPENDIX II

Meteorological Data - AERMET

AERMOD incorporates a meteorological pre-processor AERMET (version 19191) (USEPA, 2019b). AERMET allows AERMOD to account for changes in the plume behaviour with height. AERMET calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, convective (CBL) and stable boundary layer (SBL) height and surface heat flux. AERMOD uses this information to calculate concentrations in a manner that accounts for changes in dispersion rate with height, allows for a non-Gaussian plume in convective conditions, and accounts for a dispersion rate that is a continuous function of meteorology.

The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. A morning sounding from a representative upper air station, latitude, longitude, time zone, and wind speed threshold are also required.

Two files are produced by AERMET for input to the AERMOD dispersion model. The surface file contains observed and calculated surface variables, one record per hour. The profile file contains the observations made at each level of a meteorological tower, if available, or the one-level observations taken from other representative data, one record level per hour.

From the surface characteristics (i.e. surface roughness, albedo and amount of moisture available (Bowen Ratio)) AERMET calculates several boundary layer parameters that are important in the evolution of the boundary layer, which, in turn, influences the dispersion of pollutants. These parameters include the surface friction velocity, which is a measure of the vertical transport of horizontal momentum; the sensible heat flux, which is the vertical transport of heat to/from the surface; the Monin-Obukhov length which is a stability parameter relating the surface friction velocity to the sensible heat flux; the daytime mixed layer height; the nocturnal surface layer height and the convective velocity scale which combines the daytime mixed layer height and the sensible heat flux. These parameters all depend on the underlying surface.

The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use types was carried out in line with USEPA recommendations (USEPA, 2008) and using the detailed methodology outlined by the Alaska Department of Environmental Conservation (Alaska DOEC, 2008). AERMET has also been updated to allow for an adjustment of the surface friction velocity (u*) for low wind speed stable conditions based on the work of Qian and Venkatram (BLM, 2011). Previously, the model had a tendency to over-predict concentrations produced by near-ground sources in stable conditions.

Surface roughness

Surface roughness length is the height above the ground at which the wind speed goes to zero. Surface roughness length is defined by the individual elements on the landscape such as trees and buildings. In order to determine surface roughness length, the USEPA recommends that a representative length be defined for each sector, based on an upwind area-weighted average of the land use within the sector, by using the eight land use categories outlined by the USEPA. The inverse-distance weighted surface roughness length derived from the land use classification within a radius of 1km from Dublin Airport Meteorological Station is shown in Table A1.

Sector	Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter[Note 1]
0-360	100% Grassland	0.050	0.100	0.010	0.010

Note 1: Winter defined as periods when surfaces covered permanently by snow whereas autumn is defined as periods when freezing conditions are common, deciduous trees are leafless and no snow is present (Iqbal, 1983). Thus for the current location autumn more accurately defines "winter" conditions at the proposed facility.

Table A1 Surface Roughness based on an inverse distance weighted average of the land use within a 1km radius of Dublin Airport Meteorological Station.

Albedo

Noon-time albedo is the fraction of the incoming solar radiation that is reflected from the ground when the sun is directly overhead. Albedo is used in calculating the hourly net heat balance at the surface for calculating hourly values of Monin-Obuklov length. A 10km x 10km square area is drawn around the meteorological station to determine the albedo based on a simple average for the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Meteorological Station is shown in Table A2.

Area-weighted Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.155	0.180	0.187	0.187

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

Table A2 Albedo based on a simple average of the land use within a 10km × 10km grid centred on Dublin Airport Meteorological Station.

Bowen Ratio

The Bowen ratio is a measure of the amount of moisture at the surface of the earth. The presence of moisture affects the heat balance resulting from evaporative cooling which, in turn, affects the Monin-Obukhov length which is used in the formulation of the boundary layer. A 10km x 10km square area is drawn around the meteorological station to determine the Bowen Ratio based on geometric mean of the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Meteorological Station is shown in Table A3.

Geometric Mean Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.549	1.06	1.202	1.202

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

Table A3 Bowen Ratio based on a geometric mean of the land use within a 10km × 10km grid centred on Dublin Airport Meteorological Station.

APPENDIX E

TRAFFIC IMPACT ASSESSMENT

Prepared by

Clifton Scannell Emerson Associates

Clifton Scannell Emerson Associates

Traffic and Transport Assessment

Data Centre Development on a Site at Clonshaugh Business and Technology Park

Client: AWN

Date: 6th October 2021

Job Number: 21_084

CONSULTING ENGINEERS

Civil Engineering | Structural Engineering | Transport Engineering | Environmental Engineering | Project Management | Health and Safety

Clifton Scannell Emerson Associates Limited,
Consulting Engineers, Mentec House, Bakers Point, Dun Laoghaire, Co.

Document Control Sheet

Project Name:	Data Centre Development on a site at Clonshaugh Business and Technology Park
Project Number:	21_084
Report Title:	TTA
Filename:	RPT-21_084-005

Issue No.	Issue Status	Date	Prepared by	Checked by
1st	DRAFT	17/09/2021	HO	GE
2nd	DRAFT	20/09/2021	HO	GE
P01	ISSUE	01/10/2021	HO	GE
P02	ISSUE	05/10/2021	HO	GE

Table of Contents

1 Introduction

This Traffic and Transportation Assessment (TTA) assesses the impact that the Proposed Development (as described in the EIAR Screening Report) will have on the surrounding road network during construction and operation.

Clifton Scannell Emerson Associates (CSEA) were engaged by AWN Consulting Limited to prepare a traffic and transport assessment to support the planning application for the Proposed Development Clonshaugh Business and Technology Park.

Section 2 of Transport Infrastructure Ireland (TII)'s Traffic and Transport Guidelines (May 2014) and Table 2.1 of the Traffic Management Guidelines (DoT/DoEHLG/DTO, 2003) give the thresholds which a Transport Assessment is automatically required (Figure 1.1).

Table 2.1 Traffic Management Guidelines Thresholds For Transport Assessments

Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.
Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive.*
Residential development in excess of 200 dwellings.
Retail and leisure development in excess of 1,000m$^{2.}$
Office, education and hospital development in excess of 2,500m^2.
Industrial development in excess of 5,000m^2.
Distribution and warehousing in excess of 10,000m^2.

* In locations that experience particularly heavy congestion and when traffic flows from a proposed development are less than 5% of the traffic flows on the adjoining road, a Transport Assessment may still be required. When in doubt, the requirement for a Transport Assessment should always be scoped with the relevant local authority.

Figure 1.1 *- Threshold for Transport Assessments*

The Gross Floor Area (GFA) for the Proposed Development is c. 14,330m^2 (site area of 3.754Ha) and thus a transport assessment is required.

This report provides an assessment of the traffic and transport related matters associated with the Proposed Development, and includes detailed assessment of the main junctions leading to the development site.

2 Methodology

This report has been prepared taking the following documents into account:

- Dublin City Development Plan 2016-2022, Dublin City Council;
- TII Traffic and Transport Assessment Guidelines, 2014;
- Design Manual for Urban Roads and Streets (DMURS), 2013, Department of Transport, Tourism and Sport & Department of Environment, Community and Local Government;
- TII Project Appraisal Guidelines – Unit 5.3: Travel Demand Projections, 2019;
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Building C, Clifton Scannell Emerson Associates (sub-consultant input into overall EIS prepared by AWN), May 2018;
- Chapter 13 of the Environmental Impact Assessment to support planning application for Building B, O' Connor Sutton Cronin Consulting Engineers (sub-consultant input into overall EIS prepared by AWN), December 2016;
- Traffic and Transport Assessment to support planning application for Building A, Aecom, October 2015;
- Planning Application Details from www.dublincity.ie website relating to the adjacent site, Butlers Chocolate Development Applications 2044/15; 3007/16; 4019/17; 2517/19; and 2308/20;
- Planning Application Details from www.dublincity.ie website relating to the Pargo Properties One Ltd Development Application 3997/18.
- Planning Application Details from www.dublincity.ie website relating to the Clonmont Developments Ltd Development Application 2229/19.
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for the transmission cable connection from the Belcamp 220kV Substation to the Darndale 110kV Substation, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Aug 2018;
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Building D, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Nov 2018; and
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Buildings E and F, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Nov 2020.
- Planning Application Details from www.dublincity.ie website relating to the Lidl Ireland GmbH Development Application 3732/20

The methodology used to conduct the assessment includes:

1. Establishing baseline conditions – The existing conditions were recorded including existing site location and use, surrounding road network, public transport services, baseline (do-nothing) traffic volumes, and permitted development proposals in the area.
2. Defining the development – This includes size, use, access arrangements, parking, staffing, trip generation and distribution, etc. for the operational stage of the development. Details relating to the peak construction phase are defined.
3. Assessing impact of the development – The impact of the Proposed Development is stated without doing junction analysis for four junctions, namely;
    - Junction of R104 and Woodlawn Avenue;
    - Junction of R104 and Dundaniel Road;

- Junction of R104 and Clonshaugh Business and Technology Park; and
- Junction of R104 and Clonshaugh Road.

for baseline and development conditions for the following years:

- Existing Year (2019-baseline conditions only);
- Opening year (2025- assume Proposed Development full operation);
- Future Year – 5 years after opening (i.e. 2030- assume Proposed Development full operation); and
- Horizon Year – 15 years after opening (i.e. 2040- assume Proposed Development full operation).

4. The impact of the Proposed Development is assessed using the LinSig V3 modelling software for assessing traffic signal junctions.
5. The modelling results will be compiled to determine the operational traffic impact of the development;
6. The worst case construction traffic impact will also be discussed for the peak construction traffic movements; and
7. Mitigation measures will then be included to offset any impacts that may result from the Proposed Development.

3 Receiving Environment

3.1 Existing Site Location and Use

The subject site has a stated area of 3.754 ha (Figure 3.1 and Figure 3.2) and is located within the Clonshaugh Business and Technology Park. The Park accommodates a range of technology and industrial type uses and is bounded by the M50/M1 to the west, the River Santry to the south with Oscar Traynor Road beyond, residential areas to east and the R139 to the north.

The site is located immediately east of the entrance to the Clonshaugh Business and Technology Park from the Oscar Traynor Road to the south. The southern boundary of the site is characterised by the Santry River, with an area of public open space located between Santry River and Oscar Traynor Road. To the north an internal spur road which provides access to the site and further north is the GTT Emea Ltd data centre. Immediately to the east of the site is a retail warehouse unit currently occupied by The Range. The Northside Shopping Centre is located approximately 160m to the south-east of the subject site.

The subject site previously accommodated two conjoined 2-storey light industrial units.

Permission was granted for a data centre development under DCC Reg. Ref. 2229/19 and demolition work was undertaken as part of this permission.

There are two vehicular entrances onto the estate spur road to the north and a pedestrian access from the west. The site has dense boundary screening along part of its western boundary and more deciduous screening to the south.

The former Ricoh building is located immediately adjacent to the north east corner of the subject site and includes an area of car parking to the north with the former Ricoh building to the south. The site is currently vacant.

Figure 3.1 *- Site Location (source: Google Maps)*

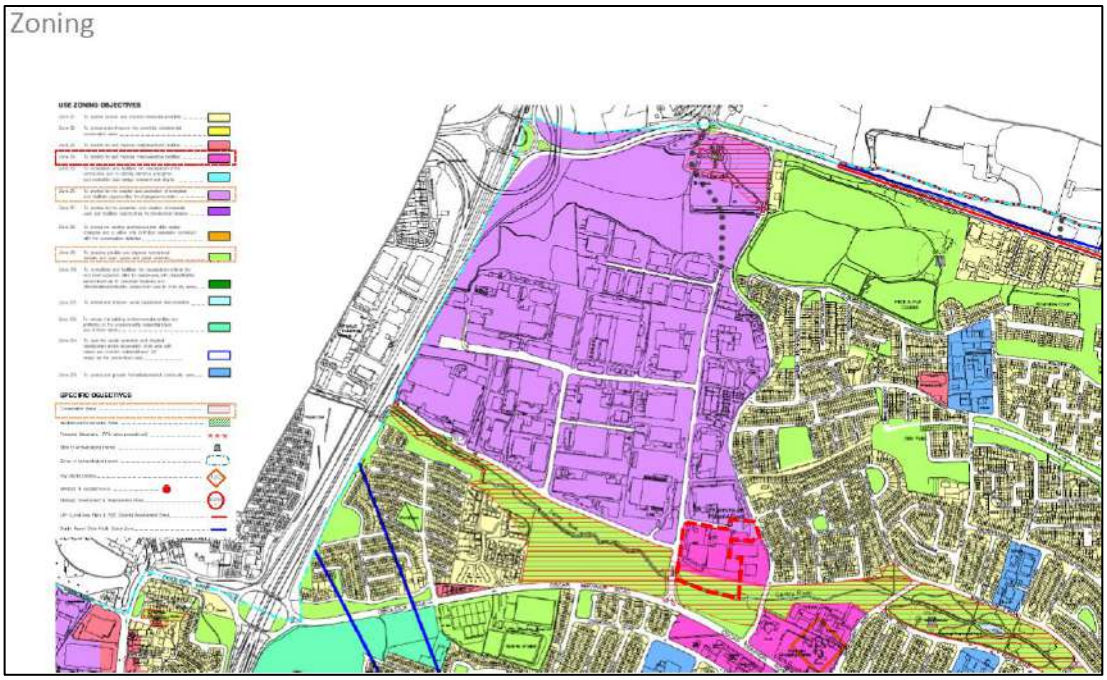


Figure 3.2 - *Zoning Map showing the site of the Proposed Development zoned as Z6. The approximate boundary of the proposed site is illustrated in red. (Source: Dublin City Development Plan 2016 – 2022; Map B).*

3.2 Existing Road Network

The surrounding road network in the vicinity of the site includes the Access Road to the Industrial Estate, the Business Estate Road, the R104, Clonshaugh Road, Dundaniel Road, Woodlawn Avenue, and the M50.

3.2.1 Clonshaugh Business and Technology Park *Estate's Access Road*

The Clonshaugh Business and Technology Park's Access Road is a private road, approximately 1km in length. It forms a T-junction with The R104 at its south end and is a dead-end at its north end. Security barriers are provided approximately 100 metres from its south end.

In the vicinity of the site, the Clonshaugh Business and Technology Park's Access Road provides one lane in each direction (approximately 4m lanes in each direction) and has a posted speed limit of 25km/hr.

The Clonshaugh Business and Technology Park's Access Road forms a T-junction with the Business Estate Road at a point approximately 680 metres north of its south end.

3.2.2 Business and Technology Park Estate Road

The Business Estate Road is a private road, approximately 150 metres in length. It forms an unsignalised T-junction with the Clonshaugh Business and Technology Park's Access Road at its west end. It connects to the main site access to the Proposed Development with two vehicular entrances to the north of the site.

In the vicinity of the site, the Clonshaugh Business and Technology Park's Access Road provides one lane in each direction (approximately 4m lanes in each direction) and has a speed limit of 25km/hr.

3.2.3 R104

The R104 is a Regional Road, located south of Clonshaugh Business and Technology Park. It is approximately 7.3 kilometres in length and has a posted speed limit of 60km/hr. It connects to the R132 in Santry at its west end and to the R105 in Bayside at its east end.

The R104 forms a T-Junction with the Clonshaugh Business and Technology Park Access Road.

In the vicinity of the site, it is called Oscar Traynor Road east of the Industrial Estate's Access Road and Coolock Lane west of the Clonshaugh Business and Technology Park's Access Road.

Along Oscar Traynor Road, the R104 provides one traffic lane in each direction. Along Coolock Lane, the R104 provides one traffic lane and one time-plated combined bus and cycle lane (07.00-10.00;12-19.00, Monday–Saturday) in each direction along its length.

3.2.4 Clonshaugh Road

Clonshaugh Road is approximately 1.7km in length. It forms a signalised T-junction with the R139 at its north end and forms a T-junction with Oscar Traynor Road (R104) at its south end. Approximately 110 metres of cycle lanes are provided on both sides of the road on the approach to Oscar Traynor Road.

Clonshaugh Road provides one traffic lane in each direction (approximately 3.5m lanes in each direction) and has a posted speed limit of 50km/hr.

3.2.5 Dundaniel Road

Dundaniel Road is approximately 520 metres in length. It forms a signalised T-junction with Coolock Lane (R104) at its north end and forms a T-junction with Ballyshannon Road at its south end.

Dundaniel Road provides one traffic lane in each direction (approximately 4.5 metre lanes in each direction) and has a posted speed limit of 50km/hr.

3.2.6 Woodlawn Avenue

Woodlawn Avenue is approximately 550 metres in length. It forms a T-junction with the Woodlawn Park at its north end and facilitates access to Gaelscoil Cholmcille at its south end.

It forms a cross junction with Coolock Lane (R104) at a point approximately 100 metres north of its south end. North of this junction, Woodlawn Avenue provides access to residential development.

Woodlawn Avenue provides one traffic lane in each direction (approximately 3.2m lanes in each direction) and has a posted speed limit of 50km/hr.

3.2.7 M50

The Clonshaugh Business and Technology Park is bounded to the west by the M50 motorway. The M50 is an orbital ring road around Dublin City with interchanges at all radiating National Primary Roads from the M1 to the North and the M11 to the South. In the vicinity of the site, the M50 provides three lanes in each direction, with access to the R104 and M1 via junctions 2 and 3; respectively. It has a posted speed limit of 80km/hr through this area.

3.3 Existing Public Transport Services

The site is currently serviced by Dublin Bus and GoAhead, with services 27B and 17A stopping in the vicinity of the site.

- The 27B bus stops approximately 800metres from the site along the R104. Buses typically operate every 15-20 minutes during peak periods and every 25-30minutes at off-peak periods from Monday-Saturday, with less frequent services provided on Sundays. As part of route variation ‘t’, the service stops at a bus stop located approximately 550 metres from the site along the Business Estate Road twice during the AM peak hour on weekdays. It provides services between Harristown and Eden Quay via Swords Road, Malahide Road, and Fairview, with the first and last weekday services departing at 06:30 and 23:30; respectively.
- The 17A bus stops approximately 800metres from the site along the R104. Buses operate on 10-15 minutes during peak period and every 20 minutes during off-peak times with less frequent services on Sundays and Public Holidays. It provides services between Kilbarrack and Blanchardstown Centre via Oscar Traynor Road, Coolock Lane, Finglas Village, and Snugborough Road, with the first and last weekday services departing at 06:20 and 23:30; respectively.

With respect to future public transport infrastructure, the most relevant project, in terms of proximity to the proposed site, is BusConnects. It is anticipated that the Clongriffin to City Centre route will include a stop in Coolock, located adjacent to the R104/Malahide Road junction 2km away from the site. The Swords to city Centre route will also have a stop located 2km away from the site, on the west side of the M50 adjacent to the R132/R104 junction.

3.4 Existing Traffic Volumes

A 12 hour classified traffic survey was conducted at the junctions shown in Figure 1-1 on Wednesday 8th of May 2019 between 7am and 7pm with the data made available to CSEA.

- Junction of R104 and Woodlawn Avenue;
- Junction of R104 and Dundaniel Road;
- Junction of R104 and Clonshaugh Business and Technology Park; and
- Junction of R104 and Clonshaugh Road.

Surveys were conducted by Nationwide Data Collection (NDC) in accordance with the National Transport Authority (NTA) specifications. AM and PM peak hour traffic volumes were recorded between 7:30 and 8:30 AM and between 4:00 and 5:00 PM and are shown in Appendix 1.

It should be noted that this traffic survey was conducted before any government enforced COVID-19 travel restrictions advising against non-essential travel were implemented and therefore provide a robust representation of existing traffic volumes on the roads in the vicinity of the site. More up to date traffic volumes would not be worthwhile as traffic volumes are heavily influenced by the government enforced COVID-19 restrictions against non-essential work, non-essential travel, organised events, and social gatherings. No adjustments were made to normalise the data as it is not feasible to forecast future traffic demand due to influencing socio-economic factors such as further COVID-19 travel restrictions, unemployment rates, the shift to working from home and shift from local retailing to online shopping/deliveries. While the constraints in the data is recognised, it still represents the best available data. The 2019 traffic counts have been scaled up using TII growth factors to represent predicted traffic flows in the Opening Year (2025), Future Year (2030) and Horizon Year (2040) as described in Section 4.5.

3.5 Proposed Future Development in the Area

There are a number of developments in the area surrounding the site that have recently had planning permission approved. Appendix A of the EIA Screening Report, provide details on relevant planning applications that have been approved in the DCC and FCC Local Government Areas. A review of these planning applications was carried out, with the review revealing that many of these new developments will have virtually no impact on trip generation. Seven permitted developments in the vicinity of the Proposed Development have been identified as developments that will likely have a traffic impact on the surrounding road network. The seven developments which are most relevant from a trip generation perspective are discussed below.

3.5.1 Butlers Chocolates

There are five planning applications on behalf of Butlers Chocolates likely to add (relatively low) trips to the road network in the vicinity of the Proposed Development. These four approved developments are located north of the Proposed Development and comprise the following:

(Ref. 2308/20)

Permission for an extension to the side of existing manufacturing facility to consist of single storey warehouse building (Block E) 627 sq.m gross area & all associated site works.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

(Ref. 2517/19)

Permission for an extension to the rear of existing manufacturing facility to consist of single storey warehouse building (Block D) 480sq.m gross area & all associated site works.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

(Ref. 4019/17)

Permission is being sought for alterations and additions to existing manufacturing facility, comprising the construction of a new 2-storey extension to the front elevation, incorporating a new main entrance foyer/reception area, meeting rooms, and staff facilities, with an area of 217.6sq.m at ground floor level, and a new staff cafeteria area, together with additional offices and meeting rooms with an area of 197sq.m at first floor level.

It should be noted that no details are provided in DCC's planning records on trip generation for this development. The planning report associated with this application provides a brief chapter on 'Roads, Access and Parking' stating that there would be a reduction in parking of 3 spaces and a negligible effect on traffic.

(Ref. 3007/16)

RETENTION: Full permission for an extension to the rear of existing manufacturing facility to consist of single storey warehouse building of 950 sq. metres gross floor area & all associated site works and retention permission for additional car park entrance at front of building.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

(Ref. 2044/15)

Alterations & additions to existing manufacturing facility, including the construction of a new 2-storey extension to the front elevation, comprising a 103.2sq.m extension incorporating a new staff entrance foyer and additional offices at ground floor level, and a 121sq.m extension comprising a new canteen area at first floor level.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

Given the fact that these developments were not yet operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with these developments will be added to future traffic volumes for all years after 2019 to assist in the calculation of baseline (or do-nothing) traffic flows for these future years.

These developments have not been subject to detailed traffic impact assessments and therefore, it is not possible to estimate receiving traffic flows (the flows that will be in effect at the time of construction and operation of the Proposed Development) with full accuracy. The receiving flows have thus been calculated based on best predictions using all available information and in keeping with recognised standards as per the EPA Draft EIA Report Guidelines (2017).

In line with this, trip generation has been estimated for these developments using the Trip Rate Information Computer System (TRICS) database which is a database of trip rates for developments used in the UK for transport planning purposes, specially to quantify the trip generation of a new development (Refer to Appendix 2 for TRICS survey information). The four applications equate to 2069m^2 of additional warehousing development. Using the TRICS database to estimate the tip generation represents a conservative approach in this instance as the approved developments are extensions to existing warehouses and not new standalone developments. Extensions typically have lower trip generation than new standalone developments as they often share trips (maintenance, delivery trips etc.) with the existing development. Therefore the TRICS estimate represents a worst-case scenario for additional trip generation. The TRICS estimate results in the following peak hour trip generation (Table 3.1):

Table 3.1- *Trip generation for Butlers Chocolate Development*

	Trips IN	Trips OUT
AM (07:30-08:30)	4 LV's, 1 HGV	2 LV's, 1 HGV
PM (16:00-17:00)	1 LV, 1HGV	4 LV's, 1HGV

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

As these developments were not yet operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with these developments will be added to future traffic volumes to assist in the calculation of baseline (or do-nothing) traffic flows for the assessment years.

3.5.2 Clonmont Developments Ltd

This planning application, made on behalf of Clonmont Developments Ltd., is the previous approved development located on the subject site. The approved development was not constructed.

(Ref. 2229/19)

Planning permission for development at a site of c.3.1ha comprising Units 15/16, Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17. The development will comprise the following: Demolition of existing former industrial buildings (c.7,400 sq.m total GFA), associated plant and hard-standing. Construction of a 2 storey data centre including data halls, offices/admin, staff areas, storage/loading areas, circulation, UPS rooms, and roof plant (total floor area c.9,250 sq.m). Provision of a generator yard with 3 no. buildings (total floor area c.275 sq.m) housing 5 no. back-up generators. Provision of a substation building (floor area c.34.5sq.m), waste compound building (floor area c.16sq.m), 14 no. car parking spaces, 10 no. bicycle parking spaces, internal roads, docking/service yard, site lighting, new entrance gate, new security fencing to replace existing fencing. All associated site development works, landscape works and services provision. Total floor area of the Proposed Development is c.9,520.5m.

DCC's planning records provide a traffic assessment report. This report summarizes the AM peak hour and PM peak hour trip generation in Section 2.13 (Figure 3.1):

Proposed Development Trips	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
	30	15	16	25

Figure 3.1 - Trip generation for Clonmont Developments Ltd Development

As this development was not yet operational at the time the NDC May 2019 traffic survey was conducted, and that the operational trips associated with this development will not be added to future traffic volumes as the development is not due to be constructed, these operational traffic flows will not be included calculation of baseline (or do-nothing) traffic flows for the assessment years.

3.5.3 Pargo Properties One Ltd

The Pargo Properties One Ltd have been granted planning permission for a development at a site located north of the Proposed Development. This development will add trips to the road network in the vicinity of the Proposed Development.

(Planning Ref. 3997/18)

Planning Application for new part single storey / part 2 storey Block 6 (1,640 sq.m.) containing 5 no. single storey warehouse units at 242 sq.m. with 2 storey ancillary offices at (82 sq.m.) each; and new part single storey/part 2 storey Block 7 (1,972 sq.m.) containing 6 no. single storey warehouse units at 242 sq.m. with 2 storey ancillary offices at (82 sq.m.) each; car parking and associated siteworks all for use as Light Industrial/Workshop/Enterprise Units.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

This development has not been subject to detailed traffic impact assessments and therefore, it is not possible to estimate receiving traffic flows (the flows that will be in effect at the time of construction and operation of the Proposed Development) with full accuracy. The receiving flows have thus been calculated based on best predictions using all available information and in keeping with the standards as per the EPA Draft EIA Report Guidelines (2017).

In line with this, trip generation has been estimated for these developments using the TRICS database (see Section 4.2 for TRICS database definition and Appendix 2 for TRICS survey information) which results in the following peak hour trip generation (Table 3.2):

Table 3.2 - Trip generation for Pargo Properties One Ltd Development

	Trips IN	Trips OUT
AM (07:30-08:30)	7 LV's, 1 HGV	3 LV's, 1 HGV
PM (16:00-17:00)	2 LV's, 2 HGV's	6 LV's, 2 HGV's

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

As this development was not yet operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with this development will be added to future traffic volumes to assist in the calculation of baseline (or do-nothing) traffic flows for the assessment years.

3.5.4 Lidl Ireland GmbH

Lidl Ireland GmbH have been granted planning permission for a development at a site located east of the Proposed Development which is accessed via the Clonshuagh Road. This development will add trips to the road network in the vicinity of the Proposed Development.

(Planning Ref. 3732/20)

Planning permission for the demolition of the existing building located immediately south of "The Range" and the construction of a discount food store (with ancillary off-licence sales area). Provision of surface car park spaces (including electrical vehicle charging spaces), boundary treatments, cycle parking, trolley bay, hard and soft landscaping, lighting and connections to drainage and drainage systems, roof mounted photovoltaic panels, advertising signage and all other ancillary and associated works including ESB substation building. Access to the proposed development is via the two established access points on to the Clonshaugh Road, operated by "The Range". All ancillary works to facilitate the development.

It should be noted that DCC's planning records do not provide any information on trip generation associated with this development.

This development has not been subject to detailed traffic impact assessments and therefore, it is not possible to estimate receiving traffic flows (the flows that will be in effect at the time of construction and operation of the Proposed Development) with full accuracy. The receiving flows have thus been calculated based on best predictions using all available information and in keeping with the standards as per the EPA Draft EIA Report Guidelines (2017).

In line with this, trip generation has been estimated for these developments using the TRICS database (see Section 4.2 for TRICS database definition and Appendix 2 for TRICS survey information) which results in the following peak hour trip generation (Table 3.3):

Table 3.3 - Trip generation for Lidl Ireland GmbH Development

	Trips IN	Trips OUT
AM (07:30-08:30)	43 LV's, 1 HGV	32 LV's, 1 HGV
PM (16:00-17:00)	96 LV's, 0 HGV's	104 LV's, 0 HGV's

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

As this development was not yet operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with this development will be added to future traffic volumes to assist in the calculation of baseline (or do-nothing) traffic flows for the assessment years.

3.5.5 Adjacent Developments

In addition to the above, there are a number of planning applications relating to developments located at the north of the Clonshaugh Business and Technology Park. The impact of these developments on traffic generation is discussed in this section.

In order to understand the cumulative impact the Proposed Development will have on the surrounding road network, existing and future trip generation associated with adjacent developments must be understood and accounted for. A summary of the relevant developments and the associated trip generation is provided in the following sections.

3.5.5.1 Building A Planning Application (Ref. 3874/15)

This development was already constructed at the time the NDC May 2019 traffic count was conducted. Thus, operational traffic from the development would have been captured in this data.

3.5.5.2 Building B Planning Application (Ref. 4449/16)

This development was already constructed at the time the NDC May 2019 traffic count was conducted. Thus, operational traffic from the development would have been captured in this data.

3.5.5.3 Building C Planning Application (Ref. 3096/18)

An EIAR was prepared in May 2018 by AWN (Traffic and Transportation Chapter provided by Clifton Scannell Emerson Associates) to accompany the Planning application for the development. The provision of 40 no. car parking spaces was included as part of this application. Construction commenced in Q4 2018 and was forecast to be fully operational by Q4 2020.

The operational traffic recorded in Chapter 13 of the EIA Report supporting the planning application for Planning Ref. 3096/18 estimated trip generation based on staff numbers per Figure 3.2.

	AM		PM	
	IN	OUT	IN	OUT
Security Staff	4	4	4	4
General Shift	0	0	0	0
Visiting Staff	15	5	0	0
HGV Deliveries	1	1	0	0
Total	**19 LVs*, 1 HGV****	**9 LVs, 1 HGV**	**4 LVs, 0 HGV**	**4 LVs, 0HGV**

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 3.2 - Peak hour trip generation for Planning Ref. 3096/18

Given the fact that this development was not operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with the development will be added to future traffic volumes for all years from 2020 onwards to assist in the calculation of baseline (or do-nothing) traffic flows for these future years.

3.5.5.4 110 kV Substation (Ref. 3288/16)

Construction of this substation commenced in Q2 2018 and is now operational. The 110kV Substation was permitted by DCC as under Ref.: 3288/16, which was an amendment to the planning permission for Planning Ref. 3874/15.

In accordance with the letter provided by Kavanagh Tuite Architects to DCC Planning Department on 7th July 2015 regarding 'Former Diamond Innovations Site (Unit 1C), Clonshaugh Business & Technology Park, Dublin', the Transportation Assessment Report that accompanied the original planning application for Planning Ref. 3874/15 (Aecom, October 2015) remained current for the planning application for the 110kV Substation. This confirms that there will be no additional trip generation for the Substation development above that associated with the original planning application Ref. 3874/15.

In accordance with CSEA's knowledge of trip movements associated with operational Substations on similar sites, a trip generation in the order of one trip in and out of the site per month will be generated during the operational phase of the above-mentioned development. Therefore, peak hour trips are considered negligible and, no adjustments will be made to future traffic volumes with respect to this Substation development.

3.5.5.5 Building D Planning Application (Ref. 4185/18)

An EIAR was prepared in Nov 2018 by AWN (Traffic and Transportation Chapter provided by Clifton Scannell Emerson Associates) to accompany the Planning application. The provision of 40 no. car parking spaces was included as part of this application. Construction of the development commenced in Q3 2020. It is anticipated that building will be fully operational by Q4 2021.

The operational traffic recorded in Chapter 13 of the EIAR supporting the planning application for the development estimated trip generation based on staff numbers as per Figure 3.3:

	AM		PM	
	IN	OUT	IN	OUT
Security Staff	4	4	4	4
General Shift	0	0	0	0
Visiting Staff	15	5	0	0
HGV Deliveries	1	1	0	0
Total	**19 LVs*, 1 HGV****	**9 LVs, 1 HGV**	**4 LVs, 0 HGV**	**4 LVs, 0HGV**

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 3.3 - Peak hour trip generation for Planning Ref. 4185/18

The construction traffic recorded in Chapter 13 of the EIAR supporting the planning application for the development estimated trip generation based on trips generated to the site at peak construction as 240 cars, 110 HGV's and 30 LV's with trips to/from the site at peak hours as shown in Figure 3.4.

	AM		PM	
	IN	OUT	IN	OUT
Cars	48	10	10	48
HGV's	11	6	6	11
LV's	3	2	2	3
Total	**51 LVs*, 11 HGVs****	**12 LVs, 6 HGVs**	**12 LVs, 6 HGVs**	**51 LVs*, 11 HGVs****

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 3.4 - Peak Construction trip generation for Planning Ref. 4185/18

Given the fact that this development was not constructed or operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with the development will be added to future traffic volumes for all years from 2022 onwards to assist in the calculation of baseline (or do-nothing) traffic flows for these future years. The construction trips associated with the development will be added to future traffic volumes for 2021 to assist in the calculation of baseline (or do-nothing) traffic flows for this year.

3.5.5.6 Underground Cable Installation Planning Application (Ref. 4367/19)

An EIAR was prepared in Nov 2019 by AWN to accompany the Planning application (Traffic and Transportation Chapter provided by Clifton Scannell Emerson Associates) for permission for a 49kVa

low voltage underground cable and installation and MV unit substation on the Proposed Development site. The development is fully operational with the construction period having taken place in Q1 2020.

The EIAR states a worst case scenario of trip generation to the development to be "one return light vehicle trip once every three years by ESB staff for maintenance purposes, apart from the initial inspection which will be carried out after one year, generating a return light vehicle trip to and from the site".

Therefore, peak hour trips are considered negligible and, no adjustments will be made to future traffic volumes with respect to this development.

3.5.5.7 Building E and Building F Planning Application (Ref. 3096/18)

An EIAR was prepared in Nov 2018 by AWN (Traffic and Transportation Chapter provided by Clifton Scannell Emerson Associates) to accompany the Planning. The provision of 100 no. car parking spaces was included as part of this application. Construction of the development commenced in 2021. It is anticipated that the development will be fully operational by Q1 2024.

The operational traffic recorded in Chapter 13 of the EIAR supporting the planning application the development estimated trip generation based on staff numbers as per Figure 3.5.

	AM		PM	
	IN	OUT	IN	OUT
Security Staff	8	8	8	8
General Shift	0	0	0	0
Visiting Staff	30	9	0	0
HGV Deliveries	1	1	0	0
Total	**38 LVs*, 1 HGV****	**17 LVs, 1 HGV**	**8 LVs, 0 HGV**	**8 LVs, 0HGV**

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 3.5 - Peak hour trip generation for Planning Ref. 3096/18

The construction traffic recorded in Chapter 13 of the EIAR supporting the planning application for Planning Ref. 4185/18 estimated trip generation based on trips generated to the site at peak construction as 240 cars, 110 HGV's and 30 LV's with trips to/from the site at peak hours as shown in Figure 3.6:

	AM		PM	
	IN	OUT	IN	OUT
Cars	48	10	10	48
HGV's	11	6	6	11
LV's	3	2	2	3
Total	**51 LVs*, 11 HGVs****	**12 LVs, 6 HGVs**	**12 LVs, 6 HGVs**	**51 LVs*, 11 HGVs****

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 3.6 - Peak Construction trip generation for Planning Ref. 3096/18

Given the fact that this development was not constructed or operational at the time the NDC May 2019 traffic survey was conducted, the operational trips associated with the development will be added to future traffic volumes for all years from 2025 onwards to assist in the calculation of baseline (or do-nothing) traffic flows for these future years.

4 Characteristics of the Proposed Development

4.1 General Description and Use

The proposed development (Figure 4.1) comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works (other buildings previously occupying the site were cleared under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, screened plant, and solar panels at roof level;
- Data Centre B will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, and screened plant at roof level;
- Emergency generators and associated flues will be provided within fenced compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;
- Ancillary structures including a sprinkler tank, security building, and provision of two additional MV substation rooms to the existing substation on site (c. 72 sq.m additional GFA), which was previously constructed in accordance with Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking and bicycle parking spaces;
- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated works including underground foul and storm water drainage network, attenuation area, and utility cables.

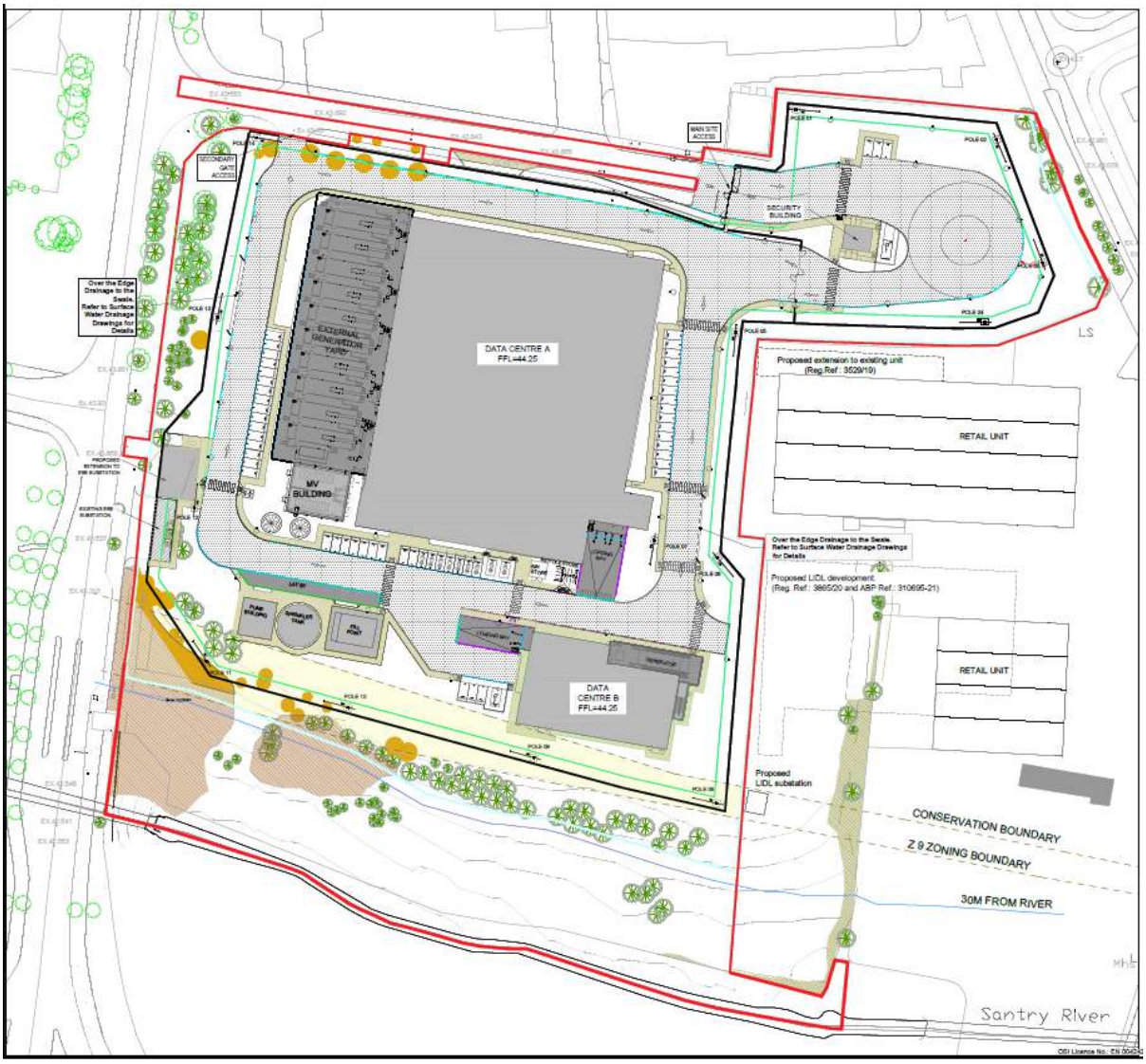


Figure 4.1 *- Site Layout*

The main access to the site is located to the north-east, via the former Ricoh building entrance, and will provide the daily access to the Proposed Development for vehicular traffic, cyclists and pedestrians via a security controlled point.

The secondary gate access located to the north-west of the site is an existing entrance which will be retained to provide redundance for the main site security entrance in the unlikely event that access via the main entrance is temporarily obstructed.

For the purposes of a conservative assessment of traffic impact, and as detailed in Table 4.1, up to 58 personnel including general shift staff, security and visitors will be on site at the data centre facility at any given time (i.e. a maximum of 35 full time day staff). It is assumed for this assessment that up to 35 no. full time data centre facility staff will be on site on a daily basis during standard operation. Typical weekday staff and shift times including security staff and external visitors for the Proposed Development are shown in Table 4.1.

Table 4.1 *Staff shifts and estimated maximum number of staff for Proposed Development*

	Day		Night	
	Shift/ Times	Max typical Staff	Shift/ Times	Max typical Staff
Security Staff	08:00-17:00	3-4	17:00-08:00	3-4
General Shift- Data Centre Facility	07:00-19:00	5-31	19:00-07:00	2-4
Visiting & Maintenance Staff	Typically arrive/depart between 08:00&15:00	2-15	n/a	n/a
Total	Day shift	10-50	Night shift	5-8
Total Staff over 24 hour period			15-58	

It should be noted that while a maximum of 15 visiting and maintenance staff may attend the Proposed Development on a given day, this would be a seldom occurrence. The number of visiting / maintenance staff will typically be in the order of 5 staff per day. There will also typically be one daily HGV delivery to the site.

4.2 Trip Generation

Based on projected staff and visitor numbers (as outlined in Section 4.1), the use of the TRICS database (a database of trip rates for developments used in the UK for transport planning purposes, specially to quantify the trip generation of a new development) would overestimate the trip generation for the Proposed Development. Therefore, the trip generation for the development has been derived from first principals, based on staff numbers using the methodology outlined below.

As mentioned above, for the purpose of modelling it is assumed that a maximum of 58 personnel (full time daily staff with additional external staff, maintenance staff and visitors) will occupy the Proposed Development at any given time during the operational stage of the development.

Up to 4 security staff will be on the site at any given time. Weekday shifts for security staff will be 8am-5pm and 5pm-8am. Taking a conservative approach, it is assumed that 4 security day staff will enter and 4 security night staff will exit during the AM peak hour (i.e.08:30-09:30) and 4 security night staff will enter and 4 security day staff will exit during the PM peak hour (i.e. 17:00-18:00).

Up to 35 day staff and 4 night staff will operate the data centre facility per day, with shift hours 7am-7pm for day staff and 7pm-7am for night staff. Given that peak hours were recorded between 08:30 and 09:30 and between 17:00 and 18:00, it is assumed no staff operating the data centre facility building will enter or exit the site during the AM or PM peak hour.

In addition to security, shift and general office staff, the remaining staff (up to 15 staff) comprise visiting and maintenance staff who attend the site infrequently (e.g. staff conducting routine inspections, maintenance checks, attending meetings, etc.). These staff will most likely arrive and depart from the site within an hour or two, early in the day. Taking a conservative approach, it is assumed that 100%

of the maximum number of visiting staff will arrive during the AM peak (i.e. 15 staff), and 30% will depart during the AM peak (i.e. 5 staff).

A maximum of 1 HGV will deliver to the site per day. Taking a conservative approach, it is assumed 1 HGV will enter and exit the site during the AM peak hour. Apart from this HGV delivery, it is assumed all staff trips will be made by car (light vehicle-LV).

Table 4.2 shows the AM and PM peak hour trip generation for the site.

Table 4.2 - *Peak hour trip generation for the Proposed Development*

	AM (08:30-09:30)		PM (17:00-18:00)	
	IN	OUT	IN	OUT
Security Staff	4	4	4	4
General Shift	0	0	0	0
Visiting & Maintenance Staff	15	5	0	0
HGV Deliveries	1	1	0	0
Total	**19 LVs, 1 HGV**	**9 LVs, 1 HGV**	**4 LVs, 0 HGV**	**4 LVs, 0 HGV**

4.3 Modal Choice

Trips to similar developments in the area are currently highly car-based and have very low public transport or slow-mode modal splits. Some trips to the site may be via public transport. However, for the purposes of this assessment, a worst-case scenario has been assumed for traffic generation by assuming all trips to the site are by private car or HGV.

4.4 Trip Distribution

It has been assumed that all trips to the site will be new trips (i.e. trips that would not appear on the road network without the Proposed Development). This represents the worst-case scenario for trip generation.

4.5 Trip Assignment

It is assumed that all operational trips will travel to and from the site via one of the site accesses (Figure 4.1) on the estate spur road.

It is expected that the origins and destinations of traffic to/from the Proposed Development will continue to match the distribution of traffic currently accessing Clonshaugh Business and Technology Park.

As the Proposed Development is envisaged to be fully operational in 2025, an assessment year of 2025 will be used to assess the operational traffic impact of the Proposed Development. It hence follows that the traffic associated with the full operation of the Proposed Development would appear on the network in 2025.

Therefore, taking a conservative approach, the operational traffic flows associated with the surrounding permitted developments (Section 3.5) have been accounted for in the calculation base flows from 2025 onwards.

The following assessment years have been analysed:

- Existing – 2019
- Opening year (full operation) – 2025
- Future year – 2030
- Horizon Year – 2040

In order to establish baseline conditions for future years, future traffic flows were derived by applying TII growth factors (published in the TII Project Appraisal Guidelines – Unit 5.3 Travel Demand Projections, October 2016) to existing 2019 network traffic. In accordance with these guidelines, Table 4.3 displays the central (medium) growth factors used to estimate future traffic flows from 2019 volumes:

Table 4.3 - Central Growth Factors for Dublin (including DCC area)

Years	Growth Factor for LVs	Growth Factor for HVs
Annual factor (2013-2030)	1.0134	1.0237
Annual factor (2030-2050)	1.0038	1.0176
2019 to 2025	1.0831	1.1501
2019 to 2030	1.1577	1.2934
2019 to 2040	1.2024	1.5405

Once these growth factors were applied to the 2019 traffic volumes, the additonal future traffic associated with surrounding approved developments not accounted for in the 2019 count was accounted for to establish baseline (do-nothing) traffic flows as follows:

1. Adjustments to flows to account for the operational traffic associated with planning application (Ref. 3096/18) have been taken into account.
2. Adjustments to flows to account for the operational traffic associated with planning application (Ref. 4185/18) have been taken into account.
3. Adjustments to flows to account for the operational traffic associated with planning application (Ref. 3096/18) have been taken into account.
4. Adjustments to flows to account for the operational traffic associated with the planning applications (Ref. 2308/20, 2517/19, 4019/17, 3007/16 and 2044/15) warehousing planning applications have been taken into account.
5. Adjustments to flows to account for the operational traffic associated with the planning application (Ref. 3997/18) planning application have been taken into account.
6. Adjustments to flows to account for the operational traffic associated with the planning application (Ref. 3732/20) have been taken into account.

Following the establishment of 2025 Baseline (do-nothing) traffic flows, 2025 baseline flows were compared to 2025 baseline plus operational traffic from the Proposed Development to assess the worst case operational impact of the development.

Similarly, once 2030 and 2040 Baseline (do-nothing) traffic flows were established, 2030/ 2040 baseline flows were compared to 2030/ 2040 baseline flows plus operational traffic from the Proposed Development to assess the worst case operational impact of the Proposed Development in Future and Horizon years.

4.6 Parking Provision

4.6.1 Car Parking Provision

The Proposed Development has a GFA of c. 14,330m^2 (c. 12,875m^2 for Data Centre A and c. 1,455m^2 for Data Centre B).

Table 16.1 of the Dublin City Development Plan (2016-2022) sets out maximum car parking standards for various land uses. Given that there are no car parking rates set out for data centre facilities; '*Enterprise and Employment/Offices/General Industry (inc warehousing)'* is the closest fit to the land use of the Proposed Development.

The standard recommends a maximum provision of one space per 100m² gross floor area for '*Enterprise and Employment/Offices/General Industry (incl. warehousing)'* in a Zone 3 Area (Note: '*Map J'*, as referenced in the development plan, sets out Zones for Strategic Transport and Parking Areas. The site of the current development is located in Parking Zone).

Based on a GFA of c. 14,330m^2, these guidelines would suggest a maximum car parking provision of 143 spaces for the Proposed Development.

Given the fact that the maximum total number of data centre facility staff, security and visitors on site at a given time is 58 (since the arrival and departure hours for security, data centre facility and visiting staff differ it is unlikely staff would ever exceed the maximum daily daytime staff, security and visitor figure of 58 staff), it would be excessive to provide 143 car parking spaces for the Proposed Development.

Therefore, it is recommended to provide parking in accordance with first principles in this case, based on staff requirements. As mentioned previously, in order to present the worst-case scenario for the purpose of the traffic impact assessment, a total of 30 visiting/ maintenance staff was stated. However, the number of visiting/maintenance staff on the site at any one time is likely to be lower than this number.

Therefore, a provision of **58 spaces** is recommended for the Proposed Development including **4 disabled bays** in accordance with the Technical Guidance Document M of the Building Regulations, 2010, which states in section 1.1.5 that *'for buildings (including apartment buildings), at least 5% of the total number of spaces should be designated [disabled] car parking spaces, with a minimum provision of at least one such space'*. This is in accordance with the Dublin City Development Plan (2016-2022).

These 58 spaces allows parking for internal daytime staff (including at shift changeover times when parking occupancy is at its highest) and also includes an additional spaces for external staff attending the site on a once-off basis for meetings and/or maintenance purposes.

Disabled parking bays will be located in close proximity to the entrances. All standard parking bays within the Proposed Development will have dimensions of 2.5m x 5.0m. Disabled parking bays have minimum dimensions of 4.5m x 5.0m.

It is proposed to provide Electrical Vehicle (EV) charging spaces in a staged manner as follows:

- 5no. EV charging spaces provided initially with capacity within the electrical system to add an additional 5 no. spaces;
- An additional 5 no. EV charging spaces added subject to demand; and
- Provision for ducting to the remaining 48 no. car parking spaces. This provision will allow for future expansion of the EV charging provisions to 100% of the car parking spaces.

2 no. disabled bays with EV charging facilities are included within the initial parking provision, as shown in Figure 4.1.

2 loading bays (1 for Data Centre A and 1 for Data Centre B) will provided to facilitate deliveries to the site.

Section 16.38.6 of the Dublin City Development Plan (2016-2022) states;

New developments shall include provision for motorcycle parking in designated, signposted areas at a rate of 4% of the number of car parking spaces provided. Motorcycle parking areas should have limited gradients to enable easy manoeuvrability and parking. Fixed and robust features such as rails, hoops or posts should be provided to secure a motorcycle using a chain or similar device.

2 no. motorcycle parking spaces (i.e. 4% of total car parking spaces) will be provided in a designated, signposted area. Motorcycle parking will be provided in an area with a limited gradient to enable easy manoeuvrability and parking. The design of these motorcycle spaces will be such that fixed and robust features such as rails, hoops or posts will be provided.

The location of the proposed car parking spaces (indicated EV's bays and disabled bays), motorcycle spaces and loading bays are shown in Figure 4.1.

4.6.2 Cycle Parking Provision

Table 16.2 of the Dublin City Development Plan (2016-2022) sets out cycle parking standards for various land uses. Given that there are no cycle parking rates set out for data centre facilities; '*Enterprise and Employment'* is the closest fit to the land use of the Proposed Development.

The standard recommends a provision of one space per 150m² gross floor area for Enterprise and Employment in a Zone 3 Area (Note: '*Map J*', as referred to in the development plan, sets out Zones for Strategic Transport and Parking Areas. The site of the current development is located in Zone 3).

However, based on a total gross floor area of c. 14,330m² for the Proposed Development, these guidelines would suggest a cycle parking provision of 96 spaces for the Proposed Development.

Given the fact that the maximum number of data centre facility staff, security and visitors on site at a given time is 58 (since the arrival and departure hours for security, data centre facility and visiting staff differ it is unlikely staff would ever exceed the maximum daily full time staff figure of 35 staff, as set out in Table 4.1 above), it would be excessive to provide 96 cycle parking spaces for the Proposed Development.

Thus, cycle parking will be estimated from first principles, using the same methodology for cycle parking provision as for car parking (i.e. based on maximum staff numbers).

Given that 58 car parking spaces are recommended for staff at the Proposed Development and in order to have the same parking provision per building, a **cycle parking provision of 24 spaces is recommended for** the development.

These cycle parking spaces will be well-lit Sheffield-type sheltered cycle parking spaces located within close proximity to the door and within the 24/7 security of the Proposed Development site. Cycle parking shall be secure, conveniently located, sheltered and well lit. Shower and changing facilities shall also be provided as part of the development. Key/fob access shall be required to bicycle compounds. Cycle parking design shall allow both wheel and frame to be locked. Cycle parking shall be in situ prior to the occupation of the development. The location of the proposed cycle parking spaces is shown in Figure 4.1.

4.6.3 Pedestrian Facilities

The Proposed Development includes internal pedestrian footpaths providing safe passage for pedestrians between internal buildings on the Proposed Development site which will connect to the pedestrian footpaths in the existing data centre facility campus. External public footpaths are provided on both sides of the road running along the western and northern boundaries of the site (i.e. along Business Estate Road). The internal footpaths connect to these external footpaths, through the main site access to the north-east of the site, as indicated in Figure 4.1 above.

4.6.4 Cycle Facilities

Cycle lane provision is limited in the area surrounding the site. No cycle lanes are provided along the Clonshaugh Business and Technology Park's Access Road or along Business Estate Road.

No Cycle lanes are provided along the R104 east of its junction with the Clonshaugh Business and Technology Park's Access Road. However, west of this junction, the R104 provides one traffic lane and one time-plated combined bus and cycle lane (07.00-10.00 and 12:00-19.00; Monday – Saturday) in each direction along Coolock Lane.

Cycle lanes are also provided along a short section of Clonshaugh Road, providing approximately 110 metres of cycle lanes on both sides of the road on the approach to the R104.

Cycle Parking is provided in accordance with first principles, based on staff levels. Cycle parking for the Proposed Development is stated in Section 4.6.2 - Cycle Parking Provision.

In addition to cycle parking, 2 showers and 24 lockers will be provided with the Proposed Development. Note that the number of lockers recommended matches the number of cycle parking spaces recommended.

5 Potential Impacts of the Proposed Development

5.1 Construction Phase

Construction of the Proposed Development would take place over a period of approximately 30-40 months from the commencement of construction for site development works. In general, the impact of the construction period would be short term in nature.

- Construction traffic would consist of the following:
- Private vehicles belonging to site construction staff;
- Private vehicles belonging to site security staff;
- Occasional Private vehicles belonging to professional staff (i.e. design team, utility companies); and
- Excavation plant and dumper trucks used for site development works.

Construction traffic has been estimated using data obtained from a similar data centre facility development, that used a similar construction methodology to the current development. The following construction data has been used to estimate peak daily construction traffic:

- Average construction staff for one data centre facility: 275;
- Peak construction staff for one data centre facility: 400;
- Average cars/ day for one data centre facility: 165;
- Peak cars/day for one data centre facility: (400/275)*165= 240
- Peak HGVs/day for one data centre facility: 110; and
- Peak LGVs/ day for one data centre facility: 30.

Peak hour flows corresponding to peak construction periods were then calculated assuming the following:

1. Of the 240 Cars (LVs) entering and exiting the site during peak construction, it is assumed:
    - 20% enter the site in the AM peak hour;
    - 4% exit the site in the AM peak hour;
    - 4% enter the site in the PM peak hour; and
    - 20% exit the site in the PM peak hour.
2. Of the 110 HGVs entering and exiting the site during peak construction, it is assumed:
    - 10% enter the site in the AM peak hour;
    - 5% exit the site in the AM peak hour;
    - 5% enter the site in the PM peak hour; and

- 10% exit the site in the PM peak hour.

3. Of the 30 LGVs entering and exiting the site during peak construction, it is assumed:

   - 10% enter the site in the AM peak hour;
   - 5% exit the site in the AM peak hour;
   - 5% enter the site in the PM peak hour; and
   - 10% exit the site in the PM peak hour.

Table 5.1 shows the peak construction traffic generation:

Table 5.1 Peak hour flows corresponding to peak construction periods.

Peak Construction Traffic		AM		PM	
		Entering	Exiting	Entering	Exiting
Cars	240	48	10	10	48
HGVs	110	11	6	6	11
LGVs	30	3	2	2	3
TOTAL		**51 LVs*, 11 HGVs****	**12 LVs, 6 HGVs**	**12 LVs, 6 HGVs**	**51 LVs*, 11 HGVs****

- *LV - Light Vehicles
  **HGV – Heavy Goods Vehicle

The Proposed Development will be built on a phased basis to meet customer demand. Our assessment has been done in accordance with the following estimated timeline:

- Construction Start – Q1 2022
- Commence Operation of DC1 first 2 data halls & DC 2 – Q1/Q2 2023
- Fully operational Q1 2025

It is assumed, based on the above, that peak construction for the Proposed Development will occur in Q3 2022. This is considered the worst case construction impact.

Given the temporary nature of the peak construction phase, the overall impact of the construction phase is considered ***short-term, negative*** and ***not significant***.

5.2 Operational Phase

Major junctions on the road network in the vicinity of the site were assessed for Opening, Future and Horizon years, namely:

- Junction of R104 and Woodlawn Avenue;
- Junction of R104 and Dundaniel Road;
- Junction of R104 and Clonshaugh Industrial Park Access Road; and
- Junction of R104 and Clonshaugh Road;

The junctions were analysed for 20235 (Opening year), 2030 (Future year) and 2040 (Horizon year) with and without the proposed development in place.

The junction capacity analysis was carried out using the LinsSig V.3 computer-modelling program. LinSig models degree of saturation, queues and delays at signalised/unsignalised T-junctions and crossroads.

Traffic flow diagrams for the existing, opening, future and horizon scenarios are shown in Appendix 1. The results of the capacity analysis of the junctions are shown in Section 5.2.1.

5.2.1 Junction Analysis

5.2.1.1 Junction of R104 and Woodlawn Avenue

The results of the capacity analysis of the junction of the R104 and Woodlawn Avenue during the operational phase of development are shown in Table 5.2.

Table 5.2 - *Junction Capacity Results for Baseline (Do-nothing) and Proposed Development Case scenarios for the junction of the R104 and Woodlawn Avenue*

Junction	Year	Peak Hour	Max DoS		% Difference	Max. Queue (pcu)		% Difference	Total Traffic Delay (s/pcu)		% Difference
			Base	+ Dev		Base	+ Dev		Base	+ Dev	
R104 & Woodlawn Avenue	2019	AM	97.6	n/a	n/a	33.9	n/a	n/a	49.9	n/a	n/a
		PM	106.2	n/a	n/a	73.3	n/a	n/a	68.6	n/a	n/a
	2025	AM	112.6	113.3	**0.6**	119.3	131.6	**10.3**	211.9	229.0	**8.1**
		PM	118.1	119.1	**0.8**	143.3	149.8	**4.5**	165.2	172.8	**4.6**
	2030	AM	120.2	121.0	**0.7**	178.1	182.6	**2.5**	330.2	339.6	**2.8**
		PM	126.4	127.3	**0.7**	195.3	201.1	**3.0**	262.3	269.2	**2.6**
	2040	AM	126.7	127.3	**0.5**	218.6	223.9	**2.4**	419.1	128.5	**-69.3**
		PM	132.4	133.4	**0.8**	232.8	239.5	**2.9**	337.3	345.1	**2.3**

5.2.1.1.1 2025 Opening Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 eastbound. At the AM peak for the Proposed Development scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 eastbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

5.2.1.1.2 2030 Future Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and eastbound and the longest mean maximum queue is along the R104 eastbound. At the AM peak for the Proposed Development scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 eastbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario

5.2.1.1.3 2040 Horizon Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. At the AM peak for the Proposed Development scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 eastbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

5.2.1.2 Junction of R104 and Dundaniel Road

The results of the capacity analysis of the junction of the R104 and Dundaniel Road during the operational phase of development are shown in Table 5.3.

Table 5.3 - *Junction Capacity Results for Baseline (Do-nothing) and Proposed Development Case scenarios for the junction of the R104 and Dundaniel Road*

Junction	Year	Peak Hour	Max DoS		% Difference	Max. Queue (pcu)		% Difference	Total Traffic Delay (s/pcu)		% Difference
			Base	+ Dev		Base	+ Dev		Base	+ Dev	
R104 & Dundaniel Road	2019	AM	104.9	n/a	n/a	36.1	n/a	n/a	63.8	n/a	n/a
		PM	101.8	n/a	n/a	34.2	n/a	n/a	51.3	n/a	n/a
	2025	AM	117.7	117.4	**-0.3**	108.9	107.8	**-1.0**	175.0	176.1	**0.6**
		PM	114.9	116.2	**1.1**	104.8	110.9	**5.8**	154.3	160.8	**4.2**
	2030	AM	126.2	126.2	**0.0**	138.9	143.4	**3.2**	240.3	245.5	**2.2**
		PM	123.0	124.0	**0.8**	148.1	147.5	**-0.4**	227.9	226.9	**-0.4**
	2040	AM	133.0	133.0	**0.0**	168.1	173.1	**3.0**	299.9	306.3	**2.1**
		PM	129.0	129.4	**0.3**	166.6	173.3	**4.0**	270.9	277.7	**2.5**

5.2.1.2.1 2025 Opening Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the Dundaniel Road and the R104 westbound and the longest mean maximum queue is along the R104 westbound. This shift in degree of saturation alters the stage sequence timings leading to the mean maximum queue to be shorted in the Proposed Development scenario than the base scenario. However as there is more traffic on the network in the Proposed Development scenario than the base scenario, the total traffic delay is higher.

At the PM peak for the base scenario, the highest degree of saturation occurs along Dundaniel Road and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

5.2.1.2.2 2030 Future Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the Dundaniel Road and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

At the PM peak for the Proposed Development scenario, the highest degree of saturation occurs along Dundaniel Road the R104 eastbound and the longest mean maximum queue is along the R104 westbound. This shift in degree of saturation alters the stage sequence timings leading to the mean maximum queue to be shorted in the Proposed Development scenario than the base scenario. However as there is more traffic on the network in the Proposed Development scenario than the base scenario, the total traffic delay is higher.

5.2.1.2.3 2040 Horizon Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the Dundaniel Road and the longest mean maximum queue is along the R104 westbound. At the AM peak for the Proposed Development scenario, the highest degree of saturation occurs along Dundaniel Road and the longest mean maximum queue is along the R104 westbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

5.2.1.3 Junction of R104 and Clonshaugh Industrial Park Access Road

The results of the capacity analysis of the junction of the R104 and Clonshaugh Industrial Park Access Road during the operational phase of development are shown in Table 5.4.

Table 5.4- *Junction Capacity Results for Baseline (Do-nothing) and Proposed Development Case*

Junction	Year	Peak Hour	Max DoS		% Difference	Max. Queue (pcu)		% Difference	Total Traffic Delay (s/pcu)		% Difference
			Base	+ Dev		Base	+ Dev		Base	+ Dev	
R104 & Clonshaugh Industrial Park Access Road	2019	AM	66.3	n/a	n/a	12.6	n/a	n/a	6.2	n/a	n/a
		PM	68.0	n/a	n/a	17.1	n/a	n/a	11.8	n/a	n/a
	2025	AM	81.8	86.8	**6.1**	24.7	30.0	**21.5**	14.6	18.2	**24.7**
		PM	78.6	78.7	**0.1**	23.1	23.1	**0.0**	14.5	17.0	**17.2**
	2030	AM	116.7	117.6	**0.8**	135.1	140.4	**3.9**	207.4	218.6	**5.4**
		PM	83.3	84.2	**1.1**	26.7	27.5	**3.0**	19.5	20.3	**4.1**
	2040	AM	122.1	123.2	**0.9**	167.5	172.7	**3.1**	274.2	287.1	**4.7**
		PM	87.1	88.5	**1.6**	30.2	31.5	**4.3**	22.8	24.0	**5.3**

5.2.1.3.1 2025 Opening Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

At the PM peak for the Proposed Development scenario, the highest degree of saturation occurs along the R104 eastbound and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.2.1.3.2 2030 Future Year

At the AM peak for the base scenario, the highest degree of saturation occurs along Clonshaugh Industrial Park Access Road and the longest mean maximum queue is along the R104 westbound. At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 eastbound and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.2.1.3.3 2040 Horizon Year

At the AM peak for the base scenario, the highest degree of saturation occurs along R104 eastbound and the longest mean maximum queue is along the R104 westbound. At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 eastbound Industrial Park Access Road and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.2.2 Junction of R104 and Clonshaugh Road

The results of the capacity analysis of the junction of the R104 and Clonshaugh Road during the operational phase of development are shown in Table 5.5.

Table 5.5 - *Junction Capacity Results for Baseline (Do-nothing) and Proposed Development Case scenarios for the junction of the R104 and Clonshaugh Road*

Junction	Year	Peak Hour	Max DoS		% Difference	Max. Queue (pcu)		% Difference	Total Traffic Delay (s/pcu)		% Difference
			Base	+ Dev		Base	+ Dev		Base	+ Dev	
R104 & Clonshaugh Road	2019	AM	75.9	n/a	n/a	21.7	n/a	n/a	20.7	n/a	n/a
		PM	90.4	n/a	n/a	30.7	n/a	n/a	22.2	n/a	n/a
	2025	AM	85.9	86.6	**0.8**	29.2	29.9	**2.4**	24.5	28.4	**15.9**
		PM	100.7	101.5	**0.8**	54.1	57.5	**6.3**	46.1	49.3	**6.9**
	2030	AM	92.0	92.7	**0.8**	36.1	37.1	**2.8**	36.0	36.9	**2.5**
		PM	107.5	108.4	**0.8**	90.0	95.5	**6.1**	87.8	92.8	**5.7**
	2040	AM	96.7	97.1	**0.4**	44.5	43.6	**-2.0**	46.2	49.4	**6.9**
		PM	112.3	113.2	**0.8**	121.0	126.2	**4.3**	122.3	127.6	**4.3**

5.2.2.1.1 2025 Opening Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 eastbound and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.2.2.1.2 2030 Future Year

At the AM peak for the base scenario, the highest degree of saturation occurs along the R104 westbound and the longest mean maximum queue is along the R104 westbound. This remains the same for the Proposed Development scenario.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 eastbound and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.2.2.1.3 2040 Horizon Year

At the AM peak for the base scenario, the highest degree of saturation occurs along Clonshaugh Road and the longest mean maximum queue is along the R104 westbound. At the AM peak for the Proposed Development scenario, the highest degree of saturation occurs along Clonshaugh Road and the R104 westbound and the longest mean maximum queue is along the R104 westbound.

At the PM peak for the base scenario, the highest degree of saturation occurs along the R104 eastbound and the longest mean maximum queue is along the R104 eastbound. This remains the same for the Proposed Development scenario.

5.3 Impact of the Proposed Development

The LinSig junction analysis indicates the impact that the Proposed Development will have on the performance of the junctions examined in the in the Opening-Year 2025, Future-Year 2030 and Horizon Year 2040 is minor compared to the baseline flows.

These growth factors also represent a conservative approach. The Central Statistics Office (CSO) noted that traffic volumes decreased due to government enforce COVID-19 restrictions and have not yet returned to pre-2019 levels. The TII growth factors, published in 2016, are therefore likely overestimating background traffic growth. As outlined in Section 3.3, no adjustments were made to normalise the existing traffic data as it is not feasible to forecast future traffic demand due to influencing socio-economic factors. It therefore follows that the growth factors used quantify the worst-case scenario which is unlikely to be represented on the road network in the Opening, Future and Horizon years.

While the performance of the junction does become lower, as would be expected with the opening of Proposed Development, it will still operate with similar capacity. Across all the measured parameters, the decrease in performance is minimal and does not have any major or notable operational impacts. The decrease in performance from the 2019 baseline traffic flows is mostly attributed to the growth in background traffic as determined by the application of TII Growth Factors and not the traffic generated by the proposed development.

The current development on the site, the existing former Ricoh building which is proposed to be demolished as part of the Proposed Development, is an industrial development. Should this development be operational, it would generate significantly more traffic than the Proposed Development. Once operational, the Proposed Development will generate minimal traffic as described

in Section 4.2. This is common with data centre developments which require few operational staff in comparison with industrial developments of a similar size.

It is worth noting that, for the most part, the R104 is the arm that sees the highest degree of saturation and longest mean maximum queue across all junctions. This is the expected result as the R104 is a main throughfare that leads to the M50 and is recognised as seeing high volumes of traffic at peak hours. Due to this high level of base traffic, the additional traffic generated by the proposed development is minor and will dissipate into the base traffic flow as shown by the modelling results.

Based on the above analysis, the traffic impact the operational phase of the Proposed Development will have on four of the four key junctions that will be impacted by the Proposed Development can be described as ***long-term***, ***negative*** and ***imperceptible***. The traffic impact shown for future case scenarios is caused, for the most part, by background traffic growth and would occur with or without the Proposed Development.

6 Environmental Impact

The Proposed Development will not generate a significant volume of additional vehicular traffic during operation or construction. The worst case construction impact of the development occurs in 2023.

The increase in traffic volumes associated with the construction and operational phases of development is not likely to have any adverse transport-related environmental effects in terms of noise, air quality, vibrations, etc.

As stated previously, the impact of the operational period will be ***long-term***, ***neutral*** and ***imperceptible***. The impact of the construction period is, as detailed in Section 5.3, envisaged to be ***short-term***, ***negative*** and ***not significant*** in nature.

Considering that the overall environmental impact is minor, this will have a correspondingly minor impact on the environment with the adjacent and surrounding permitted developments. Therefore, the cumulative environmental impact is also considered ***long-term***, ***neutral*** and ***imperceptible***.

7 Road Safety

7.1 Internal Traffic

The internal layout of the site will have no negative impact on road safety and has been designed to give clear, legible routes for pedestrians, cyclists and motorists to enter and exit the development during construction and operation.

7.2 External Traffic

As stated above, the Proposed Development will not add a significant amount of additional construction or operational traffic to the surrounding road network. The construction and main site access junctions with the Business Estate Road are already in place and will be utilised for the Proposed Development. These were designed to ensure adequate sightlines for all road users.

7.2.1 Collision Data

Table 7.1 shows collision data recorded within the study area for the 5 most recent years of available data, from 2012 to 2016. Over this period there were no collisions recorded at the junction of the R104 and the access road to the Clonshaugh Business and Technology Park, along the access road itself or within the Clonshaugh Business and Technology Park.

Looking at a more extensive area, all accident records taken between 2012 and 2016 along the R104 from a point 100m east of the M50 to Kilmore Road have been included in our assessment (Figure 7.1, for area captured in analysis). Collision data was sourced from the RSA Irish Road Collision database (http://www.rsa.ie/RSA/Road-Safety/Our-Research/Collision-Statistics/Ireland-Road-Collisions/).

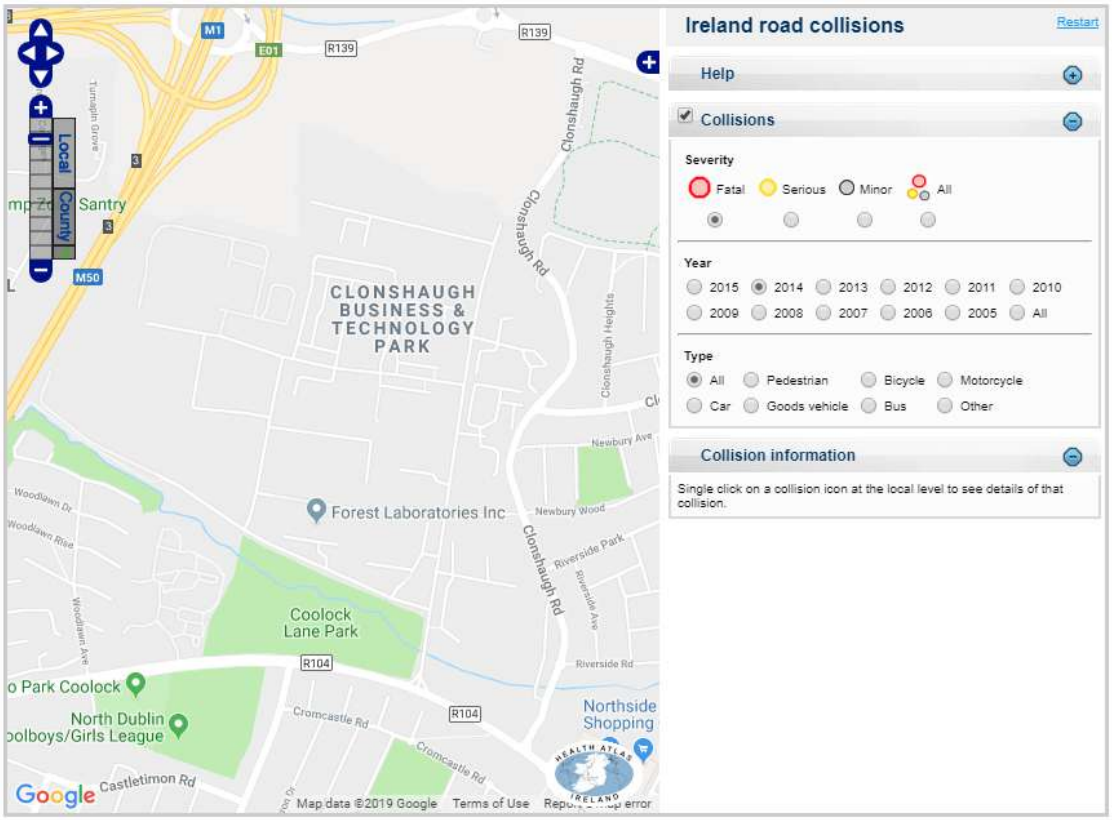


Figure 7.1 - *RSA Collision Map showing extent of R104 captured in data for analysis*

Twenty-five (25) collisions were recorded during this period, including twenty-two (22) (88.0%) minor, three (3) (12.0%) serious, and zero (0) (0%) fatal. (Figure 7.2).

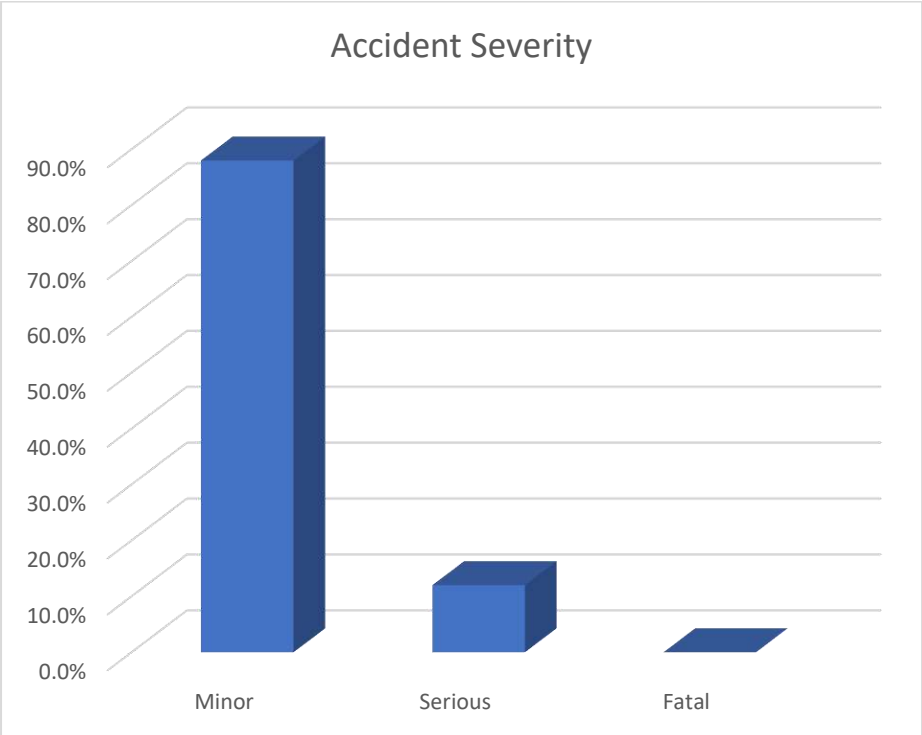


Figure 7.2 - *Accident Severity*

Figure 7.3 shows the type of collisions recorded in the area. Nine (36.0%) of the recorded collisions involved a vehicle and a pedestrian. Of these pedestrian type collisions, two involved a pedestrian being struck by a bus (one minor severity and one of serious severity), 6 involved a pedestrian being struck by a car (5 of minor severity and 1 of serious severity), and one involved a pedestrian being struck by a Goods Vehicle (minor severity).

Five (20.0%) of these collisions involved a vehicle rear ending another vehicle. These were all of minor severity. Two (8.0%) were classed as ‘Angle/Right Turn’.

Four (16.0%) collisions are described as ‘Head-on Conflicts’ and one (4.0%) as ‘Head-on Right turn’.

One (4.0%) collision is described as ‘angle, both straight’ with minor severity. Two (8.0%) as ‘single vehicle collision’, with one being minor in severity and one serious in severity.

The remaining three collisions were classed as ‘Unknown’ and ‘Other’. One involved a car, one invloved a bicycle and the vehicle involved in the third collision described as ‘unidentified’. All three collisions are described as minor in severity.

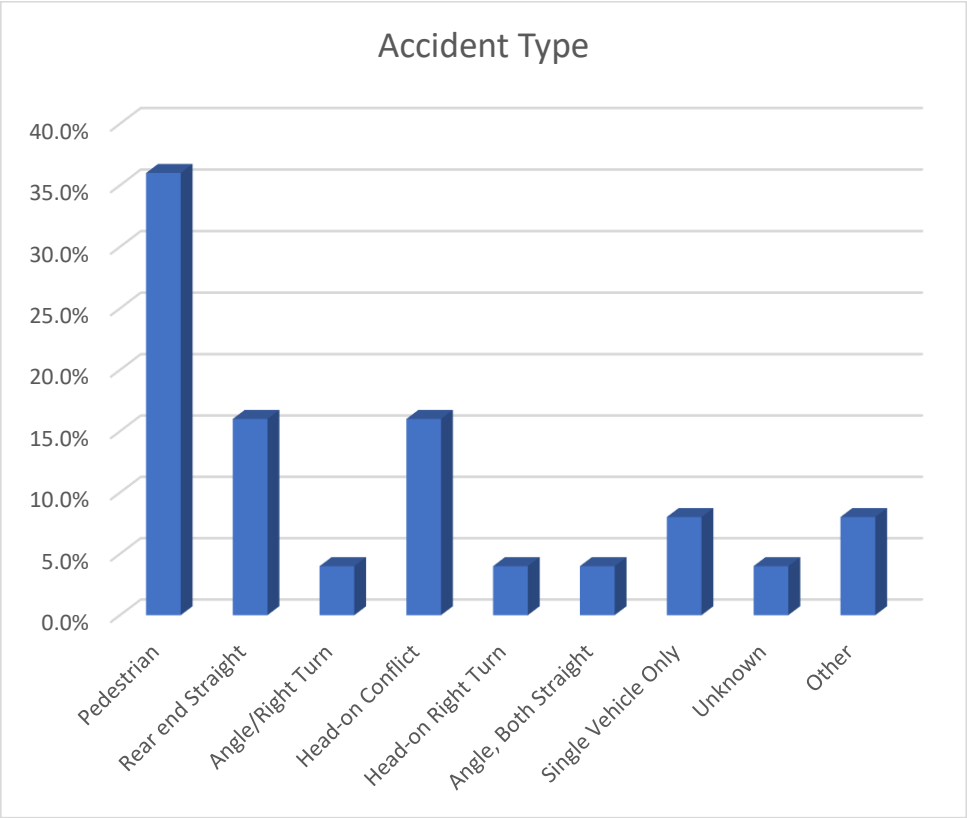


Figure 7.3 - *Accident Type*

Figure 7.4 shows the day of the week when each collision occurred. Saturday had the highest proportion of total recorded collisions at 40.0%. Tuesdays and Wednesdays recorded relatively high proportions of total collisions at 32.0% and 12.0% respectively.

Mondays, Thursdays, Fridays and Sundays all recorded 4.0% of total collisions.

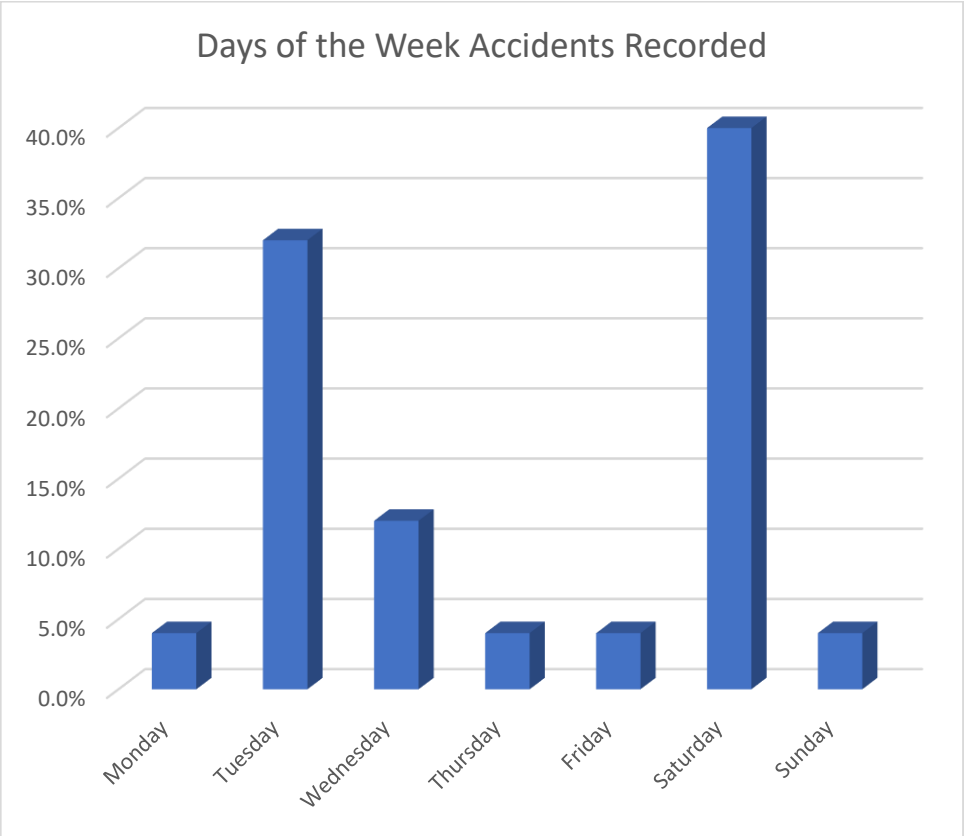


Figure 7.4 *- Days of week Accidents Recorded*

Figure 7.5 shows the time of day collisions in the study area occurred. Times are categorised into six time periods as follows:

- 03:00-07:00 (4 hrs)
- 07:00-10:00 (3 hrs)
- 10:00-16:00 (6 hrs)
- 16:00-19:00 (3 hrs)
- 19:00-23:00 (4 hrs)
- 23:00-03:00 (4 hrs)

At 28.0%, the highest proportion of accidents occurred during the 10:00-16:00 time period. However, this was the longest time period, with an average collision rate of 4.67% per hour.

At 24.0%, the next highest proportion of collisions occurred during the 19:00-23:00 time period. This time period was 2 hours shorter than the 10:00-16:00 period and has a collision rate of 6.00% per hour.

The collision rate per hour for the 07:00-10:00 period is 6.67%, making it marginally the highest.

The collision rate per hour was for the 16:00-19:00 and 23:00-03:00 periods 2.67% and 3.00% respectively. The accident rate per hour was lowest for the 03:00-07:00 time period at 2.00%.

Table 7.2 - *Summary at which Time of Day Accidents were Recorded*

Time Period when Accidents Occurred	03:00-07:00	07:00-10:00	10:00-16:00	16:00-19:00	19:00-23:00	23:00-03:00
Percentage of total accidents recorded during time period	8.00%	20.00%	28.00%	8.00%	24.00%	12.00%
Percentage of total accidents recorded per hour of specified time period	2.00%	6.67%	4.67%	2.67%	6.00%	3.00%

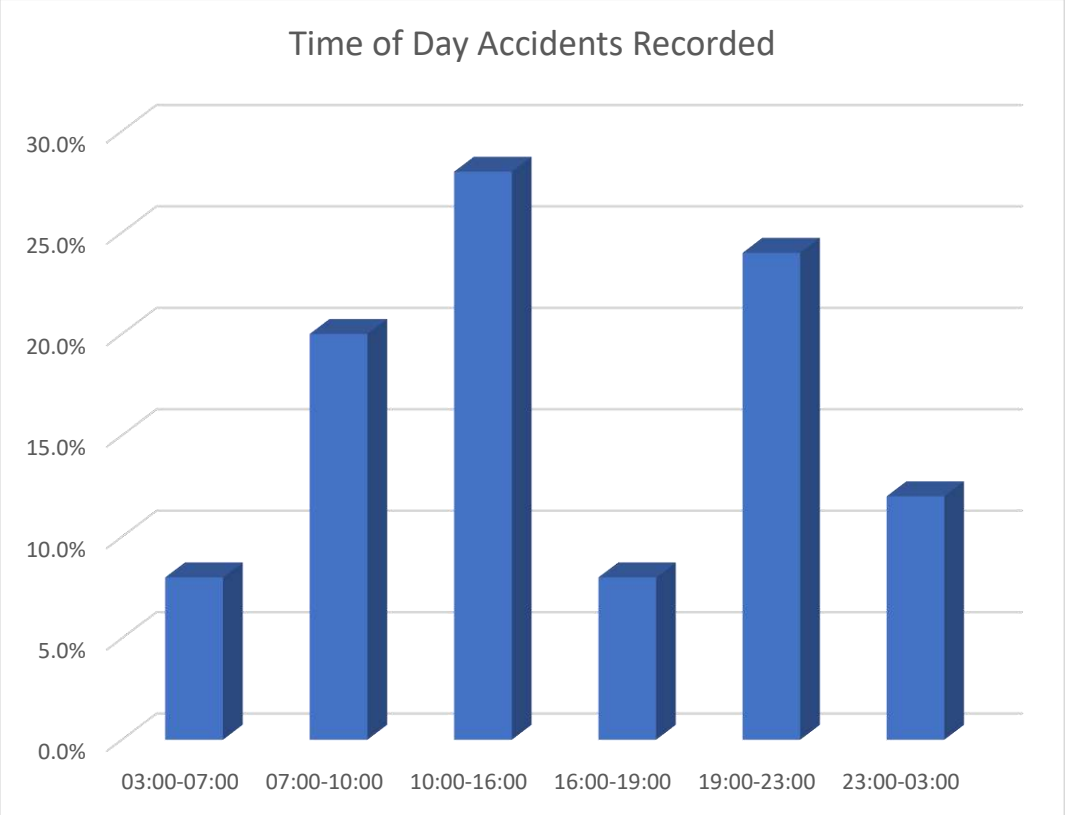


Figure 7.5 - *Time of Day Accidents Recorded*

Based on the above collision data analysis, it can be concluded that there are no accident black spots or notable accident patterns that would indicate a road safety design flaw on the road infrastructure surrounding the site.

Table 7.1 - *Collision data recorded within the study area for the 5 most recent years of available data*

Location	Severity	Road User(s)	Accident Type	No. Casualties	Year	Day	Time	Speed
Coolock Lane/ R104 -110m west of Dundaniel rd	Minor	Car	Single Vehicle Only	1	2012	Sun	3-7am	50km/hr
Coolock Lane/ R104 – 90m east of Dundaniel Rd	Minor	Car	Rear end/ Straight	3	2012	Sat	4-7pm	50km/hr
Oscar Traynor Rd/ R104/ Clonshaugh Rd	Minor	car	Pedestrian	1	2012	Tues	10-4pm	50km/hr
Oscar Traynor Rd/ R104/ Kilmore Rd entrance	Minor	Car	Angle/ Right turn	1	2012	Mon	10-4pm	50km/hr
Oscar Traynor Rd/ R104/ Clonshaugh Rd entrance	Minor	Bus	Pedestrian	1	2013	Sat	11-3am	50km/hr
Oscar Traynor Rd/ R104/ Clonshaugh Rd entrance	Minor	Car	Head-on conflict	1	2013	Tues	7-11pm	50km/hr
Oscar Traynor Rd/ R104/ Kilmore Rd entrance	Minor	Car	Head-on conflict	1	2013	Sat	10-4pm	60km/hr
Coolock Lane/ R104- 200m west of Woodlawn Ave	Serious	Car	Single Vehicle only	1	2014	Tues	7-10am	60km/hr
Coolock Lane/ R104 - 200m west of Woodlawn Ave	Minor	Goods Vehicle	Pedestrian	1	2014	Tues	7-10am	60km/hr
Coolock Lane/ R104 -30m west of Woodlawn Ave	Minor	Car	Pedestrian	1	2014	Wed	7-10am	50 km/hr
Coolock Lane / R104/ Dundaniel Rd entrance	Minor	Car	Angle, Both Straight	1	2014	Tues	7-10am	50km/hr
Oscar Traynor Rd/ R104 -100m east of Clonshaugh Rd	Minor	Car	Unknown	1	2014	Sat	11-3am	50km/hr
Oscar Traynor Rd/R104/ Kilmore Rd entrance	Minor	Car	Pedestrian	1	2014	Tues	4-7pm	60km/hr
Oscar Traynor Rd/ R104/ Kilmore Rd entrance	Minor	Car	Head-on-Conflict	1	2014	Tues	7-11pm	50km/hr
Oscar Traynor Rd/ R104/Kilmore road	Minor	Car	Pedestrian	1	2014	Tues	10-4pm	50km/hr
Oscar Traynor Rd/ R104/Kilmore road	Minor	Car	Rear end, straight	1	2014	Wed	7-11pm	50km/hr
Coolock Lane/ R104- 200m west of Woodlawn Ave	Minor	Car	Pedestrian	1	2015	Sat	10-4pm	50km/hr
Coolock Lane/ R104/ Woodlawn Ave Entrance	Minor	Car	Rear end, straight	2	2015	Sat	7-11pm	50km/hr

Coolock Lane/ R104/The Court/Car Park Entrance	Minor	Car	Head-on Right turn	1	2015	Wed	10-4pm	50km/hr
Coolock Lane/ R104/The Court/Car Park Entrance	Minor	Car	Rear end straight	1	2015	Sat	10-4pm	50km/hr
Coolock Lane / R104/ Dundaniel Rd entrance	Minor	Car	Head-on conflict	1	2015	Thurs	7-11pm	50km/hr
Oscar Traynor Rd/ R104/ Clonshaugh Rd entrance	Minor	Undefined	Other	1	2016	Fri	11-3am	50km/hr
Coolock Lane/ R104/The Court/Car Park Entrance	Minor	Bicycle	Other	1	2016	Sat	7-11pm	50km/hr
Coolock Lane/ R104/The Court/Car Park Entrance	Serious	Bus	Pedestrian	1	2016	Sat	3-7am	50km/hr
Coolock Lane/ R104/The Court/Car Park Entrance	Serious	Car	Pedestrian	1	2016	Sat	7-10am	50km/hr

8 Potential Cumulative Impacts

8.1 Construction Phase

There is the potential for the construction phase of the proposed development to coincide with the several developments (outlined in Section 3.5) that had not commenced/completed construction at the time the 2019 traffic counts were conducted.

The status of the five Butlers Chocolates developments (Ref. 2308/20, 2517/19, 4019/17, 3007/16 and 2044/15) are unknown. The combined trip generation of the construction traffic of these developments would be minor due to the nature of the developments being small extension works. The worst case scenario would occur if the peak construction period these developments all coincided with the peak construction period of the Proposed Development. It is noted that the potential of all five Butlers Chocolate developments having the same peak construction period is considered unlikely. As stated, the envisaged construction traffic of the Butlers Chocolates developments is not considered to be significant due to the size of the developments and would be a minor addition to the peak construction traffic associated with the Proposed Development. The duration of this worst-case scenario would be temporary and therefore, the cumulative impact of this scenario can also be described as **short term**, **negative** and **not significant**.

The status of the Pargo Properties One Ltd development is unknown. The worst case scenario would occur if the peak construction period of the Pargo Properties One Ltd development coincided with the peak construction period of the Proposed Development. As stated, the envisaged construction traffic of the Pargo Properties One Ltd development is not envisaged to be significant due to the size of the development and would be a minor addition to the peak construction traffic associated with the Proposed Development. The duration of this worst-case scenario would be temporary and therefore, the cumulative impact of this scenario can also be described as **short term**, **negative** and **not significant**.

The potential existence of cumulative impacts on traffic and transportation from the Proposed Development and a MV/LV underground cable and substation on the site (Planning Ref: 4367/19) and HV underground cable and substation (Planning Ref VA0014) and substation was considered. The MV/LV underground cable and substation is currently operation and the HV underground cable and substation is due to be commissioned in November 2020, therefore there is no potential impact with the construction phase of these developments and the Proposed Development. The operational trip generation of these developments is in the order of one maintenance trip per year. It is likely that for these developments, this maintenance trip will be coordinated with so that the total operational traffic amounts to one return light vehicle trip for all the developments once operational. Therefore, the cumulative impact is considered **short term**, **neutral** and **imperceptible.**

There is potential for the existence of cumulative impacts on traffic and transportation from the Proposed Development and 110Kv cable connections between client transformers and 110kV Substation on the existing campus incorporating transformer AIS bushings, surge arresters & cable chairs, for which a separate SID application is due to be submitted to ABP in Q1 2021. Subject to grant of permission, this development is targeted to be operational in Q2 2022. The operational trip generation of this development is of the order of one maintenance trip per year. It is likely that for this development, this maintenance trip will be coordinated with that of the HV underground cable and the MV/LV underground cable so that the total operational traffic amounts to one return light vehicle trip for all the developments once operational. Therefore, the cumulative impact is considered **short term**, **neutral** and **imperceptible**.

There is potential for the existence of cumulative impacts on traffic and transportation from the Proposed Development and Planning Application (Ref. 3096/18). The peak construction of this development is expected to occur in will occur in Q4 2022. The envisaged peak construction traffic is shown in Figure 8.1.

Peak Construction Traffic - Peak Construction of Building F		AM		PM	
		Entering	Exiting	Entering	Exiting
Cars	240	48	10	10	48
HGVs	110	11	6	6	11
LGVs	30	3	2	2	3
TOTAL		**51 LVs*, 11 HGVs****	**12 LVs, 6 HGVs**	**12 LVs, 6 HGVs**	**51 LVs*, 11 HGVs****

*LV - Light Vehicles
**HGV – Heavy Goods Vehicle

Figure 8.1 – *Peak Construction for Planning Ref 3096/18*

The EIAR submitted as part of this development notes that the 'given the temporary nature of the peak construction phase, the overall impact of the construction phase is considered ***short-term***, ***negative*** and ***not significant.***' There is potential for a cumulative impact with the construction traffic from Planning Application (Ref. 3096/18) with the construction traffic with the Proposed Development. However, the peak construction traffic periods are not envisaged to overlap. From CSEA's knowledge of similar developments, the peak construction traffic is significantly more than the construction traffic of the fit-out/commissioning stage. It is envisaged that the peak construction traffic of the proposed development will overlap with the fit-out construction traffic. This combined peak construction traffic of the Proposed Development and fit-out construction traffic of Planning Application (Ref. 3096/18) will be lower than the peak construction traffic of Planning Application (Ref. 3096/18). Therefore, this cumulative impact is considered short-term, negative and not significant.

There is potential for cumulative impact between the construction of the Proposed Development and the construction of the Lidl Ireland GmbH, (Planning Ref. 3732/20), development. It is likely that the construction periods will overlap. However, with no traffic assessment available for this development, it is unknown when the peak construction period or associated peak construction traffic is envisaged to occur. Taking a conservative approach, it is assumed that the peak construction period of this development will overlap with the peak construction of the Proposed Development. From CSEA's knowledge of similar developments to the Lidl Ireland GmbH development, the peak construction period is expected to last a matter of weeks with the peak construction traffic significantly less than that of the Proposed Development. Therefore, an increase in traffic of this magnitude would be minor in comparison to the peak construction traffic of the Proposed Development. Given that the impact of the construction period of the proposed development is considered **short term**, **negative** and **not significant** and the temporary nature of any overlap in construction period, the potential cumulative impact is also considered **short term**, **negative** and **not significant.**

The construction traffic generated by the Proposed Development is not expected to combine with the construction traffic generated by other developments in the area to amount to a significant additional volume of traffic on the road network. Therefore, no significant cumulative impact is expected. As discussed in Section 5.1, given the temporary nature of the peak construction phase, the overall impact of the construction phase is considered ***short-term***, ***negative*** and ***not significant.***

8.2 Operational Phase

The traffic associated with the operational phase of the permitted surrounding developments has been accounted for in the baseline traffic flows when assessing the potential impact of the Proposed Development (Section 5.2). Therefore, the cumulative impact has been accounted for.

9 Remedial and Mitigation Measures

9.1 Construction Phase

An outline Construction Environmental Management Plan (CEMP) is included as part of the EIAR and outlines the remedial and mitigation measures of the construction phase. The following measures are a non-exhaustive list of what will be put in place during the construction works from a traffic and transportation perspective:

- The contractor will be required to provide wheel cleaning facilities, and regular cleaning of the main access road to ensure the public roads in the surrounding areas are not impacted by material that may otherwise be carried from the site.
- Temporary car parking facilities for the construction workforce will be provided within walking distance of the site, and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads. If there are space restrictions that do not allow for all spaces to be provided on the site during construction of the Proposed Development, any overflow parking for construction vehicles will be provided on an alternative site within the Clonshaugh Business and Technology Park. However, all efforts will be made to maintain all parking for construction vehicles within the site, where feasible.
- Monitoring and control of construction traffic will be ongoing during construction works. Construction traffic will minimise movements during peak hours and avoid queuing at peak hours.
- Construction Traffic routes, via the R104 and Clonshaugh Business and Technology Park Access Road, minimising traffic impact on surrounding residential development will be used by construction vehicles.

9.2 Operational Phase

The potential traffic impact of the Proposed Development, and the cumulative traffic impact of permitted developments and the Proposed Development were found to be ***long-term, neutral*** and ***imperceptible***. The operational traffic volumes associated with the Proposed Development were found to be below the thresholds stated in the TII Guidelines for Traffic and Transport Assessments, 2014 for junction analysis. Therefore, no junction modifications are recommended on the public road to facilitate the Proposed Development.

The following measures will be put in place within the proposed:

- Internal road markings through the carpark to highlight pedestrian routes.
- Dropped kerbs at building entrances to enable easier access.
- A total of 24 Sheffield type covered cycle parking spaces will be provided at ground level for the Proposed Development.
- The occupant will commit to a Mobility Management Plan, which has been submitted in support of the Planning Application for the Proposed Development.

10 Predicted Impact of the Proposed Development

Mitigation measures (Section 9) will be put in place to offset any potential traffic impacts of the Proposed Development. Therefore, the predicted impact of the Proposed Development, will be ***short-term***, ***negative*** and ***not significant*** for the construction phase and ***long-term, neutral*** and ***imperceptible*** for the operational phase.

11 Residual Impacts

The residual traffic impacts of the Proposed Development will be ***neutral*** and ***imperceptible.***

Cumulative impacts are addressed in Section of 8 of this Report .

12 References

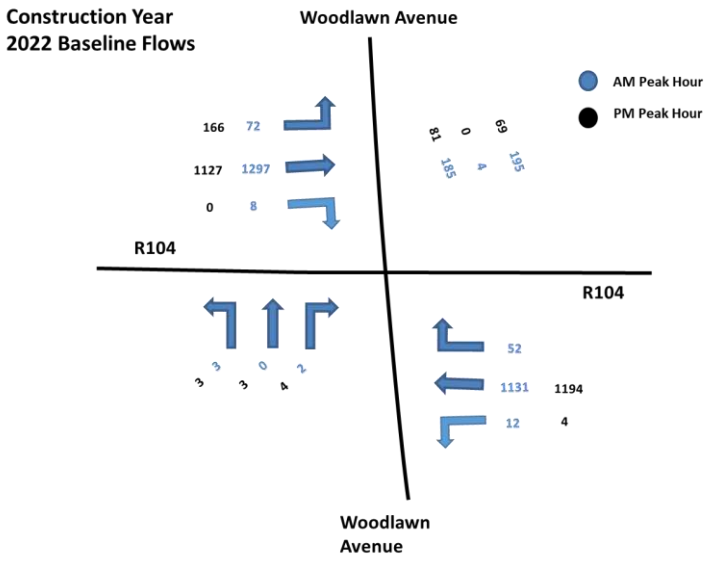
- Dublin City Development Plan 2016-2022, Dublin City Council;
- TII Traffic and Transport Assessment Guidelines, 2014;
- Design Manual for Urban Roads and Streets (DMURS), 2013, Department of Transport, Tourism and Sport & Department of Environment, Community and Local Government;
- TII Project Appraisal Guidelines – Unit 5.3: Travel Demand Projections, 2019;
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Building C, Clifton Scannell Emerson Associates (sub-consultant input into overall EIS prepared by AWN), May 2018;
- Chapter 13 of the Environmental Impact Assessment to support planning application for Building B, O' Connor Sutton Cronin Consulting Engineers (sub-consultant input into overall EIS prepared by AWN), December 2016;
- Traffic and Transport Assessment to support planning application for Building A, Aecom, October 2015;
- Planning Application Details from www.dublincity.ie website relating to the adjacent site, Butlers Chocolate Development Applications 2044/15; 3007/16; 4019/17; 2517/19; and 2308/20;
- Planning Application Details from www.dublincity.ie website relating to the Pargo Properties One Ltd Development Application 3997/18.
- Planning Application Details from www.dublincity.ie website relating to the Clonmont Developments Ltd Development Application 2229/19.
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for the transmission cable connection from the Belcamp 220kV Substation to the Darndale 110kV Substation, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Aug 2018;
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Building D, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Nov 2018; and
- Chapter 13 of the Environmental Impact Assessment Report to support planning application for Buildings E and F, Clifton Scannell Emerson Associates (sub-consultant input into overall EIAR prepared by AWN), Nov 2020.
- Planning Application Details from www.dublincity.ie website relating to the Lidl Ireland GmbH Development Application 3732/20

APPENDIX 1

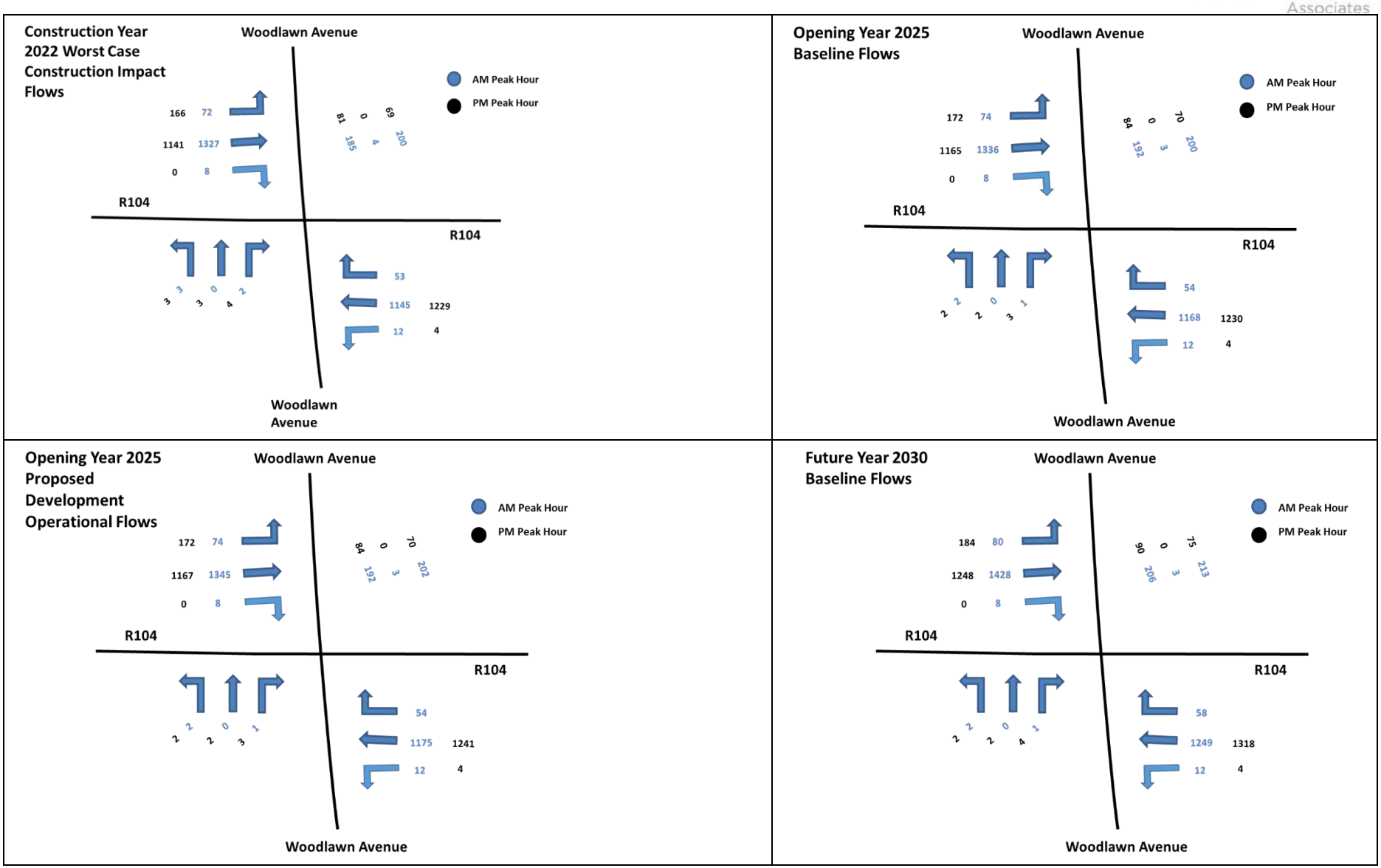
TRAFFIC VOLUMES

COMPILED BY CLIFTON SCANNELL EMERSON ASSOCIATES

JUNCTION OF R104 AND WOODLAWN AVENUE

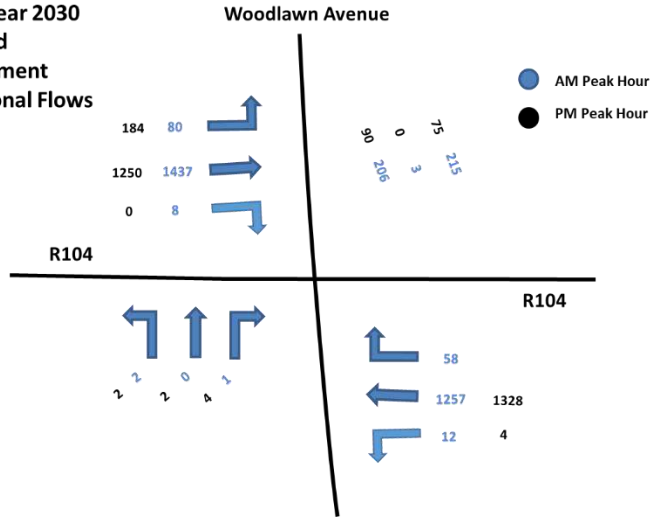


Clifton Scannell Emerson Associates

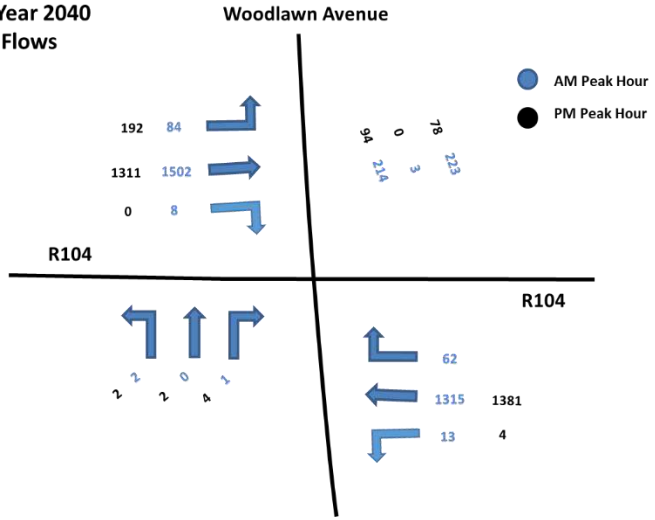


Clifton Scannell Emerson Associates

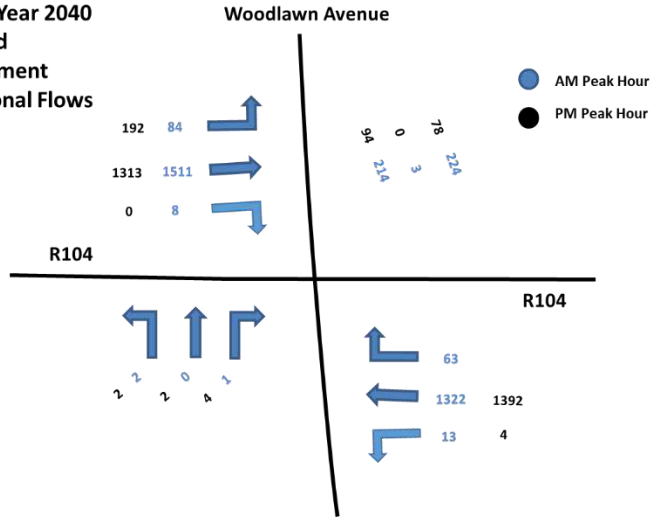
Future Year 2030 Proposed Development Operational Flows



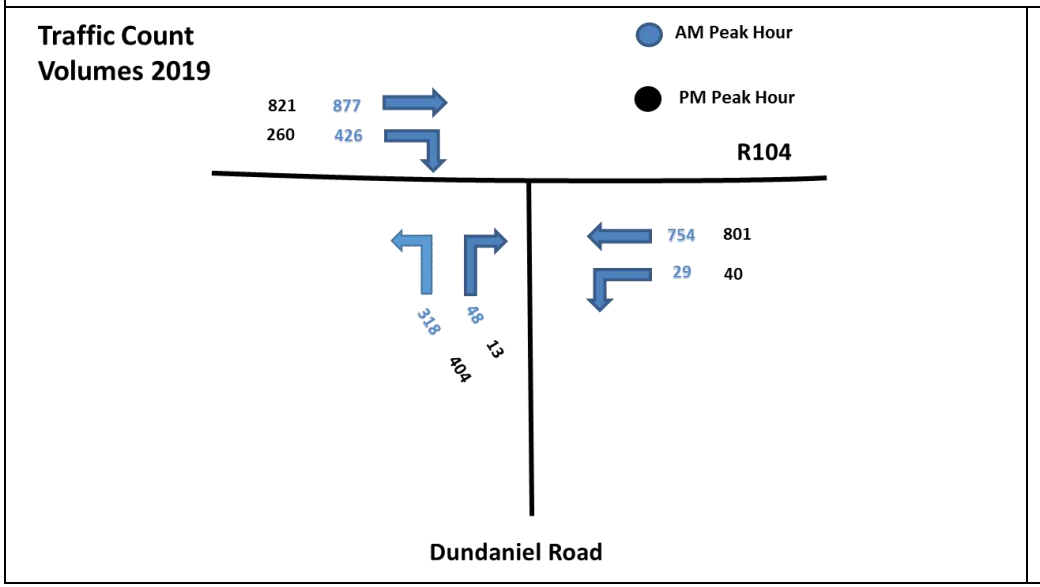
Horizon Year 2040 Baseline Flows

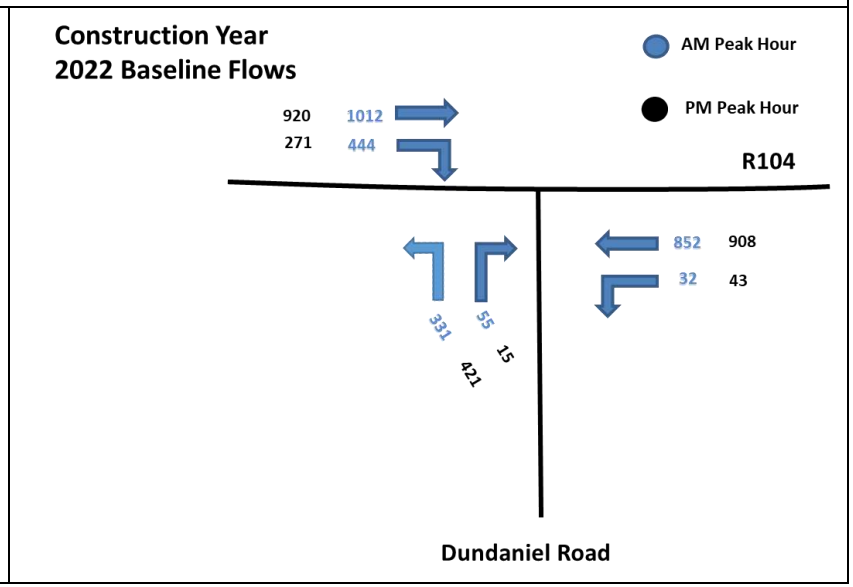


Horizon Year 2040 Proposed Development Operational Flows



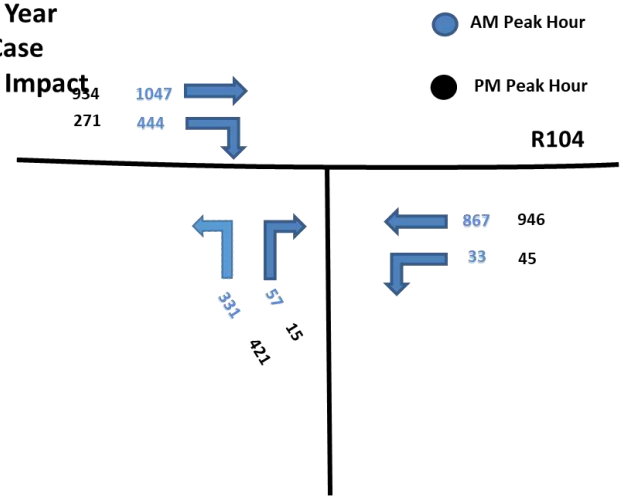
JUNCTION OF R104 AND DUNDANIEL ROAD



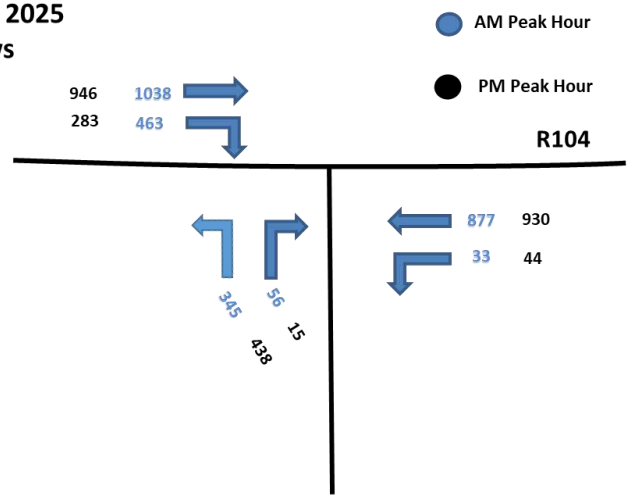


Clifton Scannell Emerson Associates

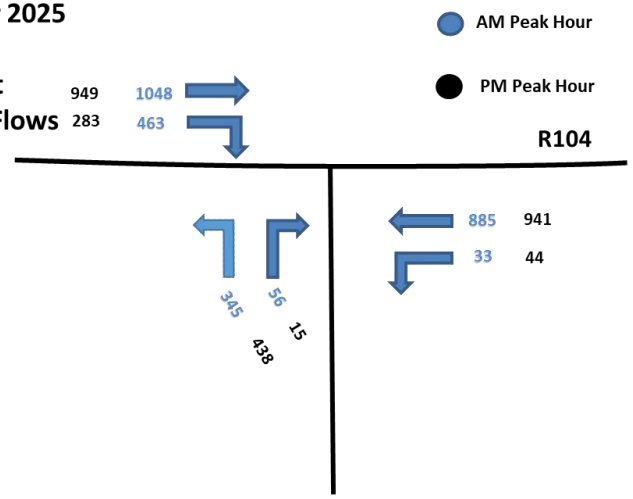
Construction Year 2022 Worst Case Construction Impact Flows



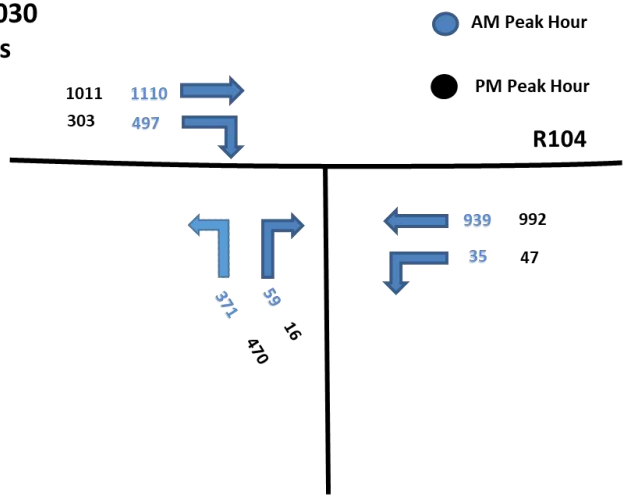
Opening Year 2025 Baseline Flows



Opening Year 2025 Proposed Development Operational Flows

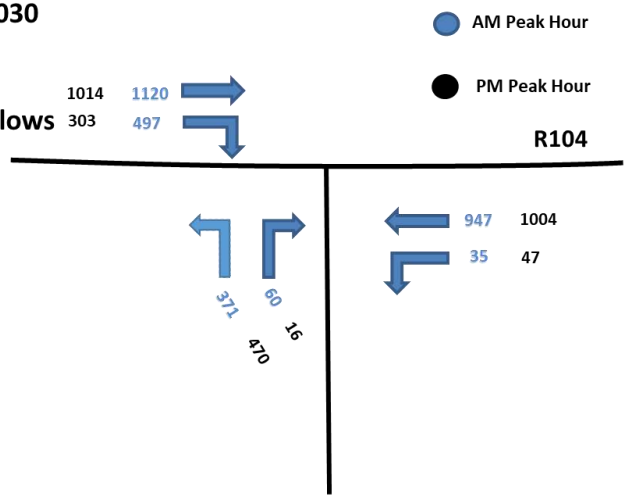


Future Year 2030 Baseline Flows

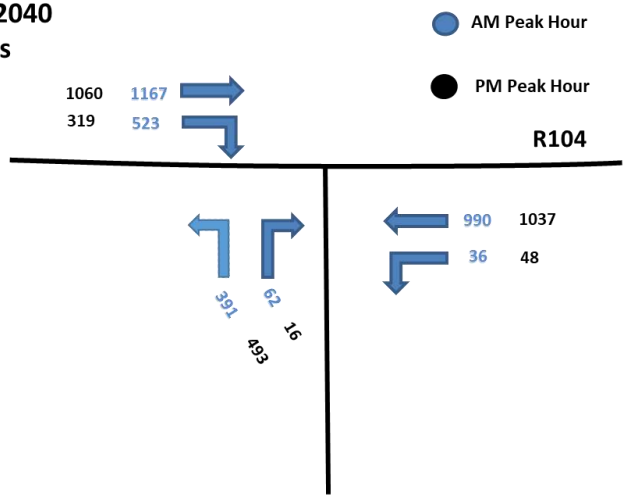


Clifton Scannell Emerson Associates

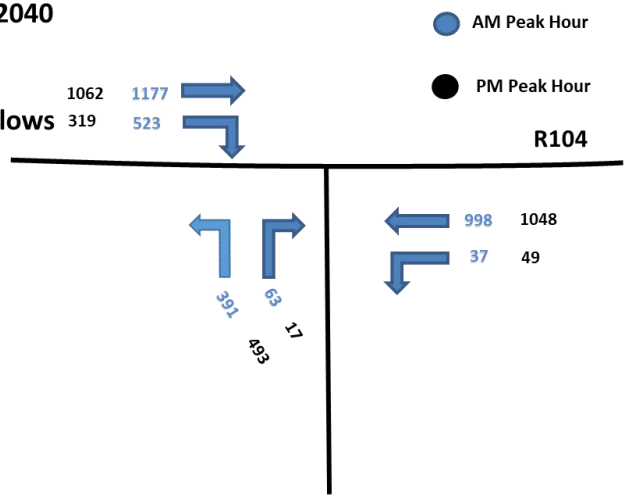
Future Year 2030 Proposed Development Operational Flows



Horizon Year 2040 Baseline Flows



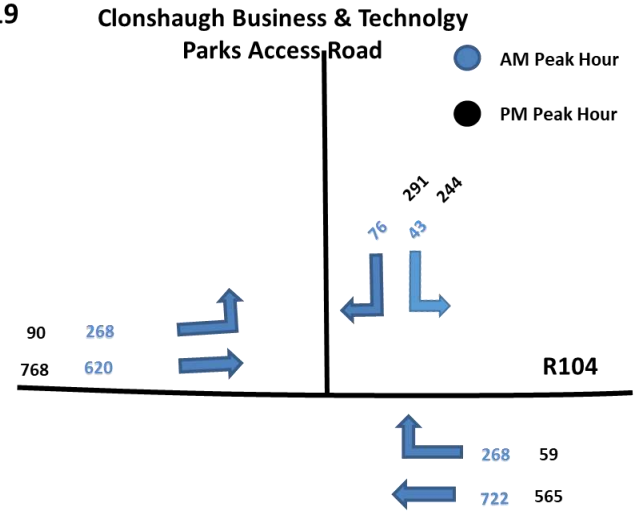
Horizon Year 2040 Proposed Development Operational Flows



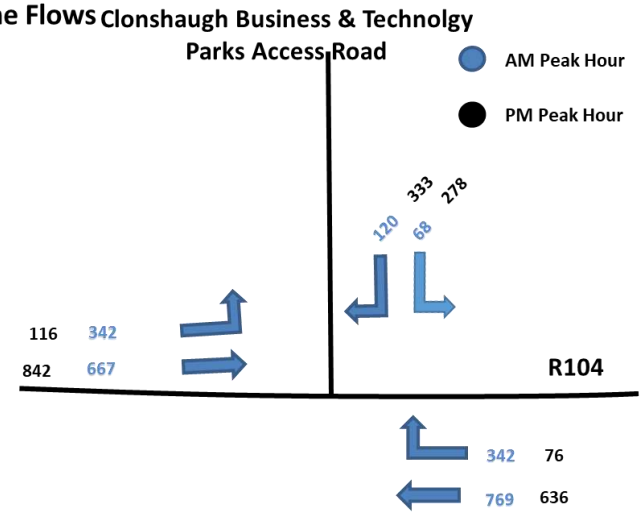
Clifton Scannell Emerson Associates

JUNCTION OF R104 AND CLONSHAUGH BUSINESS & TECHNOLOGY PARK

Traffic Count Volumes 2019

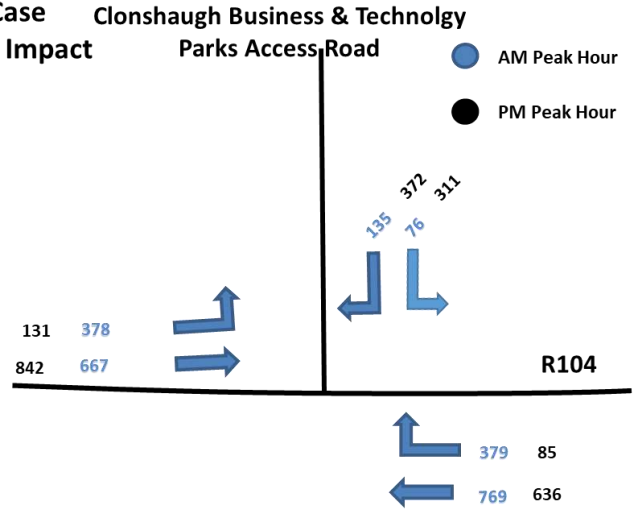


Construction Year 2022 Baseline Flows

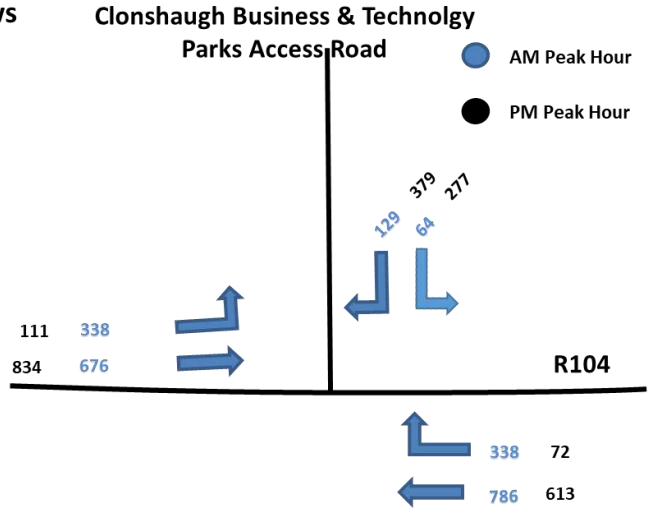


Clifton Scannell Emerson Associates

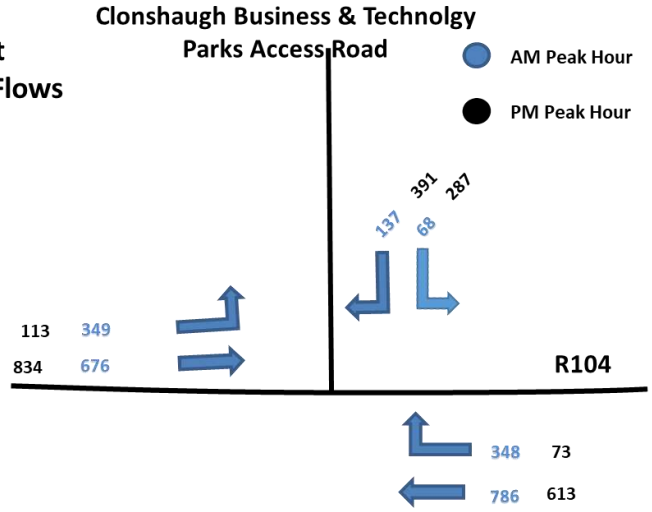
Construction Year 2022 Worst Case Construction Impact Flows



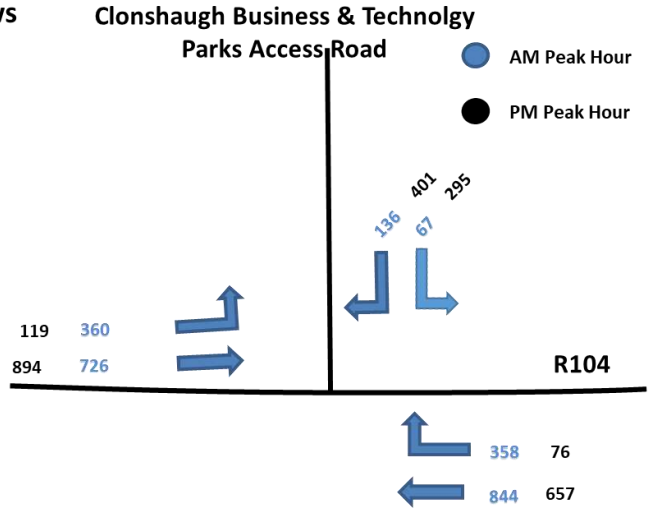
Opening Year 2025 Baseline Flows



Opening Year 2025 Proposed Development Operational Flows

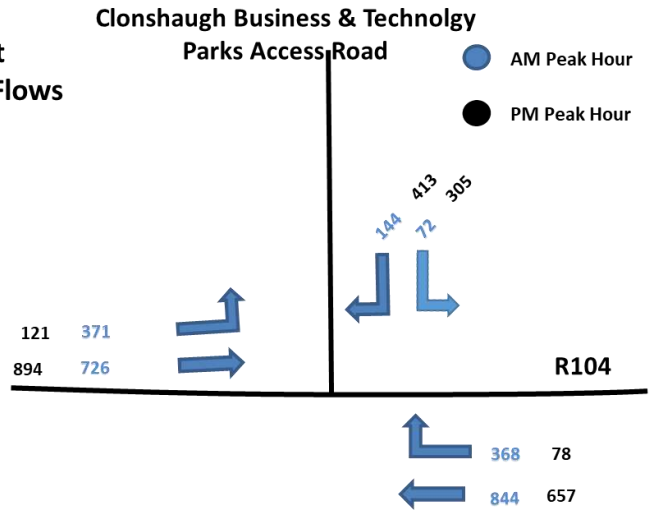


Future Year 2030 Baseline Flows

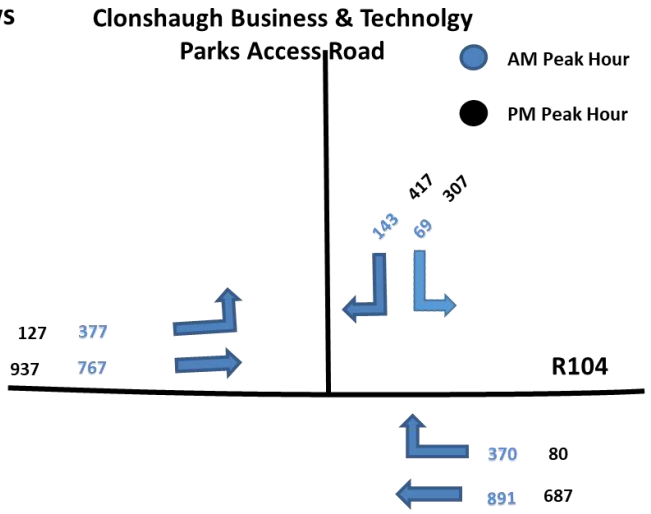


Clifton Scannell Emerson Associates

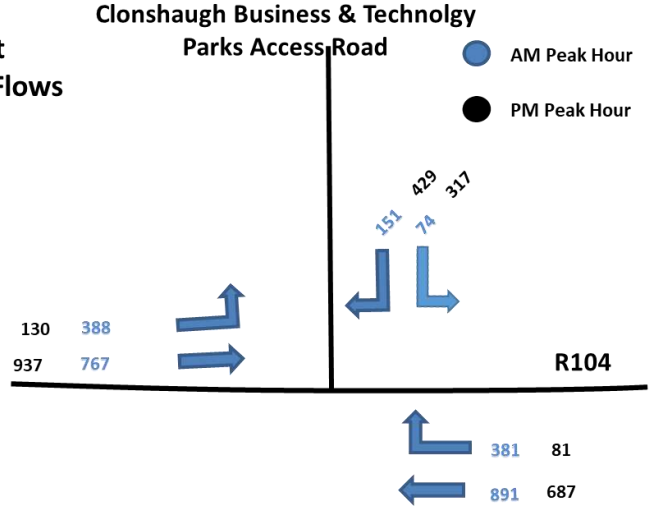
Future Year 2030 Proposed Development Operational Flows



Horizon Year 2040 Baseline Flows

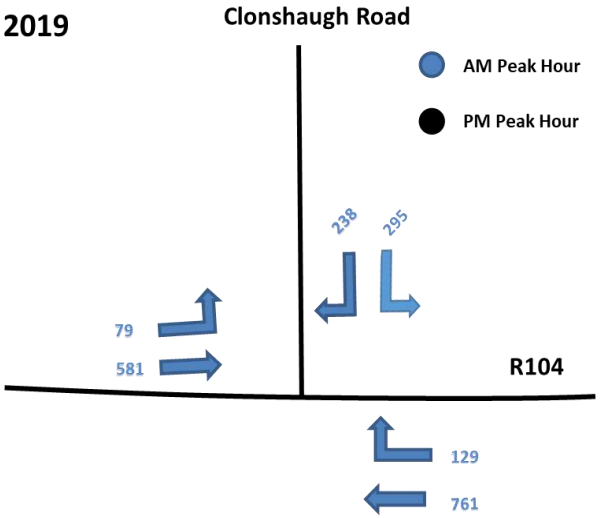


Horizon Year 2040 Proposed Development Operational Flows

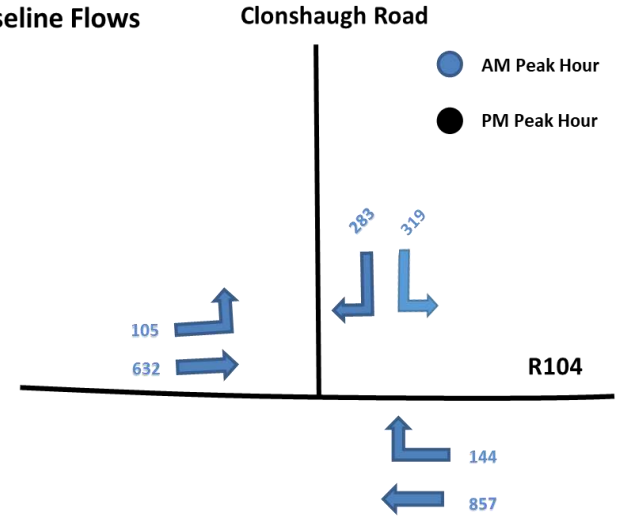


JUNCTION OF R104 AND CLONSHAUGH ROAD

Traffic Count Volumes 2019

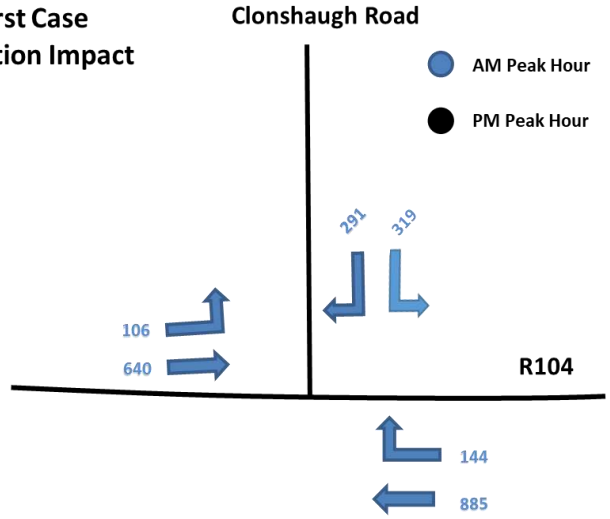


Construction Year 2022 Baseline Flows

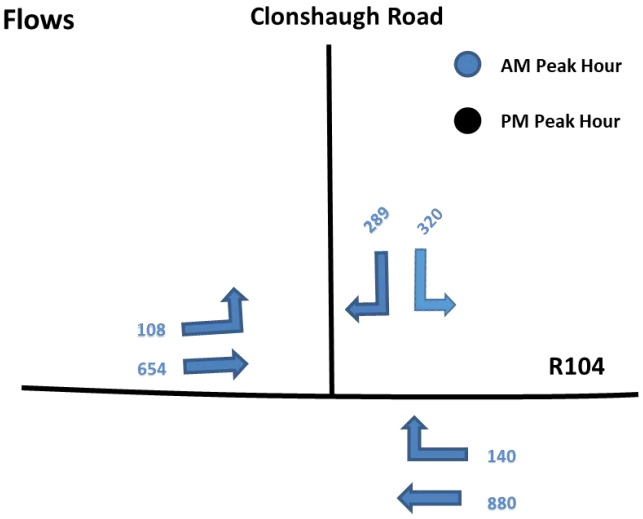


Clifton Scannell Emerson Associates

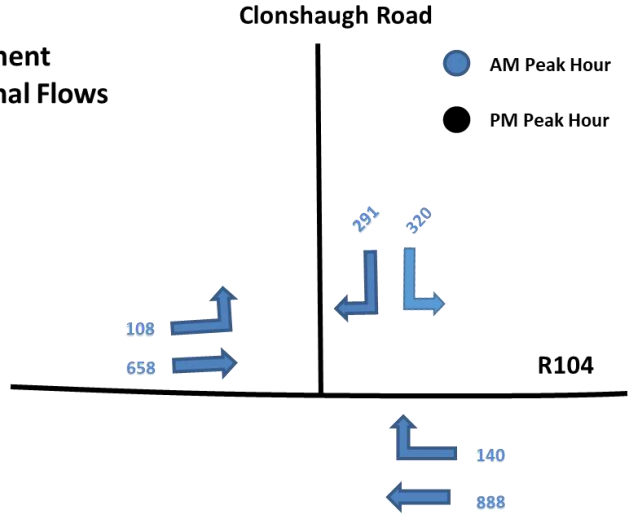
Construction Year 2022 Worst Case Construction Impact Flows



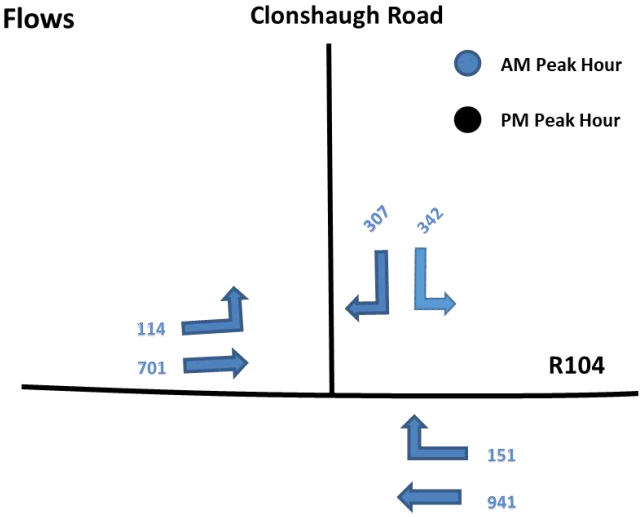
Opening Year 2025 Baseline Flows



Opening Year 2025 Proposed Development Operational Flows

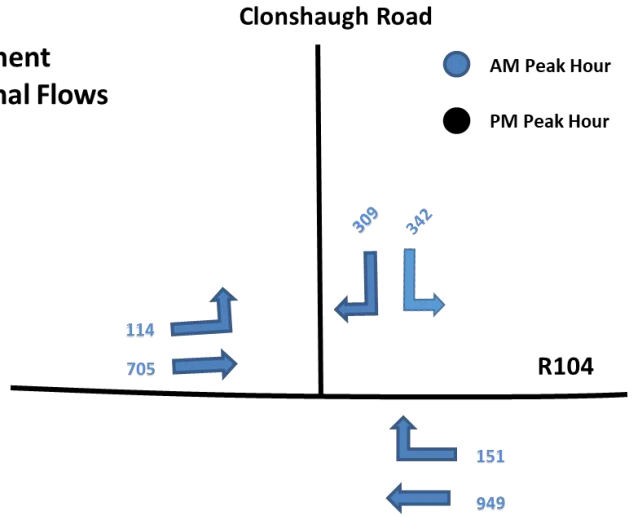


Future Year 2030 Baseline Flows

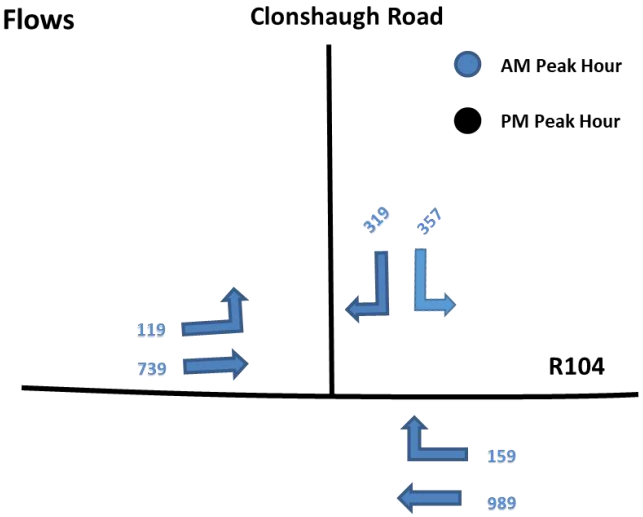


Clifton Scannell Emerson Associates

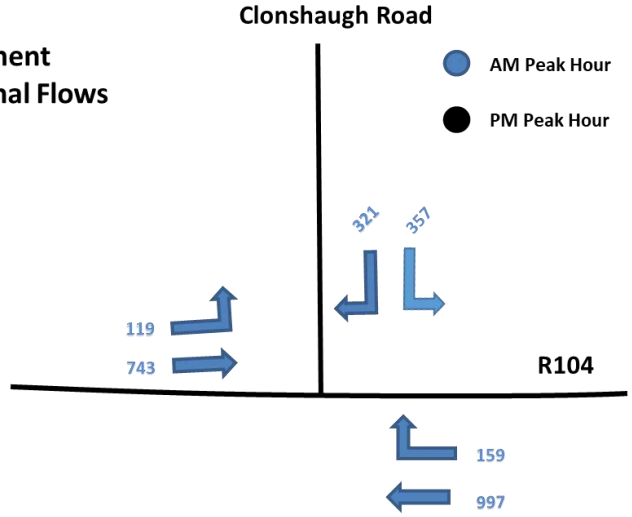
Future Year 2030 Proposed Development Operational Flows



Horizon Year 2040 Baseline Flows



Horizon Year 2040 Proposed Development Operational Flows



APPENDIX 2

TRICS DATA

COMPILED BY CLIFTON SCANNELL EMERSON ASSOCIATES

Calculation Reference: AUDIT-441201-200629-0639

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : F - WAREHOUSING (COMMERCIAL)
VEHICLES

Selected regions and areas:

01	GREATER LONDON		
	BE	BEXLEY	1 days
02	SOUTH EAST		
	EX	ESSEX	1 days
	KC	KENT	1 days
03	SOUTH WEST		
	DV	DEVON	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	WY	WEST YORKSHIRE	1 days
09	NORTH		
	CB	CUMBRIA	1 days
	TW	TYNE & WEAR	1 days
14	LEINSTER		
	LU	LOUTH	1 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 190 to 31000 (units: sqm)
Range Selected by User: 190 to 80066 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 26/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Thursday	4 days
Friday	6 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	12 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	3
Edge of Town	9

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	11
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B1	1 days
B8	10 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	4 days
10,001 to 15,000	1 days
15,001 to 20,000	3 days
25,001 to 50,000	1 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	3 days
25,001 to 50,000	2 days
125,001 to 250,000	3 days
250,001 to 500,000	4 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	5 days
1.1 to 1.5	6 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	11 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	11 days
1a (Low) Very poor	1 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AN-02-F-03 PACKAGING COMPANY ANTRIM
KENNEDY WAY
BELFAST
KENNEDY WAY IND. EST.
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 12234 sqm
Survey date: TUESDAY 11/10/16 Survey Type: MANUAL

2 AN-02-F-04 TESCO DISTRIBUTION CENTRE ANTRIM
APOLLO ROAD
BELFAST
BALMORAL
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 11000 sqm
Survey date: THURSDAY 14/03/19 Survey Type: MANUAL

3 BE-02-F-01 FRESH FRUIT DISTRIBUTOR BEXLEY
THAMES ROAD
CRAYFORD

Edge of Town
Industrial Zone
Total Gross floor area: 20400 sqm
Survey date: THURSDAY 20/09/18 Survey Type: MANUAL

4 CB-02-F-01 DOMINO'S PIZZA CUMBRIA
COWPER ROAD
PENRITH
GILWILLY IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 2950 sqm
Survey date: TUESDAY 10/06/14 Survey Type: MANUAL

5 DV-02-F-01 OPTICS WAREHOUSE DEVON
ALDERS WAY
PAIGNTON

Edge of Town
Industrial Zone
Total Gross floor area: 190 sqm
Survey date: FRIDAY 29/03/19 Survey Type: MANUAL

6 EX-02-F-01 SPORTS SUPPLEMENTS ESSEX
BRUNEL WAY
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 6560 sqm
Survey date: FRIDAY 18/05/18 Survey Type: MANUAL

7 KC-02-F-02 COMMERCIAL WAREHOUSING KENT
MILLS ROAD
AYLESFORD
QUARRY WOOD
Edge of Town
Industrial Zone
Total Gross floor area: 11200 sqm
Survey date: FRIDAY 22/09/17 Survey Type: MANUAL

8 LU-02-F-01 PACKAGING COMPANY LOUTH
MATTHEWS LANE
DROGHEDA
LAGAVOOREN
Edge of Town
No Sub Category
Total Gross floor area: 5350 sqm
Survey date: FRIDAY 19/06/15 Survey Type: MANUAL

9 SF-02-F-02 WAREHOUSING SUFFOLK
WALTON ROAD
FELIXSTOWE

Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY 11/07/13 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

10 SF-02-F-03 ROAD HAULAGE SUFFOLK
CENTRAL AVENUE
IPSWICH
WARREN HEATH
Edge of Town
Industrial Zone
Total Gross floor area: 4700 sqm
Survey date: FRIDAY *18/09/15* *Survey Type: MANUAL*

11 TW-02-F-01 ASDA DISTRIBUTION CENTRE TYNE & WEAR
MANDARIN WAY
WASHINGTON
PATTISON IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 31000 sqm
Survey date: FRIDAY *13/11/15* *Survey Type: MANUAL*

12 WY-02-F-02 DISTRIBUTION COMPANY WEST YORKSHIRE
STAITHGATE LANE
BRADFORD
NEWHALL
Edge of Town
Industrial Zone
Total Gross floor area: 10446 sqm
Survey date: THURSDAY *14/03/19* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
BG-02-F-01	N/A
CC-02-F-01	N/A
GA-02-F-01	N/A
HC-02-F-02	N/A

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.063	1.704	5	9176	0.033	0.881	5	9176	0.096	2.585
05:30 - 06:00	5	9176	0.083	2.233	5	9176	0.061	1.645	5	9176	0.144	3.878
06:00 - 06:30	5	9176	0.078	2.115	5	9176	0.072	1.939	5	9176	0.150	4.054
06:30 - 07:00	5	9176	0.190	5.112	5	9176	0.072	1.939	5	9176	0.262	7.051
07:00 - 07:30	12	11247	0.073	1.958	12	11247	0.080	2.157	12	11247	0.153	4.115
07:30 - 08:00	12	11247	0.102	2.757	12	11247	0.040	1.079	12	11247	0.142	3.836
08:00 - 08:30	12	11247	0.069	1.858	12	11247	0.051	1.378	12	11247	0.120	3.236
08:30 - 09:00	12	11247	0.107	2.897	12	11247	0.048	1.298	12	11247	0.155	4.195
09:00 - 09:30	12	11247	0.073	1.978	12	11247	0.045	1.219	12	11247	0.118	3.197
09:30 - 10:00	12	11247	0.062	1.678	12	11247	0.041	1.119	12	11247	0.103	2.797
10:00 - 10:30	12	11247	0.050	1.358	12	11247	0.049	1.318	12	11247	0.099	2.676
10:30 - 11:00	12	11247	0.056	1.518	12	11247	0.057	1.538	12	11247	0.113	3.056
11:00 - 11:30	12	11247	0.045	1.219	12	11247	0.049	1.318	12	11247	0.094	2.537
11:30 - 12:00	12	11247	0.056	1.518	12	11247	0.046	1.239	12	11247	0.102	2.757
12:00 - 12:30	12	11247	0.052	1.398	12	11247	0.046	1.239	12	11247	0.098	2.637
12:30 - 13:00	12	11247	0.051	1.378	12	11247	0.050	1.338	12	11247	0.101	2.716
13:00 - 13:30	12	11247	0.061	1.658	12	11247	0.080	2.157	12	11247	0.141	3.815
13:30 - 14:00	12	11247	0.082	2.197	12	11247	0.053	1.438	12	11247	0.135	3.635
14:00 - 14:30	12	11247	0.054	1.458	12	11247	0.069	1.858	12	11247	0.123	3.316
14:30 - 15:00	12	11247	0.073	1.958	12	11247	0.066	1.778	12	11247	0.139	3.736
15:00 - 15:30	12	11247	0.051	1.378	12	11247	0.090	2.437	12	11247	0.141	3.815
15:30 - 16:00	12	11247	0.046	1.239	12	11247	0.055	1.478	12	11247	0.101	2.717
16:00 - 16:30	12	11247	0.056	1.518	12	11247	0.093	2.497	12	11247	0.149	4.015
16:30 - 17:00	12	11247	0.033	0.899	12	11247	0.082	2.197	12	11247	0.115	3.096
17:00 - 17:30	12	11247	0.045	1.219	12	11247	0.112	3.016	12	11247	0.157	4.235
17:30 - 18:00	12	11247	0.039	1.039	12	11247	0.082	2.197	12	11247	0.121	3.236
18:00 - 18:30	12	11247	0.032	0.859	12	11247	0.054	1.458	12	11247	0.086	2.317
18:30 - 19:00	12	11247	0.072	1.938	12	11247	0.043	1.159	12	11247	0.115	3.097
19:00 - 19:30	6	11047	0.045	1.220	6	11047	0.106	2.847	6	11047	0.151	4.067
19:30 - 20:00	6	11047	0.035	0.936	6	11047	0.054	1.464	6	11047	0.089	2.400
20:00 - 20:30	6	11047	0.023	0.610	6	11047	0.044	1.180	6	11047	0.067	1.790
20:30 - 21:00	6	11047	0.029	0.773	6	11047	0.026	0.691	6	11047	0.055	1.464
21:00 - 21:30	1	22270	0.018	0.484	1	22270	0.009	0.242	1	22270	0.027	0.726
21:30 - 22:00	1	22270	0.013	0.363	1	22270	0.009	0.242	1	22270	0.022	0.605
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			2.017	54.425			1.967	52.980			3.984	107.405

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	190 - 31000 (units: sqm)
Survey date date range:	01/01/12 - 26/09/19
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	4

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
TAXIS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.002	0.059	5	9176	0.002	0.059	5	9176	0.004	0.118
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.002	0.060	12	11247	0.001	0.040	12	11247	0.003	0.100
07:30 - 08:00	12	11247	0.001	0.020	12	11247	0.001	0.040	12	11247	0.002	0.060
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.001	0.040	12	11247	0.001	0.040	12	11247	0.002	0.080
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.001	0.020	12	11247	0.001	0.020	12	11247	0.002	0.040
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.001	0.020	12	11247	0.001	0.020	12	11247	0.002	0.040
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
16:00 - 16:30	12	11247	0.001	0.040	12	11247	0.002	0.060	12	11247	0.003	0.100
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.001	0.020	12	11247	0.001	0.020	12	11247	0.002	0.040
17:30 - 18:00	12	11247	0.001	0.020	12	11247	0.001	0.020	12	11247	0.002	0.040
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.012	0.319			0.011	0.319			0.023	0.638

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
OGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.020	0.529	5	9176	0.020	0.529	5	9176	0.040	1.058
05:30 - 06:00	5	9176	0.020	0.529	5	9176	0.048	1.293	5	9176	0.068	1.822
06:00 - 06:30	5	9176	0.026	0.705	5	9176	0.046	1.234	5	9176	0.072	1.939
06:30 - 07:00	5	9176	0.028	0.764	5	9176	0.050	1.351	5	9176	0.078	2.115
07:00 - 07:30	12	11247	0.024	0.639	12	11247	0.023	0.619	12	11247	0.047	1.258
07:30 - 08:00	12	11247	0.016	0.439	12	11247	0.024	0.659	12	11247	0.040	1.098
08:00 - 08:30	12	11247	0.021	0.559	12	11247	0.024	0.659	12	11247	0.045	1.218
08:30 - 09:00	12	11247	0.026	0.699	12	11247	0.028	0.759	12	11247	0.054	1.458
09:00 - 09:30	12	11247	0.021	0.579	12	11247	0.025	0.679	12	11247	0.046	1.258
09:30 - 10:00	12	11247	0.025	0.679	12	11247	0.018	0.479	12	11247	0.043	1.158
10:00 - 10:30	12	11247	0.027	0.739	12	11247	0.025	0.679	12	11247	0.052	1.418
10:30 - 11:00	12	11247	0.022	0.599	12	11247	0.027	0.739	12	11247	0.049	1.338
11:00 - 11:30	12	11247	0.026	0.699	12	11247	0.024	0.659	12	11247	0.050	1.358
11:30 - 12:00	12	11247	0.018	0.479	12	11247	0.015	0.400	12	11247	0.033	0.879
12:00 - 12:30	12	11247	0.024	0.639	12	11247	0.019	0.499	12	11247	0.043	1.138
12:30 - 13:00	12	11247	0.022	0.599	12	11247	0.015	0.400	12	11247	0.037	0.999
13:00 - 13:30	12	11247	0.021	0.579	12	11247	0.027	0.719	12	11247	0.048	1.298
13:30 - 14:00	12	11247	0.030	0.819	12	11247	0.017	0.459	12	11247	0.047	1.278
14:00 - 14:30	12	11247	0.015	0.400	12	11247	0.018	0.479	12	11247	0.033	0.879
14:30 - 15:00	12	11247	0.019	0.499	12	11247	0.019	0.519	12	11247	0.038	1.018
15:00 - 15:30	12	11247	0.023	0.619	12	11247	0.020	0.539	12	11247	0.043	1.158
15:30 - 16:00	12	11247	0.027	0.719	12	11247	0.016	0.420	12	11247	0.043	1.139
16:00 - 16:30	12	11247	0.030	0.819	12	11247	0.025	0.679	12	11247	0.055	1.498
16:30 - 17:00	12	11247	0.022	0.599	12	11247	0.019	0.499	12	11247	0.041	1.098
17:00 - 17:30	12	11247	0.024	0.659	12	11247	0.019	0.499	12	11247	0.043	1.158
17:30 - 18:00	12	11247	0.022	0.599	12	11247	0.026	0.699	12	11247	0.048	1.298
18:00 - 18:30	12	11247	0.010	0.280	12	11247	0.012	0.320	12	11247	0.022	0.600
18:30 - 19:00	12	11247	0.019	0.519	12	11247	0.011	0.300	12	11247	0.030	0.819
19:00 - 19:30	6	11047	0.020	0.529	6	11047	0.029	0.773	6	11047	0.049	1.302
19:30 - 20:00	6	11047	0.017	0.447	6	11047	0.032	0.854	6	11047	0.049	1.301
20:00 - 20:30	6	11047	0.020	0.529	6	11047	0.032	0.854	6	11047	0.052	1.383
20:30 - 21:00	6	11047	0.014	0.366	6	11047	0.018	0.488	6	11047	0.032	0.854
21:00 - 21:30	1	22270	0.013	0.363	1	22270	0.004	0.121	1	22270	0.017	0.484
21:30 - 22:00	1	22270	0.013	0.363	1	22270	0.000	0.000	1	22270	0.013	0.363
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.725	19.582			0.775	20.858			1.500	40.440

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
CYCLISTS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.007	0.176	5	9176	0.000	0.000	5	9176	0.007	0.176
07:00 - 07:30	12	11247	0.001	0.040	12	11247	0.001	0.040	12	11247	0.002	0.080
07:30 - 08:00	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
08:00 - 08:30	12	11247	0.003	0.080	12	11247	0.000	0.000	12	11247	0.003	0.080
08:30 - 09:00	12	11247	0.004	0.120	12	11247	0.001	0.020	12	11247	0.005	0.140
09:00 - 09:30	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.001	0.040	12	11247	0.001	0.020	12	11247	0.002	0.060
13:30 - 14:00	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
14:00 - 14:30	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
14:30 - 15:00	12	11247	0.001	0.040	12	11247	0.002	0.060	12	11247	0.003	0.100
15:00 - 15:30	12	11247	0.003	0.080	12	11247	0.001	0.040	12	11247	0.004	0.120
15:30 - 16:00	12	11247	0.001	0.040	12	11247	0.002	0.060	12	11247	0.003	0.100
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.001	0.020	12	11247	0.001	0.020
16:30 - 17:00	12	11247	0.003	0.080	12	11247	0.002	0.060	12	11247	0.005	0.140
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.006	0.160	12	11247	0.006	0.160
17:30 - 18:00	12	11247	0.001	0.020	12	11247	0.003	0.080	12	11247	0.004	0.100
18:00 - 18:30	12	11247	0.001	0.020	12	11247	0.002	0.060	12	11247	0.003	0.080
18:30 - 19:00	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.002	0.041	6	11047	0.002	0.041
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.032	0.936			0.024	0.661			0.056	1.597

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
CARS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.039	1.058	5	9176	0.011	0.294	5	9176	0.050	1.352
05:30 - 06:00	5	9176	0.057	1.528	5	9176	0.013	0.353	5	9176	0.070	1.881
06:00 - 06:30	5	9176	0.044	1.175	5	9176	0.022	0.588	5	9176	0.066	1.763
06:30 - 07:00	5	9176	0.142	3.819	5	9176	0.017	0.470	5	9176	0.159	4.289
07:00 - 07:30	12	11247	0.034	0.919	12	11247	0.048	1.298	12	11247	0.082	2.217
07:30 - 08:00	12	11247	0.071	1.918	12	11247	0.007	0.200	12	11247	0.078	2.118
08:00 - 08:30	12	11247	0.041	1.099	12	11247	0.010	0.280	12	11247	0.051	1.379
08:30 - 09:00	12	11247	0.068	1.838	12	11247	0.009	0.240	12	11247	0.077	2.078
09:00 - 09:30	12	11247	0.036	0.979	12	11247	0.013	0.360	12	11247	0.049	1.339
09:30 - 10:00	12	11247	0.025	0.679	12	11247	0.009	0.240	12	11247	0.034	0.919
10:00 - 10:30	12	11247	0.014	0.380	12	11247	0.012	0.320	12	11247	0.026	0.700
10:30 - 11:00	12	11247	0.022	0.599	12	11247	0.017	0.459	12	11247	0.039	1.058
11:00 - 11:30	12	11247	0.011	0.300	12	11247	0.016	0.439	12	11247	0.027	0.739
11:30 - 12:00	12	11247	0.024	0.639	12	11247	0.019	0.499	12	11247	0.043	1.138
12:00 - 12:30	12	11247	0.014	0.380	12	11247	0.017	0.459	12	11247	0.031	0.839
12:30 - 13:00	12	11247	0.016	0.439	12	11247	0.025	0.679	12	11247	0.041	1.118
13:00 - 13:30	12	11247	0.029	0.779	12	11247	0.041	1.119	12	11247	0.070	1.898
13:30 - 14:00	12	11247	0.037	0.999	12	11247	0.027	0.719	12	11247	0.064	1.718
14:00 - 14:30	12	11247	0.031	0.839	12	11247	0.039	1.059	12	11247	0.070	1.898
14:30 - 15:00	12	11247	0.041	1.119	12	11247	0.041	1.099	12	11247	0.082	2.218
15:00 - 15:30	12	11247	0.018	0.479	12	11247	0.056	1.518	12	11247	0.074	1.997
15:30 - 16:00	12	11247	0.012	0.320	12	11247	0.030	0.819	12	11247	0.042	1.139
16:00 - 16:30	12	11247	0.013	0.360	12	11247	0.055	1.478	12	11247	0.068	1.838
16:30 - 17:00	12	11247	0.010	0.260	12	11247	0.051	1.378	12	11247	0.061	1.638
17:00 - 17:30	12	11247	0.012	0.320	12	11247	0.079	2.137	12	11247	0.091	2.457
17:30 - 18:00	12	11247	0.013	0.340	12	11247	0.047	1.278	12	11247	0.060	1.618
18:00 - 18:30	12	11247	0.016	0.439	12	11247	0.034	0.919	12	11247	0.050	1.358
18:30 - 19:00	12	11247	0.049	1.318	12	11247	0.029	0.779	12	11247	0.078	2.097
19:00 - 19:30	6	11047	0.014	0.366	6	11047	0.074	1.993	6	11047	0.088	2.359
19:30 - 20:00	6	11047	0.012	0.325	6	11047	0.017	0.447	6	11047	0.029	0.772
20:00 - 20:30	6	11047	0.002	0.041	6	11047	0.012	0.325	6	11047	0.014	0.366
20:30 - 21:00	6	11047	0.009	0.244	6	11047	0.003	0.081	6	11047	0.012	0.325
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.976	26.297			0.900	24.326			1.876	50.623

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
LGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.002	0.059	5	9176	0.002	0.059
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.002	0.059	5	9176	0.002	0.059	5	9176	0.004	0.118
06:30 - 07:00	5	9176	0.007	0.176	5	9176	0.002	0.059	5	9176	0.009	0.235
07:00 - 07:30	12	11247	0.010	0.280	12	11247	0.007	0.180	12	11247	0.017	0.460
07:30 - 08:00	12	11247	0.009	0.240	12	11247	0.006	0.160	12	11247	0.015	0.400
08:00 - 08:30	12	11247	0.007	0.180	12	11247	0.015	0.400	12	11247	0.022	0.580
08:30 - 09:00	12	11247	0.009	0.240	12	11247	0.006	0.160	12	11247	0.015	0.400
09:00 - 09:30	12	11247	0.015	0.400	12	11247	0.004	0.100	12	11247	0.019	0.500
09:30 - 10:00	12	11247	0.010	0.260	12	11247	0.014	0.380	12	11247	0.024	0.640
10:00 - 10:30	12	11247	0.008	0.220	12	11247	0.008	0.220	12	11247	0.016	0.440
10:30 - 11:00	12	11247	0.009	0.240	12	11247	0.010	0.280	12	11247	0.019	0.520
11:00 - 11:30	12	11247	0.007	0.200	12	11247	0.007	0.200	12	11247	0.014	0.400
11:30 - 12:00	12	11247	0.013	0.360	12	11247	0.010	0.280	12	11247	0.023	0.640
12:00 - 12:30	12	11247	0.012	0.320	12	11247	0.010	0.260	12	11247	0.022	0.580
12:30 - 13:00	12	11247	0.010	0.280	12	11247	0.009	0.240	12	11247	0.019	0.520
13:00 - 13:30	12	11247	0.008	0.220	12	11247	0.010	0.260	12	11247	0.018	0.480
13:30 - 14:00	12	11247	0.011	0.300	12	11247	0.010	0.260	12	11247	0.021	0.560
14:00 - 14:30	12	11247	0.007	0.200	12	11247	0.012	0.320	12	11247	0.019	0.520
14:30 - 15:00	12	11247	0.010	0.260	12	11247	0.003	0.080	12	11247	0.013	0.340
15:00 - 15:30	12	11247	0.010	0.280	12	11247	0.013	0.360	12	11247	0.023	0.640
15:30 - 16:00	12	11247	0.006	0.160	12	11247	0.009	0.240	12	11247	0.015	0.400
16:00 - 16:30	12	11247	0.011	0.300	12	11247	0.009	0.240	12	11247	0.020	0.540
16:30 - 17:00	12	11247	0.001	0.040	12	11247	0.006	0.160	12	11247	0.007	0.200
17:00 - 17:30	12	11247	0.007	0.180	12	11247	0.007	0.200	12	11247	0.014	0.380
17:30 - 18:00	12	11247	0.002	0.060	12	11247	0.002	0.060	12	11247	0.004	0.120
18:00 - 18:30	12	11247	0.002	0.060	12	11247	0.004	0.100	12	11247	0.006	0.160
18:30 - 19:00	12	11247	0.001	0.020	12	11247	0.001	0.040	12	11247	0.002	0.060
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.003	0.081	6	11047	0.003	0.081
19:30 - 20:00	6	11047	0.003	0.081	6	11047	0.003	0.081	6	11047	0.006	0.162
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.003	0.081	6	11047	0.003	0.081	6	11047	0.006	0.162
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.210	5.697			0.207	5.600			0.417	11.297

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
MOTOR CYCLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.002	0.059	5	9176	0.000	0.000	5	9176	0.002	0.059
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.001	0.020	12	11247	0.001	0.020
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.001	0.040	12	11247	0.000	0.000	12	11247	0.001	0.040
14:00 - 14:30	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.001	0.040	12	11247	0.001	0.040
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.002	0.060	12	11247	0.002	0.060
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.001	0.020	12	11247	0.000	0.000	12	11247	0.001	0.020
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.009	0.239			0.004	0.120			0.013	0.359

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Light Vehicles (LV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Rigid Trucks - No Trailer (OGV1)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Trucks Towing Trailers (OGV2)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Buses
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Non-Motorised Vehicles (NMV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Cycles
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Scooters
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Non-Vehicular People Movements (NVPM)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2696 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
05:30 - 06:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:00 - 06:30	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
06:30 - 07:00	5	9176	0.000	0.000	5	9176	0.000	0.000	5	9176	0.000	0.000
07:00 - 07:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
07:30 - 08:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:00 - 08:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
08:30 - 09:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:00 - 09:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
09:30 - 10:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:00 - 10:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
10:30 - 11:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:00 - 11:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
11:30 - 12:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:00 - 12:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
12:30 - 13:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:00 - 13:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
13:30 - 14:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:00 - 14:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
14:30 - 15:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:00 - 15:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
15:30 - 16:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:00 - 16:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
16:30 - 17:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:00 - 17:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
17:30 - 18:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:00 - 18:30	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
18:30 - 19:00	12	11247	0.000	0.000	12	11247	0.000	0.000	12	11247	0.000	0.000
19:00 - 19:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
19:30 - 20:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:00 - 20:30	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
20:30 - 21:00	6	11047	0.000	0.000	6	11047	0.000	0.000	6	11047	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-441201-200629-0634

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	1 days
	HC	HAMPSHIRE	1 days
03	SOUTH WEST		
	WL	WILTSHIRE	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	WY	WEST YORKSHIRE	1 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
09	NORTH		
	DH	DURHAM	2 days
10	WALES		
	CO	CONWY	1 days
13	MUNSTER		
	CR	CORK	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	2 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 186 to 12474 (units: sqm)
Range Selected by User: 178 to 175000 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 25/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	7 days
Wednesday	3 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	13 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	3
Edge of Town	8
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	1
Commercial Zone	2
Development Zone	1
Residential Zone	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B1	13 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	3 days
5,001 to 10,000	3 days
10,001 to 15,000	3 days
25,001 to 50,000	3 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	1 days
75,001 to 100,000	1 days
100,001 to 125,000	2 days
125,001 to 250,000	4 days
250,001 to 500,000	4 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	4 days
1.1 to 1.5	7 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	12 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	13 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AN-02-A-06 SPORTS ADMINISTRATION ANTRIM
UPPER MALONE ROAD
BELFAST

Edge of Town
Residential Zone
Total Gross floor area: 2217 sqm
Survey date: TUESDAY *20/11/18* *Survey Type: MANUAL*

2 CA-02-A-06 OFFICES CAMBRIDGESHIRE
LYNCH WOOD
PETERBOROUGH

Edge of Town
Commercial Zone
Total Gross floor area: 4040 sqm
Survey date: WEDNESDAY *19/10/16* *Survey Type: MANUAL*

3 CO-02-A-01 GOVERNMENT OFFICES CONWY
NARROW LANE
LLANDUDNO JUNCTION

Edge of Town
Commercial Zone
Total Gross floor area: 6186 sqm
Survey date: WEDNESDAY *28/03/18* *Survey Type: MANUAL*

4 CR-02-A-01 STATISTICS OFFICES CORK
MAHON CRESCENT
CORK

Edge of Town
No Sub Category
Total Gross floor area: 8600 sqm
Survey date: MONDAY *23/06/14* *Survey Type: MANUAL*

5 DH-02-A-02 CONSTRUCTION COMPANY DURHAM
DURHAM ROAD
NEAR DURHAM
BOWBURN
Edge of Town
Industrial Zone
Total Gross floor area: 2000 sqm
Survey date: TUESDAY *27/11/12* *Survey Type: MANUAL*

6 DH-02-A-03 ENGINEERING COMPANY DURHAM
ALDERMAN BEST WAY
DARLINGTON

Edge of Town
No Sub Category
Total Gross floor area: 3530 sqm
Survey date: THURSDAY *18/10/18* *Survey Type: MANUAL*

7 DL-02-A-05 OFFICE DUBLIN
GORT MUIRE
DUBLIN
BALLINTEER
Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Gross floor area: 12474 sqm
Survey date: TUESDAY *10/09/13* *Survey Type: MANUAL*

8 DL-02-A-07 OFFICES DUBLIN
BELGARD SQUARE EAST
DUBLIN
TALLAGHT
Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Gross floor area: 3230 sqm
Survey date: WEDNESDAY *20/06/18* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9	ES-02-A-11 THE SIDINGS HASTINGS ORE VALLEY Suburban Area (PPS6 Out of Centre) Residential Zone Total Gross floor area: *Survey date: TUESDAY*	HOUSING COMPANY	186 sqm *17/11/15*	EAST SUSSEX *Survey Type: MANUAL*
10	HC-02-A-12 NORTHERN ROAD PORTSMOUTH COSHAM Suburban Area (PPS6 Out of Centre) No Sub Category Total Gross floor area: *Survey date: MONDAY*	HMRC	10100 sqm *23/11/15*	HAMPSHIRE *Survey Type: MANUAL*
11	LC-02-A-09 FURTHERGATE BLACKBURN Suburban Area (PPS6 Out of Centre) Built-Up Zone Total Gross floor area: *Survey date: TUESDAY*	OFFICES	2600 sqm *04/06/13*	LANCASHIRE *Survey Type: MANUAL*
12	WL-02-A-01 THE CRESCENT AMESBURY SUNRISE WAY Edge of Town Development Zone Total Gross floor area: *Survey date: TUESDAY*	PET INSURANCE COMPANY	2500 sqm *18/09/18*	WILTSHIRE *Survey Type: MANUAL*
13	WY-02-A-05 PIONEER WAY CASTLEFORD WHITWOOD Edge of Town No Sub Category Total Gross floor area: *Survey date: TUESDAY*	OFFICES	1230 sqm *23/05/17*	WEST YORKSHIRE *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.406	1.331	1	10100	0.030	0.097	1	10100	0.436	1.428
06:30 - 07:00	1	10100	0.703	2.306	1	10100	0.139	0.455	1	10100	0.842	2.761
07:00 - 07:30	13	4527	0.241	0.791	13	4527	0.024	0.078	13	4527	0.265	0.869
07:30 - 08:00	13	4527	0.459	1.505	13	4527	0.059	0.195	13	4527	0.518	1.700
08:00 - 08:30	13	4527	0.765	2.508	13	4527	0.058	0.190	13	4527	0.823	2.698
08:30 - 09:00	13	4527	0.913	2.993	13	4527	0.058	0.190	13	4527	0.971	3.183
09:00 - 09:30	13	4527	0.704	2.308	13	4527	0.078	0.256	13	4527	0.782	2.564
09:30 - 10:00	13	4527	0.335	1.098	13	4527	0.099	0.323	13	4527	0.434	1.421
10:00 - 10:30	13	4527	0.177	0.580	13	4527	0.087	0.284	13	4527	0.264	0.864
10:30 - 11:00	13	4527	0.110	0.362	13	4527	0.054	0.178	13	4527	0.164	0.540
11:00 - 11:30	13	4527	0.073	0.240	13	4527	0.075	0.245	13	4527	0.148	0.485
11:30 - 12:00	13	4527	0.095	0.312	13	4527	0.092	0.301	13	4527	0.187	0.613
12:00 - 12:30	13	4527	0.102	0.334	13	4527	0.190	0.624	13	4527	0.292	0.958
12:30 - 13:00	13	4527	0.197	0.647	13	4527	0.260	0.853	13	4527	0.457	1.500
13:00 - 13:30	13	4527	0.214	0.702	13	4527	0.248	0.814	13	4527	0.462	1.516
13:30 - 14:00	13	4527	0.195	0.641	13	4527	0.150	0.490	13	4527	0.345	1.131
14:00 - 14:30	13	4527	0.168	0.552	13	4527	0.146	0.479	13	4527	0.314	1.031
14:30 - 15:00	13	4527	0.117	0.385	13	4527	0.235	0.769	13	4527	0.352	1.154
15:00 - 15:30	13	4527	0.090	0.295	13	4527	0.272	0.892	13	4527	0.362	1.187
15:30 - 16:00	13	4527	0.063	0.206	13	4527	0.263	0.864	13	4527	0.326	1.070
16:00 - 16:30	13	4527	0.078	0.256	13	4527	0.464	1.522	13	4527	0.542	1.778
16:30 - 17:00	13	4527	0.102	0.334	13	4527	0.545	1.789	13	4527	0.647	2.123
17:00 - 17:30	13	4527	0.070	0.229	13	4527	0.916	3.004	13	4527	0.986	3.233
17:30 - 18:00	13	4527	0.071	0.234	13	4527	0.557	1.828	13	4527	0.628	2.062
18:00 - 18:30	12	4802	0.023	0.074	12	4802	0.378	1.241	12	4802	0.401	1.315
18:30 - 19:00	12	4802	0.023	0.074	12	4802	0.182	0.598	12	4802	0.205	0.672
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			6.494	21.297			5.659	18.559			12.153	39.856

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	186 - 12474 (units: sqm)
Survey date date range:	01/01/12 - 25/09/19
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
TAXIS
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
08:00 - 08:30	13	4527	0.002	0.006	13	4527	0.000	0.000	13	4527	0.002	0.006
08:30 - 09:00	13	4527	0.005	0.017	13	4527	0.005	0.017	13	4527	0.010	0.034
09:00 - 09:30	13	4527	0.003	0.011	13	4527	0.005	0.017	13	4527	0.008	0.028
09:30 - 10:00	13	4527	0.010	0.033	13	4527	0.008	0.028	13	4527	0.018	0.061
10:00 - 10:30	13	4527	0.003	0.011	13	4527	0.005	0.017	13	4527	0.008	0.028
10:30 - 11:00	13	4527	0.002	0.006	13	4527	0.005	0.017	13	4527	0.007	0.023
11:00 - 11:30	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
11:30 - 12:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
12:00 - 12:30	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
12:30 - 13:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
13:00 - 13:30	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
13:30 - 14:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
14:00 - 14:30	13	4527	0.002	0.006	13	4527	0.003	0.011	13	4527	0.005	0.017
14:30 - 15:00	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
15:00 - 15:30	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
15:30 - 16:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
16:00 - 16:30	13	4527	0.003	0.011	13	4527	0.003	0.011	13	4527	0.006	0.022
16:30 - 17:00	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
17:00 - 17:30	13	4527	0.008	0.028	13	4527	0.008	0.028	13	4527	0.016	0.056
17:30 - 18:00	13	4527	0.005	0.017	13	4527	0.007	0.022	13	4527	0.012	0.039
18:00 - 18:30	12	4802	0.003	0.011	12	4802	0.003	0.011	12	4802	0.006	0.022
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.071	0.238			0.074	0.245			0.145	0.483

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
OGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.010	0.032	1	10100	0.010	0.032	1	10100	0.020	0.064
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.003	0.011	13	4527	0.003	0.011	13	4527	0.006	0.022
08:30 - 09:00	13	4527	0.003	0.011	13	4527	0.000	0.000	13	4527	0.003	0.011
09:00 - 09:30	13	4527	0.002	0.006	13	4527	0.005	0.017	13	4527	0.007	0.023
09:30 - 10:00	13	4527	0.005	0.017	13	4527	0.003	0.011	13	4527	0.008	0.028
10:00 - 10:30	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.002	0.006	13	4527	0.002	0.006
11:00 - 11:30	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
11:30 - 12:00	13	4527	0.002	0.006	13	4527	0.003	0.011	13	4527	0.005	0.017
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.002	0.006	13	4527	0.003	0.011	13	4527	0.005	0.017
13:30 - 14:00	13	4527	0.002	0.006	13	4527	0.000	0.000	13	4527	0.002	0.006
14:00 - 14:30	13	4527	0.003	0.011	13	4527	0.003	0.011	13	4527	0.006	0.022
14:30 - 15:00	13	4527	0.002	0.006	13	4527	0.000	0.000	13	4527	0.002	0.006
15:00 - 15:30	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.002	0.006	13	4527	0.002	0.006
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.042	0.140			0.040	0.134			0.082	0.274

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
PSVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.003	0.011	13	4527	0.000	0.000	13	4527	0.003	0.011
08:00 - 08:30	13	4527	0.005	0.017	13	4527	0.000	0.000	13	4527	0.005	0.017
08:30 - 09:00	13	4527	0.005	0.017	13	4527	0.000	0.000	13	4527	0.005	0.017
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.010	0.033	13	4527	0.010	0.033
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.008	0.028	13	4527	0.008	0.028
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.003	0.011	13	4527	0.003	0.011
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.013	0.045			0.021	0.072			0.034	0.117

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
CYCLISTS
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.010	0.032	1	10100	0.000	0.000	1	10100	0.010	0.032
06:30 - 07:00	1	10100	0.010	0.032	1	10100	0.000	0.000	1	10100	0.010	0.032
07:00 - 07:30	13	4527	0.005	0.017	13	4527	0.000	0.000	13	4527	0.005	0.017
07:30 - 08:00	13	4527	0.012	0.039	13	4527	0.002	0.006	13	4527	0.014	0.045
08:00 - 08:30	13	4527	0.024	0.078	13	4527	0.000	0.000	13	4527	0.024	0.078
08:30 - 09:00	13	4527	0.027	0.089	13	4527	0.000	0.000	13	4527	0.027	0.089
09:00 - 09:30	13	4527	0.015	0.050	13	4527	0.000	0.000	13	4527	0.015	0.050
09:30 - 10:00	13	4527	0.008	0.028	13	4527	0.000	0.000	13	4527	0.008	0.028
10:00 - 10:30	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
10:30 - 11:00	13	4527	0.003	0.011	13	4527	0.003	0.011	13	4527	0.006	0.022
11:00 - 11:30	13	4527	0.002	0.006	13	4527	0.000	0.000	13	4527	0.002	0.006
11:30 - 12:00	13	4527	0.002	0.006	13	4527	0.000	0.000	13	4527	0.002	0.006
12:00 - 12:30	13	4527	0.002	0.006	13	4527	0.005	0.017	13	4527	0.007	0.023
12:30 - 13:00	13	4527	0.003	0.011	13	4527	0.000	0.000	13	4527	0.003	0.011
13:00 - 13:30	13	4527	0.003	0.011	13	4527	0.002	0.006	13	4527	0.005	0.017
13:30 - 14:00	13	4527	0.002	0.006	13	4527	0.002	0.006	13	4527	0.004	0.012
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.005	0.017	13	4527	0.005	0.017
14:30 - 15:00	13	4527	0.003	0.011	13	4527	0.007	0.022	13	4527	0.010	0.033
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.007	0.022	13	4527	0.007	0.022
15:30 - 16:00	13	4527	0.003	0.011	13	4527	0.007	0.022	13	4527	0.010	0.033
16:00 - 16:30	13	4527	0.003	0.011	13	4527	0.008	0.028	13	4527	0.011	0.039
16:30 - 17:00	13	4527	0.002	0.006	13	4527	0.020	0.067	13	4527	0.022	0.073
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.019	0.061	13	4527	0.019	0.061
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.020	0.067	13	4527	0.020	0.067
18:00 - 18:30	12	4802	0.002	0.006	12	4802	0.016	0.051	12	4802	0.018	0.057
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.143	0.473			0.125	0.409			0.268	0.882

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Light Vehicles (LV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Rigid Trucks - No Trailer (OGV1)
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Trucks Towing Trailers (OGV2)
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Buses
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Non-Motorised Vehicles (NMV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Cycles
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Scooters
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Non-Vehicular People Movements (NVPM)
Calculation factor: 100 sqm
Estimated TRIP rate value per 328 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30												
05:30 - 06:00												
06:00 - 06:30	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
06:30 - 07:00	1	10100	0.000	0.000	1	10100	0.000	0.000	1	10100	0.000	0.000
07:00 - 07:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
07:30 - 08:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:00 - 08:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
08:30 - 09:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:00 - 09:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
09:30 - 10:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:00 - 10:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
10:30 - 11:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:00 - 11:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
11:30 - 12:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:00 - 12:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
12:30 - 13:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:00 - 13:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
13:30 - 14:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:00 - 14:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
14:30 - 15:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:00 - 15:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
15:30 - 16:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:00 - 16:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
16:30 - 17:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:00 - 17:30	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
17:30 - 18:00	13	4527	0.000	0.000	13	4527	0.000	0.000	13	4527	0.000	0.000
18:00 - 18:30	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
18:30 - 19:00	12	4802	0.000	0.000	12	4802	0.000	0.000	12	4802	0.000	0.000
19:00 - 19:30												
19:30 - 20:00												
20:00 - 20:30												
20:30 - 21:00												
21:00 - 21:30												
21:30 - 22:00												
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-441201-200629-0612

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : F - WAREHOUSING (COMMERCIAL)
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	1 days
	KC	KENT	1 days
03	SOUTH WEST		
	DV	DEVON	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	WY	WEST YORKSHIRE	1 days
09	NORTH		
	TW	TYNE & WEAR	1 days
10	WALES		
	BG	BRIDGEND	1 days
14	LEINSTER		
	LU	LOUTH	1 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 190 to 31000 (units: sqm)
Range Selected by User: 190 to 80066 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 26/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Thursday	3 days
Friday	6 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	11 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	3
Edge of Town	8

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	10
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B8	10 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
5,001 to 10,000	3 days
10,001 to 15,000	1 days
15,001 to 20,000	3 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	2 days
25,001 to 50,000	2 days
75,001 to 100,000	1 days
125,001 to 250,000	3 days
250,001 to 500,000	3 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	6 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	10 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	11 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AN-02-F-03 PACKAGING COMPANY ANTRIM
KENNEDY WAY
BELFAST
KENNEDY WAY IND. EST.
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 12234 sqm
Survey date: TUESDAY 11/10/16 *Survey Type: MANUAL*

2 AN-02-F-04 TESCO DISTRIBUTION CENTRE ANTRIM
APOLLO ROAD
BELFAST
BALMORAL
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 11000 sqm
Survey date: THURSDAY 14/03/19 *Survey Type: MANUAL*

3 BG-02-F-01 LOGISTICS COMPANY BRIDGEND
PARC CRESCENT
BRIDGEND
WATERTON IND. EST.
Edge of Town
Industrial Zone
Total Gross floor area: 3050 sqm
Survey date: MONDAY 13/10/14 *Survey Type: MANUAL*

4 DV-02-F-01 OPTICS WAREHOUSE DEVON
ALDERS WAY
PAIGNTON

Edge of Town
Industrial Zone
Total Gross floor area: 190 sqm
Survey date: FRIDAY 29/03/19 *Survey Type: MANUAL*

5 EX-02-F-01 SPORTS SUPPLEMENTS ESSEX
BRUNEL WAY
COLCHESTER
SEVERALLS INDUSTRIAL PK
Edge of Town
Industrial Zone
Total Gross floor area: 6560 sqm
Survey date: FRIDAY 18/05/18 *Survey Type: MANUAL*

6 KC-02-F-02 COMMERCIAL WAREHOUSING KENT
MILLS ROAD
AYLESFORD
QUARRY WOOD
Edge of Town
Industrial Zone
Total Gross floor area: 11200 sqm
Survey date: FRIDAY 22/09/17 *Survey Type: MANUAL*

7 LU-02-F-01 PACKAGING COMPANY LOUTH
MATTHEWS LANE
DROGHEDA
LAGAVOOREN
Edge of Town
No Sub Category
Total Gross floor area: 5350 sqm
Survey date: FRIDAY 19/06/15 *Survey Type: MANUAL*

8 SF-02-F-02 WAREHOUSING SUFFOLK
WALTON ROAD
FELIXSTOWE

Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY 11/07/13 *Survey Type: MANUAL*

9 SF-02-F-03 ROAD HAULAGE SUFFOLK
CENTRAL AVENUE
IPSWICH
WARREN HEATH
Edge of Town
Industrial Zone
Total Gross floor area: 4700 sqm
Survey date: FRIDAY 18/09/15 *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

10 TW-02-F-01 ASDA DISTRIBUTION CENTRE TYNE & WEAR
MANDARIN WAY
WASHINGTON
PATTISON IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 31000 sqm
Survey date: FRIDAY *13/11/15* *Survey Type: MANUAL*

11 WY-02-F-02 DISTRIBUTION COMPANY WEST YORKSHIRE
STAITHGATE LANE
BRADFORD
NEWHALL
Edge of Town
Industrial Zone
Total Gross floor area: 10446 sqm
Survey date: THURSDAY *14/03/19* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
BE-02-F-01	N/A
CB-02-F-01	N/A
CC-02-F-01	N/A
GA-02-F-01	N/A
HC-02-F-02	N/A

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.066	1.758	4	10977	0.034	0.909	4	10977	0.100	2.667
05:30 - 06:00	4	10977	0.080	2.122	4	10977	0.064	1.698	4	10977	0.144	3.820
06:00 - 06:30	4	10977	0.080	2.122	4	10977	0.075	2.001	4	10977	0.155	4.123
06:30 - 07:00	4	10977	0.191	5.093	4	10977	0.073	1.940	4	10977	0.264	7.033
07:00 - 07:30	11	10512	0.080	2.118	11	10512	0.091	2.417	11	10512	0.171	4.535
07:30 - 08:00	11	10512	0.094	2.509	11	10512	0.046	1.220	11	10512	0.140	3.729
08:00 - 08:30	11	10512	0.067	1.796	11	10512	0.054	1.450	11	10512	0.121	3.246
08:30 - 09:00	11	10512	0.098	2.601	11	10512	0.054	1.427	11	10512	0.152	4.028
09:00 - 09:30	11	10512	0.079	2.095	11	10512	0.048	1.266	11	10512	0.127	3.361
09:30 - 10:00	11	10512	0.066	1.750	11	10512	0.044	1.174	11	10512	0.110	2.924
10:00 - 10:30	11	10512	0.056	1.496	11	10512	0.057	1.519	11	10512	0.113	3.015
10:30 - 11:00	11	10512	0.054	1.450	11	10512	0.056	1.496	11	10512	0.110	2.946
11:00 - 11:30	11	10512	0.049	1.312	11	10512	0.048	1.289	11	10512	0.097	2.601
11:30 - 12:00	11	10512	0.058	1.542	11	10512	0.053	1.404	11	10512	0.111	2.946
12:00 - 12:30	11	10512	0.056	1.496	11	10512	0.042	1.128	11	10512	0.098	2.624
12:30 - 13:00	11	10512	0.052	1.381	11	10512	0.048	1.266	11	10512	0.100	2.647
13:00 - 13:30	11	10512	0.056	1.496	11	10512	0.080	2.118	11	10512	0.136	3.614
13:30 - 14:00	11	10512	0.086	2.302	11	10512	0.048	1.289	11	10512	0.134	3.591
14:00 - 14:30	11	10512	0.054	1.450	11	10512	0.073	1.934	11	10512	0.127	3.384
14:30 - 15:00	11	10512	0.082	2.187	11	10512	0.074	1.980	11	10512	0.156	4.167
15:00 - 15:30	11	10512	0.055	1.473	11	10512	0.096	2.555	11	10512	0.151	4.028
15:30 - 16:00	11	10512	0.056	1.496	11	10512	0.064	1.704	11	10512	0.120	3.200
16:00 - 16:30	11	10512	0.065	1.727	11	10512	0.098	2.601	11	10512	0.163	4.328
16:30 - 17:00	11	10512	0.042	1.128	11	10512	0.089	2.371	11	10512	0.131	3.499
17:00 - 17:30	11	10512	0.054	1.450	11	10512	0.097	2.578	11	10512	0.151	4.028
17:30 - 18:00	11	10512	0.035	0.921	11	10512	0.082	2.187	11	10512	0.117	3.108
18:00 - 18:30	11	10512	0.025	0.668	11	10512	0.052	1.381	11	10512	0.077	2.049
18:30 - 19:00	11	10512	0.066	1.750	11	10512	0.041	1.082	11	10512	0.107	2.832
19:00 - 19:30	4	10977	0.046	1.213	4	10977	0.068	1.819	4	10977	0.114	3.032
19:30 - 20:00	4	10977	0.041	1.091	4	10977	0.052	1.394	4	10977	0.093	2.485
20:00 - 20:30	4	10977	0.027	0.728	4	10977	0.052	1.394	4	10977	0.079	2.122
20:30 - 21:00	4	10977	0.034	0.909	4	10977	0.030	0.788	4	10977	0.064	1.697
21:00 - 21:30	1	22270	0.018	0.478	1	22270	0.009	0.239	1	22270	0.027	0.717
21:30 - 22:00	1	22270	0.013	0.359	1	22270	0.009	0.239	1	22270	0.022	0.598
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			2.081	55.467			2.001	53.257			4.082	108.724

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	190 - 31000 (units: sqm)
Survey date date range:	01/01/12 - 26/09/19
Number of weekdays (Monday-Friday):	11
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	5

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
TAXIS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.002	0.061	4	10977	0.002	0.061	4	10977	0.004	0.122
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.003	0.069	11	10512	0.002	0.046	11	10512	0.005	0.115
07:30 - 08:00	11	10512	0.001	0.023	11	10512	0.002	0.046	11	10512	0.003	0.069
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
10:30 - 11:00	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
16:00 - 16:30	11	10512	0.003	0.069	11	10512	0.003	0.092	11	10512	0.006	0.161
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
17:30 - 18:00	11	10512	0.001	0.023	11	10512	0.001	0.023	11	10512	0.002	0.046
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.016	0.383			0.015	0.383			0.031	0.766

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
OGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.020	0.546	4	10977	0.020	0.546	4	10977	0.040	1.092
05:30 - 06:00	4	10977	0.020	0.546	4	10977	0.050	1.334	4	10977	0.070	1.880
06:00 - 06:30	4	10977	0.025	0.667	4	10977	0.048	1.273	4	10977	0.073	1.940
06:30 - 07:00	4	10977	0.027	0.728	4	10977	0.052	1.394	4	10977	0.079	2.122
07:00 - 07:30	11	10512	0.027	0.714	11	10512	0.029	0.783	11	10512	0.056	1.497
07:30 - 08:00	11	10512	0.017	0.460	11	10512	0.027	0.714	11	10512	0.044	1.174
08:00 - 08:30	11	10512	0.025	0.668	11	10512	0.030	0.806	11	10512	0.055	1.474
08:30 - 09:00	11	10512	0.026	0.691	11	10512	0.033	0.875	11	10512	0.059	1.566
09:00 - 09:30	11	10512	0.024	0.645	11	10512	0.028	0.737	11	10512	0.052	1.382
09:30 - 10:00	11	10512	0.027	0.714	11	10512	0.020	0.529	11	10512	0.047	1.243
10:00 - 10:30	11	10512	0.031	0.829	11	10512	0.030	0.806	11	10512	0.061	1.635
10:30 - 11:00	11	10512	0.021	0.553	11	10512	0.025	0.668	11	10512	0.046	1.221
11:00 - 11:30	11	10512	0.029	0.760	11	10512	0.026	0.691	11	10512	0.055	1.451
11:30 - 12:00	11	10512	0.016	0.437	11	10512	0.020	0.529	11	10512	0.036	0.966
12:00 - 12:30	11	10512	0.028	0.737	11	10512	0.018	0.483	11	10512	0.046	1.220
12:30 - 13:00	11	10512	0.024	0.645	11	10512	0.014	0.368	11	10512	0.038	1.013
13:00 - 13:30	11	10512	0.021	0.553	11	10512	0.030	0.806	11	10512	0.051	1.359
13:30 - 14:00	11	10512	0.035	0.921	11	10512	0.016	0.437	11	10512	0.051	1.358
14:00 - 14:30	11	10512	0.016	0.437	11	10512	0.018	0.483	11	10512	0.034	0.920
14:30 - 15:00	11	10512	0.022	0.599	11	10512	0.022	0.599	11	10512	0.044	1.198
15:00 - 15:30	11	10512	0.028	0.737	11	10512	0.022	0.599	11	10512	0.050	1.336
15:30 - 16:00	11	10512	0.034	0.898	11	10512	0.020	0.529	11	10512	0.054	1.427
16:00 - 16:30	11	10512	0.039	1.036	11	10512	0.029	0.760	11	10512	0.068	1.796
16:30 - 17:00	11	10512	0.028	0.737	11	10512	0.022	0.576	11	10512	0.050	1.313
17:00 - 17:30	11	10512	0.029	0.760	11	10512	0.016	0.437	11	10512	0.045	1.197
17:30 - 18:00	11	10512	0.024	0.645	11	10512	0.029	0.783	11	10512	0.053	1.428
18:00 - 18:30	11	10512	0.012	0.322	11	10512	0.015	0.391	11	10512	0.027	0.713
18:30 - 19:00	11	10512	0.022	0.599	11	10512	0.013	0.345	11	10512	0.035	0.944
19:00 - 19:30	4	10977	0.023	0.606	4	10977	0.030	0.788	4	10977	0.053	1.394
19:30 - 20:00	4	10977	0.023	0.606	4	10977	0.032	0.849	4	10977	0.055	1.455
20:00 - 20:30	4	10977	0.025	0.667	4	10977	0.043	1.152	4	10977	0.068	1.819
20:30 - 21:00	4	10977	0.016	0.424	4	10977	0.023	0.606	4	10977	0.039	1.030
21:00 - 21:30	1	22270	0.013	0.359	1	22270	0.004	0.120	1	22270	0.017	0.479
21:30 - 22:00	1	22270	0.013	0.359	1	22270	0.000	0.000	1	22270	0.013	0.359
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.810	21.605			0.854	22.796			1.664	44.401

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
CYCLISTS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.005	0.121	4	10977	0.000	0.000	4	10977	0.005	0.121
07:00 - 07:30	11	10512	0.002	0.046	11	10512	0.001	0.023	11	10512	0.003	0.069
07:30 - 08:00	11	10512	0.002	0.046	11	10512	0.000	0.000	11	10512	0.002	0.046
08:00 - 08:30	11	10512	0.003	0.069	11	10512	0.000	0.000	11	10512	0.003	0.069
08:30 - 09:00	11	10512	0.005	0.138	11	10512	0.001	0.023	11	10512	0.006	0.161
09:00 - 09:30	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.002	0.046	11	10512	0.000	0.000	11	10512	0.002	0.046
13:30 - 14:00	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
14:00 - 14:30	11	10512	0.002	0.046	11	10512	0.000	0.000	11	10512	0.002	0.046
14:30 - 15:00	11	10512	0.002	0.046	11	10512	0.002	0.046	11	10512	0.004	0.092
15:00 - 15:30	11	10512	0.003	0.092	11	10512	0.002	0.046	11	10512	0.005	0.138
15:30 - 16:00	11	10512	0.002	0.046	11	10512	0.003	0.069	11	10512	0.005	0.115
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.001	0.023	11	10512	0.001	0.023
16:30 - 17:00	11	10512	0.003	0.092	11	10512	0.003	0.069	11	10512	0.006	0.161
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.006	0.161	11	10512	0.006	0.161
17:30 - 18:00	11	10512	0.001	0.023	11	10512	0.003	0.092	11	10512	0.004	0.115
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.003	0.069	11	10512	0.003	0.069
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.035	0.880			0.025	0.621			0.060	1.501

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
CARS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.041	1.091	4	10977	0.011	0.303	4	10977	0.052	1.394
05:30 - 06:00	4	10977	0.059	1.576	4	10977	0.014	0.364	4	10977	0.073	1.940
06:00 - 06:30	4	10977	0.046	1.213	4	10977	0.023	0.606	4	10977	0.069	1.819
06:30 - 07:00	4	10977	0.148	3.941	4	10977	0.018	0.485	4	10977	0.166	4.426
07:00 - 07:30	11	10512	0.036	0.967	11	10512	0.053	1.404	11	10512	0.089	2.371
07:30 - 08:00	11	10512	0.064	1.704	11	10512	0.010	0.276	11	10512	0.074	1.980
08:00 - 08:30	11	10512	0.034	0.898	11	10512	0.009	0.230	11	10512	0.043	1.128
08:30 - 09:00	11	10512	0.059	1.565	11	10512	0.009	0.230	11	10512	0.068	1.795
09:00 - 09:30	11	10512	0.039	1.036	11	10512	0.015	0.391	11	10512	0.054	1.427
09:30 - 10:00	11	10512	0.027	0.714	11	10512	0.010	0.253	11	10512	0.037	0.967
10:00 - 10:30	11	10512	0.014	0.368	11	10512	0.015	0.391	11	10512	0.029	0.759
10:30 - 11:00	11	10512	0.021	0.553	11	10512	0.017	0.460	11	10512	0.038	1.013
11:00 - 11:30	11	10512	0.013	0.345	11	10512	0.015	0.391	11	10512	0.028	0.736
11:30 - 12:00	11	10512	0.025	0.668	11	10512	0.020	0.529	11	10512	0.045	1.197
12:00 - 12:30	11	10512	0.016	0.414	11	10512	0.016	0.414	11	10512	0.032	0.828
12:30 - 13:00	11	10512	0.015	0.391	11	10512	0.023	0.622	11	10512	0.038	1.013
13:00 - 13:30	11	10512	0.026	0.691	11	10512	0.039	1.036	11	10512	0.065	1.727
13:30 - 14:00	11	10512	0.036	0.967	11	10512	0.022	0.576	11	10512	0.058	1.543
14:00 - 14:30	11	10512	0.029	0.760	11	10512	0.041	1.082	11	10512	0.070	1.842
14:30 - 15:00	11	10512	0.046	1.220	11	10512	0.047	1.243	11	10512	0.093	2.463
15:00 - 15:30	11	10512	0.018	0.483	11	10512	0.061	1.611	11	10512	0.079	2.094
15:30 - 16:00	11	10512	0.012	0.322	11	10512	0.034	0.898	11	10512	0.046	1.220
16:00 - 16:30	11	10512	0.010	0.276	11	10512	0.054	1.450	11	10512	0.064	1.726
16:30 - 17:00	11	10512	0.014	0.368	11	10512	0.059	1.565	11	10512	0.073	1.933
17:00 - 17:30	11	10512	0.016	0.437	11	10512	0.067	1.773	11	10512	0.083	2.210
17:30 - 18:00	11	10512	0.007	0.184	11	10512	0.047	1.243	11	10512	0.054	1.427
18:00 - 18:30	11	10512	0.012	0.322	11	10512	0.032	0.852	11	10512	0.044	1.174
18:30 - 19:00	11	10512	0.041	1.082	11	10512	0.025	0.668	11	10512	0.066	1.750
19:00 - 19:30	4	10977	0.016	0.424	4	10977	0.039	1.031	4	10977	0.055	1.455
19:30 - 20:00	4	10977	0.014	0.364	4	10977	0.014	0.364	4	10977	0.028	0.728
20:00 - 20:30	4	10977	0.002	0.061	4	10977	0.009	0.243	4	10977	0.011	0.304
20:30 - 21:00	4	10977	0.014	0.364	4	10977	0.002	0.061	4	10977	0.016	0.425
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.970	25.769			0.870	23.045			1.840	48.814

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
LGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.002	0.061	4	10977	0.002	0.061
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.002	0.061	4	10977	0.002	0.061	4	10977	0.004	0.122
06:30 - 07:00	4	10977	0.005	0.121	4	10977	0.002	0.061	4	10977	0.007	0.182
07:00 - 07:30	11	10512	0.012	0.322	11	10512	0.006	0.161	11	10512	0.018	0.483
07:30 - 08:00	11	10512	0.009	0.230	11	10512	0.007	0.184	11	10512	0.016	0.414
08:00 - 08:30	11	10512	0.008	0.207	11	10512	0.014	0.368	11	10512	0.022	0.575
08:30 - 09:00	11	10512	0.010	0.253	11	10512	0.008	0.207	11	10512	0.018	0.460
09:00 - 09:30	11	10512	0.016	0.414	11	10512	0.004	0.115	11	10512	0.020	0.529
09:30 - 10:00	11	10512	0.012	0.322	11	10512	0.015	0.391	11	10512	0.027	0.713
10:00 - 10:30	11	10512	0.010	0.276	11	10512	0.010	0.276	11	10512	0.020	0.552
10:30 - 11:00	11	10512	0.010	0.276	11	10512	0.012	0.322	11	10512	0.022	0.598
11:00 - 11:30	11	10512	0.007	0.184	11	10512	0.008	0.207	11	10512	0.015	0.391
11:30 - 12:00	11	10512	0.015	0.391	11	10512	0.011	0.299	11	10512	0.026	0.690
12:00 - 12:30	11	10512	0.010	0.276	11	10512	0.008	0.207	11	10512	0.018	0.483
12:30 - 13:00	11	10512	0.010	0.253	11	10512	0.010	0.276	11	10512	0.020	0.529
13:00 - 13:30	11	10512	0.010	0.253	11	10512	0.010	0.253	11	10512	0.020	0.506
13:30 - 14:00	11	10512	0.012	0.322	11	10512	0.010	0.276	11	10512	0.022	0.598
14:00 - 14:30	11	10512	0.009	0.230	11	10512	0.014	0.368	11	10512	0.023	0.598
14:30 - 15:00	11	10512	0.011	0.299	11	10512	0.002	0.046	11	10512	0.013	0.345
15:00 - 15:30	11	10512	0.010	0.253	11	10512	0.013	0.345	11	10512	0.023	0.598
15:30 - 16:00	11	10512	0.009	0.230	11	10512	0.010	0.276	11	10512	0.019	0.506
16:00 - 16:30	11	10512	0.013	0.345	11	10512	0.010	0.253	11	10512	0.023	0.598
16:30 - 17:00	11	10512	0.001	0.023	11	10512	0.007	0.184	11	10512	0.008	0.207
17:00 - 17:30	11	10512	0.007	0.184	11	10512	0.007	0.184	11	10512	0.014	0.368
17:30 - 18:00	11	10512	0.002	0.046	11	10512	0.002	0.046	11	10512	0.004	0.092
18:00 - 18:30	11	10512	0.001	0.023	11	10512	0.004	0.115	11	10512	0.005	0.138
18:30 - 19:00	11	10512	0.001	0.023	11	10512	0.002	0.046	11	10512	0.003	0.069
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.002	0.061	4	10977	0.002	0.061	4	10977	0.004	0.122
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.005	0.121	4	10977	0.002	0.061	4	10977	0.007	0.182
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.229	5.999			0.214	5.710			0.443	11.709

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
MOTOR CYCLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.002	0.061	4	10977	0.000	0.000	4	10977	0.002	0.061
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.001	0.023	11	10512	0.001	0.023
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.003	0.069	11	10512	0.000	0.000	11	10512	0.003	0.069
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.002	0.046	11	10512	0.000	0.000	11	10512	0.002	0.046
14:00 - 14:30	11	10512	0.001	0.023	11	10512	0.000	0.000	11	10512	0.001	0.023
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.002	0.046	11	10512	0.002	0.046
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.003	0.069	11	10512	0.003	0.069
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.011	0.268			0.006	0.138			0.017	0.406

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Light Vehicles (LV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Rigid Trucks - No Trailer (OGV1)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Trucks Towing Trailers (OGV2)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Buses
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Non-Motorised Vehicles (NMV)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Cycles
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Scooters
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Non-Vehicular People Movements (NVPM)
Calculation factor: 100 sqm
Estimated TRIP rate value per 2662 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 00:30												
00:30 - 01:00												
01:00 - 01:30												
01:30 - 02:00												
02:00 - 02:30												
02:30 - 03:00												
03:00 - 03:30												
03:30 - 04:00												
04:00 - 04:30												
04:30 - 05:00												
05:00 - 05:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
05:30 - 06:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:00 - 06:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
06:30 - 07:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
07:00 - 07:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
07:30 - 08:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:00 - 08:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
08:30 - 09:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:00 - 09:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
09:30 - 10:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:00 - 10:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
10:30 - 11:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:00 - 11:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
11:30 - 12:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:00 - 12:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
12:30 - 13:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:00 - 13:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
13:30 - 14:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:00 - 14:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
14:30 - 15:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:00 - 15:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
15:30 - 16:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:00 - 16:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
16:30 - 17:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:00 - 17:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
17:30 - 18:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:00 - 18:30	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
18:30 - 19:00	11	10512	0.000	0.000	11	10512	0.000	0.000	11	10512	0.000	0.000
19:00 - 19:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
19:30 - 20:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:00 - 20:30	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
20:30 - 21:00	4	10977	0.000	0.000	4	10977	0.000	0.000	4	10977	0.000	0.000
21:00 - 21:30	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
21:30 - 22:00	1	22270	0.000	0.000	1	22270	0.000	0.000	1	22270	0.000	0.000
22:00 - 22:30												
22:30 - 23:00												
23:00 - 23:30												
23:30 - 24:00												
Total Rates:			0.000	0.000			0.000	0.000			0.000	0.000

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-441201-210920-0931

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : A - FOOD SUPERSTORE
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	BD	BEDFORDSHIRE	1 days
	ES	EAST SUSSEX	1 days
	WS	WEST SUSSEX	1 days
03	SOUTH WEST		
	DC	DORSET	2 days
	DV	DEVON	1 days
04	EAST ANGLIA		
	NF	NORFOLK	1 days
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NE	NORTH EAST LINCOLNSHIRE	1 days
	NY	NORTH YORKSHIRE	1 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
12	CONNAUGHT		
	MA	MAYO	1 days
13	MUNSTER		
	TI	TIPPERARY	1 days
16	ULSTER (REPUBLIC OF IRELAND)		
	CV	CAVAN	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 3275 to 14000 (units: sqm)
Range Selected by User: 800 to 15950 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/13 to 27/11/20

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Friday	5 days
Saturday	10 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	15 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	4
Edge of Town	11

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

E(a)	15 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	1 days
5,001 to 10,000	2 days
10,001 to 15,000	3 days
15,001 to 20,000	2 days
20,001 to 25,000	3 days
25,001 to 50,000	3 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,000 or Less	1 days
5,001 to 25,000	2 days
25,001 to 50,000	1 days
50,001 to 75,000	1 days
75,001 to 100,000	1 days
100,001 to 125,000	2 days
125,001 to 250,000	7 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	5 days
1.1 to 1.5	7 days
1.6 to 2.0	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Petrol filling station:

PFS is present at the site and is included in the count	10 days
PFS is present at the site but is excluded from the count	1 days
There is no PFS at the site	4 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

Yes	1 days
No	14 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	15 days

This data displays the number of selected surveys with PTAL Ratings.

Covid-19 Restrictions	Yes	At least one survey within the selected data set was undertaken at a time of Covid-19 restrictions

LIST OF SITES relevant to selection parameters

1 BD-01-A-01 TESCO BEDFORDSHIRE
RIVERFIELD DRIVE
BEDFORD

Edge of Town
Residential Zone
Total Gross floor area: 9950 sqm
Survey date: SATURDAY *17/10/20* *Survey Type: MANUAL*

2 CV-01-A-01 TESCO CAVAN
THOMAS STREET
BAILIEBOROUGH
BECKSCOURT
Edge of Town
No Sub Category
Total Gross floor area: 5000 sqm
Survey date: SATURDAY *20/05/17* *Survey Type: MANUAL*

3 DC-01-A-19 TESCO EXTRA DORSET
RIVERSIDE AVENUE
BOURNEMOUTH

Edge of Town
No Sub Category
Total Gross floor area: 8500 sqm
Survey date: SATURDAY *22/03/14* *Survey Type: MANUAL*

4 DC-01-A-20 MORRISONS DORSET
DORCHESTER ROAD
WEYMOUTH

Edge of Town
No Sub Category
Total Gross floor area: 5500 sqm
Survey date: SATURDAY *29/03/14* *Survey Type: MANUAL*

5 DV-01-A-23 SAINSBURY'S DEVON
HILL BARTON ROAD
EXETER
WHIPTON
Edge of Town
Residential Zone
Total Gross floor area: 6934 sqm
Survey date: SATURDAY *30/03/19* *Survey Type: MANUAL*

6 ES-01-A-17 ASDA EAST SUSSEX
BATTLE ROAD
HASTINGS
ST LEONARDS ON SEA
Suburban Area (PPS6 Out of Centre)
Retail Zone
Total Gross floor area: 6920 sqm
Survey date: SATURDAY *01/03/14* *Survey Type: MANUAL*

7 LC-01-A-19 ASDA LANCASHIRE
EASTWAY
PRESTON
FULWOOD
Edge of Town
Commercial Zone
Total Gross floor area: 14000 sqm
Survey date: FRIDAY *09/11/18* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

8 LN-01-A-07 WAITROSE LINCOLNSHIRE
SEARBY ROAD
LINCOLN
ERMINE EAST
Edge of Town
Residential Zone
Total Gross floor area: 6600 sqm
Survey date: SATURDAY *28/10/17* *Survey Type: MANUAL*

9 MA-01-A-02 TESCO MAYO
CLAREMORRIS ROAD
BALLINROBE

Edge of Town
No Sub Category
Total Gross floor area: 3275 sqm
Survey date: FRIDAY *09/10/20* *Survey Type: MANUAL*

10 NE-01-A-02 SAINSBURY'S NORTH EAST LINCOLNSHIRE
DONCASTER ROAD
SCUNTHORPE

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 7200 sqm
Survey date: SATURDAY *10/05/14* *Survey Type: MANUAL*

11 NF-01-A-05 MORRISONS NORFOLK
ALBION WAY
NORWICH

Suburban Area (PPS6 Out of Centre)
Retail Zone
Total Gross floor area: 10000 sqm
Survey date: SATURDAY *09/11/19* *Survey Type: MANUAL*

12 NY-01-A-07 SAINSBURY'S NORTH YORKSHIRE
WETHERBY ROAD
HARROGATE

Edge of Town
No Sub Category
Total Gross floor area: 9030 sqm
Survey date: SATURDAY *13/10/18* *Survey Type: MANUAL*

13 SF-01-A-03 ASDA SUFFOLK
STOKE PARK DRIVE
IPSWICH

Edge of Town
Residential Zone
Total Gross floor area: 4250 sqm
Survey date: FRIDAY *25/09/20* *Survey Type: MANUAL*

14 TI-01-A-01 TESCO TIPPERARY
ST JOSEPHS PARK
NENAGH

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 7000 sqm
Survey date: FRIDAY *27/05/16* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

15 WS-01-A-12 SAINSBURY'S WEST SUSSEX
NEW ROAD
LITTLEHAMPTON
WEST PRESTON
Edge of Town
Retail Zone
Total Gross floor area: 12550 sqm
Survey date: FRIDAY *21/06/19* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
TOTAL VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.170	3.825	1	10000	0.030	0.675	1	10000	0.200	4.500
06:00 - 07:00	6	8786	0.579	13.018	6	8786	0.324	7.299	6	8786	0.903	20.317
07:00 - 08:00	15	7781	1.368	30.788	15	7781	0.988	22.228	15	7781	2.356	53.016
08:00 - 09:00	15	7781	2.446	55.041	15	7781	1.893	42.587	15	7781	4.339	97.628
09:00 - 10:00	15	7781	3.711	83.496	15	7781	2.912	65.509	15	7781	6.623	149.005
10:00 - 11:00	15	7781	4.603	103.565	15	7781	4.121	92.731	15	7781	8.724	196.296
11:00 - 12:00	15	7781	4.923	110.776	15	7781	4.667	105.011	15	7781	9.590	215.787
12:00 - 13:00	15	7781	4.933	110.988	15	7781	4.988	112.221	15	7781	9.921	223.209
13:00 - 14:00	15	7781	4.575	102.948	15	7781	4.821	108.481	15	7781	9.396	211.429
14:00 - 15:00	15	7781	4.521	101.715	15	7781	4.554	102.466	15	7781	9.075	204.181
15:00 - 16:00	15	7781	4.452	100.172	15	7781	4.581	103.064	15	7781	9.033	203.236
16:00 - 17:00	15	7781	4.257	95.777	15	7781	4.625	104.067	15	7781	8.882	199.844
17:00 - 18:00	15	7781	3.970	89.318	15	7781	4.275	96.182	15	7781	8.245	185.500
18:00 - 19:00	15	7781	3.280	73.799	15	7781	3.851	86.658	15	7781	7.131	160.457
19:00 - 20:00	15	7781	2.362	53.151	15	7781	2.858	64.295	15	7781	5.220	117.446
20:00 - 21:00	15	7781	1.522	34.239	15	7781	1.787	40.215	15	7781	3.309	74.454
21:00 - 22:00	15	7781	0.876	19.703	15	7781	1.136	25.564	15	7781	2.012	45.267
22:00 - 23:00	6	8294	0.215	4.838	6	8294	0.412	9.269	6	8294	0.627	14.107
23:00 - 24:00	2	8500	0.006	0.132	2	8500	0.094	2.118	2	8500	0.100	2.250
Total Rates:			52.769	1187.289			52.917	1190.640			105.686	2377.929

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	3275 - 14000 (units: sqm)
Survey date date range:	01/01/13 - 27/11/20
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	10
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
TAXIS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.010	0.225	1	10000	0.010	0.225	1	10000	0.020	0.450
06:00 - 07:00	6	8786	0.002	0.043	6	8786	0.002	0.043	6	8786	0.004	0.086
07:00 - 08:00	15	7781	0.018	0.405	15	7781	0.015	0.328	15	7781	0.033	0.733
08:00 - 09:00	15	7781	0.024	0.540	15	7781	0.021	0.482	15	7781	0.045	1.022
09:00 - 10:00	15	7781	0.026	0.578	15	7781	0.027	0.598	15	7781	0.053	1.176
10:00 - 11:00	15	7781	0.042	0.945	15	7781	0.039	0.887	15	7781	0.081	1.832
11:00 - 12:00	15	7781	0.039	0.887	15	7781	0.041	0.925	15	7781	0.080	1.812
12:00 - 13:00	15	7781	0.033	0.733	15	7781	0.038	0.848	15	7781	0.071	1.581
13:00 - 14:00	15	7781	0.039	0.868	15	7781	0.038	0.848	15	7781	0.077	1.716
14:00 - 15:00	15	7781	0.031	0.694	15	7781	0.035	0.790	15	7781	0.066	1.484
15:00 - 16:00	15	7781	0.045	1.022	15	7781	0.039	0.868	15	7781	0.084	1.890
16:00 - 17:00	15	7781	0.027	0.598	15	7781	0.032	0.713	15	7781	0.059	1.311
17:00 - 18:00	15	7781	0.030	0.675	15	7781	0.029	0.655	15	7781	0.059	1.330
18:00 - 19:00	15	7781	0.025	0.559	15	7781	0.027	0.617	15	7781	0.052	1.176
19:00 - 20:00	15	7781	0.026	0.578	15	7781	0.028	0.636	15	7781	0.054	1.214
20:00 - 21:00	15	7781	0.021	0.463	15	7781	0.015	0.328	15	7781	0.036	0.791
21:00 - 22:00	15	7781	0.010	0.231	15	7781	0.013	0.289	15	7781	0.023	0.520
22:00 - 23:00	6	8294	0.004	0.090	6	8294	0.004	0.090	6	8294	0.008	0.180
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.000	0.000	2	8500	0.000	0.000
Total Rates:			0.452	10.134			0.453	10.170			0.905	20.304

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
OGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.000	0.000	1	10000	0.000	0.000	1	10000	0.000	0.000
06:00 - 07:00	6	8786	0.004	0.085	6	8786	0.006	0.128	6	8786	0.010	0.213
07:00 - 08:00	15	7781	0.021	0.482	15	7781	0.023	0.521	15	7781	0.044	1.003
08:00 - 09:00	15	7781	0.014	0.308	15	7781	0.019	0.424	15	7781	0.033	0.732
09:00 - 10:00	15	7781	0.011	0.251	15	7781	0.011	0.251	15	7781	0.022	0.502
10:00 - 11:00	15	7781	0.006	0.135	15	7781	0.009	0.212	15	7781	0.015	0.347
11:00 - 12:00	15	7781	0.009	0.212	15	7781	0.003	0.058	15	7781	0.012	0.270
12:00 - 13:00	15	7781	0.014	0.308	15	7781	0.009	0.193	15	7781	0.023	0.501
13:00 - 14:00	15	7781	0.014	0.308	15	7781	0.019	0.424	15	7781	0.033	0.732
14:00 - 15:00	15	7781	0.007	0.154	15	7781	0.007	0.154	15	7781	0.014	0.308
15:00 - 16:00	15	7781	0.014	0.308	15	7781	0.015	0.347	15	7781	0.029	0.655
16:00 - 17:00	15	7781	0.013	0.289	15	7781	0.014	0.308	15	7781	0.027	0.597
17:00 - 18:00	15	7781	0.007	0.154	15	7781	0.009	0.193	15	7781	0.016	0.347
18:00 - 19:00	15	7781	0.010	0.231	15	7781	0.007	0.154	15	7781	0.017	0.385
19:00 - 20:00	15	7781	0.002	0.039	15	7781	0.009	0.193	15	7781	0.011	0.232
20:00 - 21:00	15	7781	0.005	0.116	15	7781	0.004	0.096	15	7781	0.009	0.212
21:00 - 22:00	15	7781	0.003	0.077	15	7781	0.004	0.096	15	7781	0.007	0.173
22:00 - 23:00	6	8294	0.000	0.000	6	8294	0.000	0.000	6	8294	0.000	0.000
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.000	0.000	2	8500	0.000	0.000
Total Rates:			0.154	3.457			0.168	3.752			0.322	7.209

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
PSVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.000	0.000	1	10000	0.000	0.000	1	10000	0.000	0.000
06:00 - 07:00	6	8786	0.002	0.043	6	8786	0.002	0.043	6	8786	0.004	0.086
07:00 - 08:00	15	7781	0.007	0.154	15	7781	0.007	0.154	15	7781	0.014	0.308
08:00 - 09:00	15	7781	0.009	0.193	15	7781	0.009	0.193	15	7781	0.018	0.386
09:00 - 10:00	15	7781	0.008	0.174	15	7781	0.007	0.154	15	7781	0.015	0.328
10:00 - 11:00	15	7781	0.008	0.174	15	7781	0.008	0.174	15	7781	0.016	0.348
11:00 - 12:00	15	7781	0.009	0.193	15	7781	0.008	0.174	15	7781	0.017	0.367
12:00 - 13:00	15	7781	0.007	0.154	15	7781	0.008	0.174	15	7781	0.015	0.328
13:00 - 14:00	15	7781	0.006	0.135	15	7781	0.006	0.135	15	7781	0.012	0.270
14:00 - 15:00	15	7781	0.008	0.174	15	7781	0.009	0.193	15	7781	0.017	0.367
15:00 - 16:00	15	7781	0.008	0.174	15	7781	0.007	0.154	15	7781	0.015	0.328
16:00 - 17:00	15	7781	0.003	0.077	15	7781	0.004	0.096	15	7781	0.007	0.173
17:00 - 18:00	15	7781	0.008	0.174	15	7781	0.006	0.135	15	7781	0.014	0.309
18:00 - 19:00	15	7781	0.006	0.135	15	7781	0.007	0.154	15	7781	0.013	0.289
19:00 - 20:00	15	7781	0.003	0.058	15	7781	0.003	0.077	15	7781	0.006	0.135
20:00 - 21:00	15	7781	0.003	0.077	15	7781	0.003	0.077	15	7781	0.006	0.154
21:00 - 22:00	15	7781	0.003	0.058	15	7781	0.003	0.058	15	7781	0.006	0.116
22:00 - 23:00	6	8294	0.000	0.000	6	8294	0.000	0.000	6	8294	0.000	0.000
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.000	0.000	2	8500	0.000	0.000
Total Rates:			0.098	2.147			0.097	2.145			0.195	4.292

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
CYCLISTS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.010	0.225	1	10000	0.000	0.000	1	10000	0.010	0.225
06:00 - 07:00	6	8786	0.000	0.000	6	8786	0.002	0.043	6	8786	0.002	0.043
07:00 - 08:00	15	7781	0.011	0.251	15	7781	0.008	0.174	15	7781	0.019	0.425
08:00 - 09:00	15	7781	0.029	0.655	15	7781	0.024	0.540	15	7781	0.053	1.195
09:00 - 10:00	15	7781	0.022	0.501	15	7781	0.016	0.366	15	7781	0.038	0.867
10:00 - 11:00	15	7781	0.026	0.578	15	7781	0.019	0.424	15	7781	0.045	1.002
11:00 - 12:00	15	7781	0.032	0.713	15	7781	0.021	0.463	15	7781	0.053	1.176
12:00 - 13:00	15	7781	0.027	0.598	15	7781	0.027	0.617	15	7781	0.054	1.215
13:00 - 14:00	15	7781	0.035	0.790	15	7781	0.030	0.675	15	7781	0.065	1.465
14:00 - 15:00	15	7781	0.038	0.848	15	7781	0.031	0.694	15	7781	0.069	1.542
15:00 - 16:00	15	7781	0.038	0.848	15	7781	0.051	1.137	15	7781	0.089	1.985
16:00 - 17:00	15	7781	0.033	0.752	15	7781	0.033	0.733	15	7781	0.066	1.485
17:00 - 18:00	15	7781	0.031	0.694	15	7781	0.050	1.118	15	7781	0.081	1.812
18:00 - 19:00	15	7781	0.029	0.655	15	7781	0.022	0.501	15	7781	0.051	1.156
19:00 - 20:00	15	7781	0.020	0.443	15	7781	0.037	0.829	15	7781	0.057	1.272
20:00 - 21:00	15	7781	0.022	0.501	15	7781	0.017	0.386	15	7781	0.039	0.887
21:00 - 22:00	15	7781	0.005	0.116	15	7781	0.022	0.501	15	7781	0.027	0.617
22:00 - 23:00	6	8294	0.000	0.000	6	8294	0.004	0.090	6	8294	0.004	0.090
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.000	0.000	2	8500	0.000	0.000
Total Rates:			0.408	9.168			0.414	9.291			0.822	18.459

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
CARS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.150	3.375	1	10000	0.010	0.225	1	10000	0.160	3.600
06:00 - 07:00	6	8786	0.495	11.140	6	8786	0.254	5.720	6	8786	0.749	16.860
07:00 - 08:00	15	7781	1.032	23.231	15	7781	0.727	16.368	15	7781	1.759	39.599
08:00 - 09:00	15	7781	1.918	43.165	15	7781	1.435	32.292	15	7781	3.353	75.457
09:00 - 10:00	15	7781	2.975	66.936	15	7781	2.332	52.477	15	7781	5.307	119.413
10:00 - 11:00	15	7781	3.686	82.937	15	7781	3.253	73.182	15	7781	6.939	156.119
11:00 - 12:00	15	7781	3.924	88.297	15	7781	3.735	84.036	15	7781	7.659	172.333
12:00 - 13:00	15	7781	3.979	89.530	15	7781	4.019	90.417	15	7781	7.998	179.947
13:00 - 14:00	15	7781	3.671	82.590	15	7781	3.826	86.079	15	7781	7.497	168.669
14:00 - 15:00	15	7781	3.651	82.147	15	7781	3.698	83.207	15	7781	7.349	165.354
15:00 - 16:00	15	7781	3.568	80.277	15	7781	3.687	82.956	15	7781	7.255	163.233
16:00 - 17:00	15	7781	3.438	77.365	15	7781	3.709	83.458	15	7781	7.147	160.823
17:00 - 18:00	15	7781	3.196	71.910	15	7781	3.468	78.021	15	7781	6.664	149.931
18:00 - 19:00	15	7781	2.677	60.227	15	7781	3.131	70.444	15	7781	5.808	130.671
19:00 - 20:00	15	7781	1.930	43.435	15	7781	2.411	54.250	15	7781	4.341	97.685
20:00 - 21:00	15	7781	1.228	27.626	15	7781	1.445	32.504	15	7781	2.673	60.130
21:00 - 22:00	15	7781	0.696	15.654	15	7781	0.920	20.705	15	7781	1.616	36.359
22:00 - 23:00	6	8294	0.185	4.160	6	8294	0.378	8.500	6	8294	0.563	12.660
23:00 - 24:00	2	8500	0.006	0.132	2	8500	0.082	1.853	2	8500	0.088	1.985
Total Rates:			42.405	954.134			42.520	956.694			84.925	1910.828

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
LGVS
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.010	0.225	1	10000	0.010	0.225	1	10000	0.020	0.450
06:00 - 07:00	6	8786	0.074	1.665	6	8786	0.061	1.366	6	8786	0.135	3.031
07:00 - 08:00	15	7781	0.117	2.622	15	7781	0.109	2.448	15	7781	0.226	5.070
08:00 - 09:00	15	7781	0.138	3.104	15	7781	0.146	3.277	15	7781	0.284	6.381
09:00 - 10:00	15	7781	0.171	3.836	15	7781	0.158	3.547	15	7781	0.329	7.383
10:00 - 11:00	15	7781	0.204	4.588	15	7781	0.173	3.894	15	7781	0.377	8.482
11:00 - 12:00	15	7781	0.208	4.685	15	7781	0.200	4.492	15	7781	0.408	9.177
12:00 - 13:00	15	7781	0.190	4.280	15	7781	0.201	4.530	15	7781	0.391	8.810
13:00 - 14:00	15	7781	0.185	4.164	15	7781	0.174	3.914	15	7781	0.359	8.078
14:00 - 15:00	15	7781	0.195	4.376	15	7781	0.199	4.473	15	7781	0.394	8.849
15:00 - 16:00	15	7781	0.190	4.280	15	7781	0.200	4.492	15	7781	0.390	8.772
16:00 - 17:00	15	7781	0.189	4.261	15	7781	0.208	4.685	15	7781	0.397	8.946
17:00 - 18:00	15	7781	0.189	4.261	15	7781	0.186	4.183	15	7781	0.375	8.444
18:00 - 19:00	15	7781	0.133	2.988	15	7781	0.145	3.258	15	7781	0.278	6.246
19:00 - 20:00	15	7781	0.091	2.044	15	7781	0.099	2.236	15	7781	0.190	4.280
20:00 - 21:00	15	7781	0.069	1.562	15	7781	0.066	1.484	15	7781	0.135	3.046
21:00 - 22:00	15	7781	0.067	1.504	15	7781	0.063	1.407	15	7781	0.130	2.911
22:00 - 23:00	6	8294	0.026	0.588	6	8294	0.028	0.633	6	8294	0.054	1.221
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.012	0.265	2	8500	0.012	0.265
Total Rates:			2.446	55.033			2.438	54.809			4.884	109.842

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
MOTOR CYCLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 2250 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	10000	0.000	0.000	1	10000	0.000	0.000	1	10000	0.000	0.000
06:00 - 07:00	6	8786	0.002	0.043	6	8786	0.000	0.000	6	8786	0.002	0.043
07:00 - 08:00	15	7781	0.005	0.116	15	7781	0.003	0.077	15	7781	0.008	0.193
08:00 - 09:00	15	7781	0.006	0.135	15	7781	0.006	0.135	15	7781	0.012	0.270
09:00 - 10:00	15	7781	0.014	0.308	15	7781	0.009	0.212	15	7781	0.023	0.520
10:00 - 11:00	15	7781	0.016	0.366	15	7781	0.015	0.347	15	7781	0.031	0.713
11:00 - 12:00	15	7781	0.017	0.386	15	7781	0.016	0.366	15	7781	0.033	0.752
12:00 - 13:00	15	7781	0.021	0.463	15	7781	0.017	0.386	15	7781	0.038	0.849
13:00 - 14:00	15	7781	0.021	0.463	15	7781	0.027	0.617	15	7781	0.048	1.080
14:00 - 15:00	15	7781	0.027	0.598	15	7781	0.024	0.540	15	7781	0.051	1.138
15:00 - 16:00	15	7781	0.015	0.347	15	7781	0.022	0.501	15	7781	0.037	0.848
16:00 - 17:00	15	7781	0.026	0.578	15	7781	0.023	0.521	15	7781	0.049	1.099
17:00 - 18:00	15	7781	0.019	0.424	15	7781	0.023	0.521	15	7781	0.042	0.945
18:00 - 19:00	15	7781	0.014	0.308	15	7781	0.015	0.347	15	7781	0.029	0.655
19:00 - 20:00	15	7781	0.012	0.270	15	7781	0.012	0.270	15	7781	0.024	0.540
20:00 - 21:00	15	7781	0.009	0.212	15	7781	0.004	0.096	15	7781	0.013	0.308
21:00 - 22:00	15	7781	0.004	0.096	15	7781	0.009	0.212	15	7781	0.013	0.308
22:00 - 23:00	6	8294	0.000	0.000	6	8294	0.002	0.045	6	8294	0.002	0.045
23:00 - 24:00	2	8500	0.000	0.000	2	8500	0.000	0.000	2	8500	0.000	0.000
Total Rates:			0.228	5.113			0.227	5.193			0.455	10.306

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Clifton Scannell Emerson Associates Limited, Civil & Structural Consulting Engineers
Mentec House, Bakers Point, Pottery Road, Dun Laoghaire, Co Dublin,
T. +353 1 288 5006 F. +353 1 283 3466 E. info@csea.ie W. www.csea.ie

APPENDIX F

SOIL AND WATER REVIEW

Prepared by

AWN Consulting Ltd

PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS AND TECHNOLOGY PARK

SOIL AND WATER REVIEW

Technical Report Prepared For

Colliers Properties LLC

Technical Report Prepared By

Marcelo Allende BSc BEng MEIE

Teri Hayes BSc MSc PGeo EurGeol

Our Reference

MA/21/12378WR01

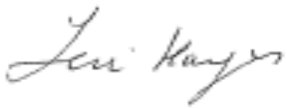
Date of Issue

22 September 2021

Document History

Document Reference		Original Issue Date	
MA/21/12378WR01		22 September 2021	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Marcelo Allende	Teri Hayes
Title	Environmental Consultant	Director
Date	22 September 2021	22 September 2021

EXECUTIVE SUMMARY

AWN has undertaken a review of a brownfield site for a proposed data centre project. The Proposed Development involves redevelopment of lands in the IDA Business & Technology Park, Dublin 17.

Inspection of the available Geological Survey of Ireland mapping shows that the bedrock geology underlying the site belongs to Lucan Formation (western section of the site) and Tober Colleen Formation (to the eastern half of the site). The GSI categorises the bedrock aquifer underlying the site as having a 'Low' vulnerability which is consistent with the site investigation results which show that depth to bedrock is >20 metres below ground level (mbgl). Site investigations confirmed that Made Ground exists up to 0.1-0.8m and this is underlain by natural ground conditions which consist of sandy gravelly silty Clay. Environmental testing was carried out on 18 samples. The testing concluded that the material tested can be classified as suitable for disposal as non-hazardous material to a licenced facility.

The bedrock aquifer underlying most of the site according to the GSI National Draft Bedrock Aquifer Map is classified as a 'Poor Aquifer' (Pl) which is described as Bedrock which is Generally Unproductive except for Local Zones. The north-western part of the site is, however, classified as a Locally Important Aquifer (Ll), Bedrock which is Moderately Productive only in Local Zones). The site is not located near any public groundwater supplies or group schemes. The Groundwater Body (GWB) underlying the site is the Dublin GWB. Currently, this GWB is classified under the WFD Risk Score system (EPA, 2021) as 'under review'. The Dublin GWB was given a classification of 'Good' for the last WFD cycle (2013-2018).

Currently, the EPA classifies the Santry River waterbody located to the south of the site as having 'Poor' status (3rd Cycle 2013-2018) and as being 'At risk' of not achieving Good status, which means that there is a possible threat to the ecological status resulting in harm to the river ecosystems. This 'Poor' status in the Santry River is due to its Invertebrate Status or Potential (EPA, 2021). An active EPA water quality station is located next to the subject site (Clonshaugh Road Bridge); this station is classified with a Biological Q Rating of 'Q2-3' according to its 2019 records, which means a 'Moderately Polluted' status in the river. This is consistent with historical ecological conditions recorded in the Santry River during previous years.

There is no direct discharge proposed to the Santry River or groundwater from the Proposed Development. During construction, the contractor will be required to operate in compliance with a Construction Environmental Management Plan (CEMP) to manage any accidental risk of discharge of sediment or hydrocarbon contaminated water during construction. During operation, design measures including bunding of oil tanks and two interceptors on the stormwater drainage will ensure no unlicensed discharge to surface water or groundwater. There is no open water connection to the Santry river but there is an indirect connection through the stormwater drainage however based on the distance to the nearest Natura site (North Dublin Bay, 4.5 km downgradient along the Santry River), even without mitigation or design measures there is no potential for impact on water quality within Dublin Bay.

OPW Flood Maps show that the area proposed for development is located within Flood Zone C (i.e., where the probability of flooding or AEP from rivers is less than 0.1% or 1 in 1000). Some of the greenfield area to the south of the site (i.e. the immediate vicinity of the Santry River) are within 1% and 10% AEP fluvial extent and therefore within Flood Zone A. SuDs measures including attenuation will ensure there is no off site risk of increased flooding.

CONTENTS

1.0 INTRODUCTION AND METHODOLOGY

AWN has been commissioned to prepare a review of a proposed site for the location of a data centre project. The site in question involves the development on lands in the IDA Business & Technology Park, Dublin 17.

This assessment evaluates the effects, if any, which the proposed development will have on Land, Soils, Geology, Hydrogeology and Hydrology as defined in the Environmental Protection Agency (EPA) 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2017). In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

Desk-based geological and hydrogeological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the site and surrounding areas as well as hydrological information in the vicinity of the site were obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database,
- Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register;

Site specific data was derived from the following sources:

- Site Investigation Report. DUB090 Data Centre & Ski Lodge Clonshaugh, Dublin 17. Site Investigations Ltd, September 2021;
- Due Diligence Report DUB090 - JCD Clonshaugh. ARUP, January 2021;
- Environmental Assessment Report. Clonshaugh Business Park. Ground Investigations Ireland, February 2020;
- Engineering Planning Report - Drainage & Water Services. Proposed Data Centre Development Clonshaugh Business and Technology Park. Clifton Scannell Emerson Associates, October 2021;
- Flood Risk Assessment. Data Centre Development Clonshaugh Business and Technology Park. Clifton Scannell Emerson Associates, September 2021.

2.0 THE RECEIVING ENVIRONMENT

2.1 Land, Soils, Geological and Hydrogeological Environment

The site is a brownfield site formerly occupied by a children's toy factory. The Santry River flows in an easterly direction along the southern boundary of the site ownership boundary but the final data centre fence line is c. 30 m from the watercourse. There is no open water connection between the site and the Santry river. There is an indirect connection through the public stormwater drainage.

Site investigations were carried out in August 2021 by Site Investigations Ltd which comprised 8 no. cable percussive boreholes, 5 no. rotary coreholes and 10 no. trial pits with geotechnical and environmental testing. Figure 2.1 below presents locations of these SI points.

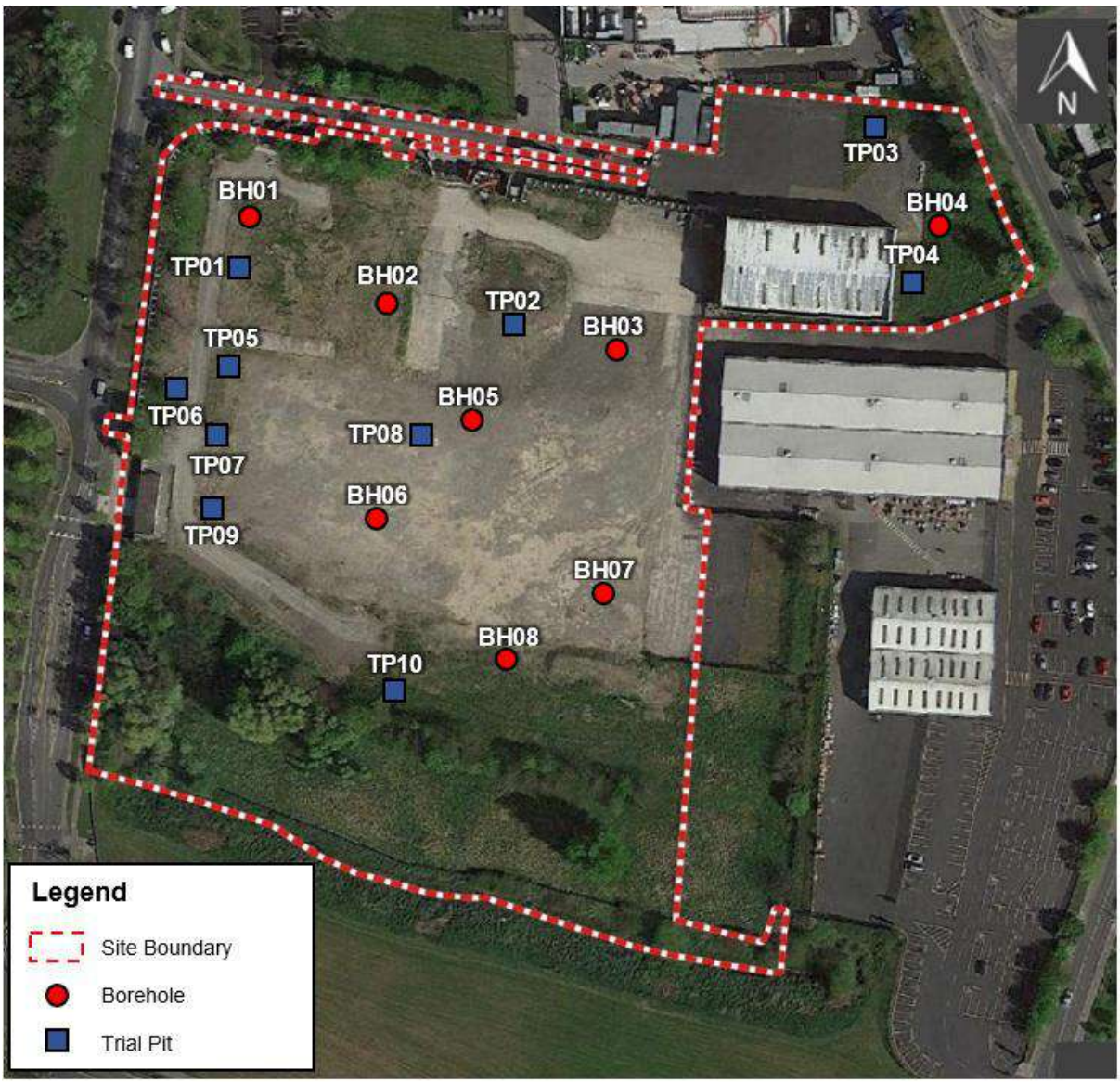


Figure 2.1 *Site Investigation Points (Source: Site Investigations Ltd., 2021)*

A thin layer of Made Ground (gravel with crushed concrete or cohesive clay soils with foreign material) was encountered at each location up to 0.1-0.8m below ground level (mbgl). Underlying the fill material, the natural ground conditions are consistent with cohesive soils encountered across the site which consist of sandy gravelly silty Clay. Rotary coreholes were completed to 20mbgl at 5 no. locations

and confirmed that the Clay extends to these depths with no bedrock encountered.

Topography on site slopes to the south where c. 30m downgradient of the boundary fence line, the Santry River is present. The northern section of the site is predominately flat.

Inspection of the available GSI maps show that the bedrock geology underlying the site belongs to Lucan Formation (western section of the site) and Tober Colleen Formation (to the eastern half of the site). The Lucan Formation comprises dark-grey to black, fine-grained, occasionally cherty and micritic limestones whilst the Tober Colleen consists of dark-grey, calcareous, commonly bioturbated mudstones. The GSI categorises the bedrock aquifer underlying the site as having a 'Low' vulnerability which is consistent with the site investigation results.

The GSI/Teagasc subsoil mapping database of the quaternary sediments in the area of the subject site indicates that the majority of the site and surrounding area is underlain limestone Tills which is made up of glacial clay which are less permeable than alluvium subsoils. This has been confirmed by the site specific investigations. To the south of the subject site, alluvial deposits associated with the Santry riverbed can be expected.

The bedrock aquifer underlying the site according to the GSI National Draft Bedrock Aquifer Map is classified as a 'Poor Aquifer' (Pl) which is described as Bedrock which is Generally Unproductive except for Local Zones. The north-western part of the site is, however, classified as a Locally Important Aquifer (Ll, Bedrock which is Moderately Productive only in Local Zones).

The Groundwater Body (GWB) underlying the site is the Dublin GWB. Currently, this GWB is classified under the WFD Risk Score system (EPA, 2021) as 'under review'. The Dublin GWB was given a classification of 'Good' for the last WFD cycle (2013-2018).

The Proposed Development is outside any delineated drinking water protection area for public water supply. Due to the urban nature of the site of the proposed project and its access to mains potable water there are no likely potable groundwater source required for local domestic dwellings in the area. There are no areas of geological heritage or groundwater dependent terrestrial ecosystems which have potential to be impacted by the proposed project.

Soil samples were compared to a Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for a resident and commercial/industrial end use. Generic Assessment Criteria in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in 2015 called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been

derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

As part of the site investigations carried out in 2021, environmental testing was carried out on 18 no. samples. The results are presented in Appendix A of this report. The full analytical laboratory results were compared to the Generic Assessment Criteria (GAC) concentrations; as a result, all parameter concentrations recorded values below the most conservative threshold value for the LQM/CIEH for HHRA (Human Health Risk Assessment) Residential and Commercial Threshold at 1% SOM.

The investigation also concluded that the material tested can be classified as non-hazardous material in terms of off site disposal according its Waste Classification report. Five samples detected total petroleum hydrocarbons above the limit of detection but the level was low and not in the liquid phase so the soils can be classified as non-hazardous. Leachate disposal results were generally below the inert thresholds but 1 no. sample recorded sulphate exceeding the non-hazardous waste limits, and total organic carbon exceeding the hazardous limit. During the 2020 site investigations, asbestos were identified in 1 no. sample although asbestos containing materials (ACMs) were not identified.

Based on the TII criteria (TII/NRA, 2009) for rating the importance of geological features, the importance of the bedrock and soil features at this site is rated as '**Low Importance**' with low quality, significance or value on a local scale.

The importance of the hydrogeological features at this site is rated as '**Medium Importance**' based on the fact that part of the site overlies a Locally Important Aquifer which is not widely used for public water supply or generally for potable use. In addition, there would not be direct or indirect hydrogeological connection between the site and any protected sites (SAC, SPA, pNHA).

2.2 Hydrological Environment

As mentioned above, the Santry River is located outside of the southern boundary of the Proposed Development site. This river flows easterly and ultimately outfalls into the North Dublin Bay and specifically the North Bull Island Waterbody at Raheny, c.4.5km downstream from the site. The North Dublin Bay hosts Natura 2000 protected sites (North Dublin Bay SAC/pNHA and North Bull Island SPA). In terms of drainage immediate to the site, the subject site is served by the existing surface water network and public foul water sewer. In terms of surface water drainage, there is an existing 225mm diameter pipe located in the centre of the existing IDA Business Park Estate Road which runs along the northern boundary of the site. This 225mm diameter pipe flows in a westerly direction to connect with a 900mm diameter pipe which flows in a southerly direction towards the Santry River in the verge of the main entrance road to the Clonshaugh Business and Technology Park.

With regard to foul water, there is an existing 150mm diameter connection to the external foul water system within the verge of the main IDA Business and Technology Park Access Road and flows in a northerly direction along the western boundary of the site. In addition there is a 225mm diameter foul sewer located to the north of the site which flows in a westerly direction towards the main IDA Business and Technology Park Access Road which it connects to a 375mm diameter foul sewer to the west of the access road.

Currently, the EPA classifies the Santry River waterbody as having 'Poor' status (3rd Cycle 2013-2018) and as being 'At risk' of not achieving Good status, which means that there is a possible threat to the ecological status resulting in harm to the river ecosystems. This 'Poor' status in the Santry River is due to its Invertebrate Status or Potential (EPA, 2021). An active EPA water quality station is located next to the subject site (Clonshaugh Road Bridge); this station is classified with a Biological Q Rating of 'Q2-3' according to its 2019 records, which means a 'Moderately Polluted' status in the river. This is consistent with historical ecological conditions recorded in the Santry River during previous years.

Based on the TII criteria (TII/NRA, 2009) for rating the importance of hydrological features, the features at this site are rated as '**Medium Importance**'. This is based on the fact that the adjacent Santry River is classified with a biotic index of Q2-3 (or Quality Class C). There is no direct hydrological connection between the site and the North Dublin Bay Natura 2000 sites.

With regard to the flooding risk at the subject site, current OPW Flood Maps show that the entire Site is located within Flood Zone C (i.e., where the probability of flooding or AEP from rivers is less than 0.1% or 1 in 1000). However, small areas at the south of the site (i.e. the immediate vicinity of the Santry River) are within 1% and 10% AEP fluvial extent and therefore within Flood Zone A. According to the Flood Risk Assessment carried out by CSEA (2021), the development on the subject site is appropriate for the site's flood zone category and a justification test is not required.

3.0 IMPACT ASSESSMENT

3.1 Construction Phase

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of the proposed development.

The project engineers have estimated that c. 32,000m^3 of material will require excavation for the stormwater attenuation system and building foundations and c. 12,500 m^3 of imported fill would be required. This volume comprises topsoil (made ground) and cohesive deposits. Bedrock will not be exposed as part of the excavation works. In addition to this a net import of suitable engineering fill up to c. 3,500 m^3 will be required. These volumes will be refined prior to commencement of construction. All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for the appropriate certificates, management status and regulatory compliance standards.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Further soil sampling will be undertaken during pre-development works; however, it is anticipated that all cut material (c. 32,000 m^3) will be removed of the site. All soil samples analysed recorded concentrations below the LQM/CIEH for HHRA Residential and Commercial Threshold at 1% SOM and site investigations also concluded that the WAC analysis classified all material tested as non-hazardous material in terms of offsite disposal. In the event that potentially contaminated soils are encountered, they would be segregated, tested and classified as hazardous or non-hazardous in accordance with the EPA Guidance Document: Waste Classification – List of

Waste and Determining if Waste is Hazardous or Non-Hazardous (2015) and Council Decision 2003/33/EC. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

To minimise any impact from material spillages, all oils, paints etc. used during construction will be stored within temporary bunded areas. All tanks will be bunded to 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance for 30mm of rainwater ingress). Refueling of construction vehicles and the use of any hydraulic oils or lubricants will take place in a designated area (or where possible offsite) which will be away from surface water features, gullies or drains.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite

Should any discharge of construction water be required during the construction phase, permission will obtained from the relevant authority to facilitate discharge to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses/ stormwater sewer, refueling of machinery off site) and hydrocarbon interceptors. There will be no direct discharge to ground or the Santry River.

In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures and any subsequent planning conditions relevant to the proposed development.

Following implementation of these mitigation measures, the predicted impact during construction of the proposed development on the hydrological and hydrogeological environment will be ***short-term***, ***imperceptible*** and ***neutral***.

3.2 Operational Phase

There will be bulk storage of fuel (maximum storage 40,000 litres) required for the operation of back up generators for the datacentres. All oil storage will be fully bunded (dimensions 4 m diameter and 4 m height). The bund will be located on impermeable surface with drainage from the bund area discharging to a full retention oil interceptor. The presence of impermeable surfaces throughout the trafficked area of the site will minimise the potential influx of any contaminants into soils and underlying groundwater. Any accidental leaks from cars within the car parking/road areas or from oil storages areas will be directed through the surface drainage system via an appropriately sized petrol interceptor. All surface water flows will be collected by the site surface water network.

Attenuation will be provided within a closed Stormtech attenuation system (or similar) to ensure that the discharge rate is maintained at greenfield runoff rate. It is proposed to provide an attenuation basin in the northeast corner of the

development site. In addition, rainwater harvesting will be provided as part of the scheme.

According to OPW information, the site is in Flood Zone C, but at risk of pluvial flooding. However, the surface water drainage network including attenuation storage are considered to be sufficient measures to provide protection to the development from the potential pluvial flooding risk. These measures will take account of flood 100-year storm return periods plus 10% allowance for climate change. As such, the proposed development will have no measurable increase on the flood risk to neighbouring lands.

The foul water system will be discharged separately into the public sewer. Irish Water has confirmed the feasibility of the proposed discharges without the requirement for infrastructure upgrades.

As the Proposed Development site was already in hardstand there will be no significant change in hardstand area and as such no measureable change in local recharge to ground.

Due to a variety of measures such as bunding, the design of the attenuation system with hydrocarbon interceptors and the design of the wider drainage system, the likelihood of any spills entering the receiving water environment is negligible.

The increase in flow to the existing public foul sewer is not expected to have a negative effect on the foul drainage system in the area. The increase in demand for water supply is not expected to have a negative effect on the water supply in the area and Irish Water will be consulted before construction begins.

The predicted impact during operation of the proposed development on the hydrological and hydrogeological environment, following implementation of above mentioned mitigation measures will be ***long-term, imperceptible*** and ***neutral***.

3.3 Cumulative Impacts

During the Construction Phase of the proposed development, contractors will be contractually required to operate in compliance with the CEMP which includes the mitigation measures outlined in this report. Other developments will also have to incorporate measures to protect water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives Groundwater Regulations [S.I. 9 of 2010 and S.I. 266 of 2016] and Surface Water Regulations [S.I. 272 of 2009 and S.I. 77 of 2019]). As a result, there will be minimal cumulative potential for change in the natural hydrological or hydrogeological regime. The cumulative impact is considered to be neutral and imperceptible.

With regard to the Operational Phase, all developments are required to manage discharges in accordance with S.I. 9/2010 (266/2016 amendments) and S.I 272/2009 (77/2019 amendments). As such there will be no cumulative impact to groundwater or surface water quality and therefore there will be no cumulative impact on the Groundwater Body and Surface Waterbody Status. The operation of the Proposed Development is concluded to have a long-term, imperceptible significance with a neutral impact on surface water quality.

Appendix A
Soil Quality Laboratory Results

Table 1 – Soil Analytical Results in Boreholes

Sample ID					BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08
Laboratory					ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Report					612768	612768	612768	612768	612768	612768	612768	612768
Sample Type					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Date					23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021
Parameters	**Units**	**LOD**	**LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)**								
Metals												
Antimony	mg/kg	<0.6	nv	nv	-	-	-	-	-	-	-	-
Arsenic	mg/kg	<0.6	40	640	7.95	12.2	8.95	14.1	8.8	9.6	10.3	13.5
Barium	mg/kg	<0.6	nv	nv	41.5	47.7	47.6	112	47.7	52.4	70.3	85.3
Cadmium	mg/kg	<0.02	85	190	1.28	1.42	1.32	1.92	1.68	1.73	2.63	2.48
Chromium	mg/kg	<0.9	910	8,600	7.06	5.72	4.81	11.4	6.01	16.3	7.36	13.5
Copper	mg/kg	<1.4	7,100	68,000	14.9	17.1	16.2	34.4	18.9	21.6	23.7	30.9
Lead	mg/kg	<0.7	nv	nv	12.1	14.8	11.1	135	12.4	16.7	14	28.4
Mercury	mg/kg	<0.1	1.2	58vap (25.8)	-	-	-	0.613	-	-	-	-
Molybdenum	mg/kg	<0.1	nv	nv	1.54	2.92	3.07	2.83	2.92	2.86	3.7	2.93
Nickel	mg/kg	<0.2	180	980	23.2	23.5	21.2	30.6	29.6	33.4	39.6	38.6
Selenium	mg/kg	<1	430	12,000	-	-	-	-	-	-	-	-
Zinc	mg/kg	<1.9	40,000	730,000	59.4	56	54.2	126	64.1	72	81	108
PAH MS												
Naphthalene	mg/kg	<0.009	2.3	190(76.4)sol	-	-	-	-	-	-	-	-
Acenaphthylene	mg/kg	<0.012	170	83000(86.1)sol	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	<0.008	210	84000(57.0)	-	-	-	-	-	-	-	-
Fluorene	mg/kg	<0.01	170	63000(30.9)sol	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	<0.015	95	22,000	-	-	-	0.086	-	-	-	-
Anthracene	mg/kg	<0.016	2,400	520,000	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	<0.017	280	23,000	-	-	-	0.147	-	-	-	-
Pyrene	mg/kg	<0.015	620	54,000	-	-	-	0.138	-	-	-	-
Benzo(a)anthracene	mg/kg	<0.014	7.2	170	-	-	-	0.094	-	-	-	-
Chrysene	mg/kg	<0.01	15	350	-	-	-	0.094	-	-	-	0.012
Benzo(a)pyrene	mg/kg	<0.015	2.2	35	-	-	-	0.105	-	-	-	-
Indeno(123cd)pyrene	mg/kg	<0.018	nv	500	-	-	-	0.0732	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.023	0.24	4	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	<0.024	320	3,900	-	-	-	0.0746	-	-	-	-
Coronene	mg/kg	<0.02	nv	nv	-	-	-	-	-	-	-	-
PAH 16 Total	mg/kg	<0.118	nv	nv	-	-	-	1.02	-	-	-	-
Benzo(b)fluoranthene	mg/kg	<0.015	2.6	44	-	-	-	0.159	-	-	-	0.0177
Benzo(k)fluoranthene	mg/kg	<0.018	77	1,200	-	-	-	0.049	-	-	-	-
Mineral Oil (C10-C40)	mg/kg	<5	nv	nv	116	-	-	22.8	-	-	-	5.38
TPH CWG												
Aliphatics												
>C5-C6	mg/kg	<0.01	42	3,200 (304) sol	-	-	-	-	-	-	-	-
>C6-C8	mg/kg	<0.01	100	7,800 (144)sol	-	-	-	-	-	-	-	-
>C8-C10	mg/kg	<0.01	27	2,000 (78)sol	-	-	-	-	-	-	-	-
>C10-C12	mg/kg	<1	130	9,700 (48)sol	-	-	-	-	-	-	-	-
>C12-C16	mg/kg	<1	1100	59,000 (24)sol	-	-	-	-	-	-	-	-
>C16-C21	mg/kg	<1	65,000 (combined)	1,600,000 (combined)	-	-	-	-	-	-	-	-
>C21-C35	mg/kg	<1	65,000	1,600,000	81.4	-	-	18.6	-	-	-	5.15
>C35-C44	mg/kg	<1	65,000	1,600,000	6.98	-	-	1.44	-	-	-	-
Total aliphatics C10-44	mg/kg	<5	nv	nv	88.6	-	-	20.3	-	-	-	5.44
Aromatics												
>C5-EC7	mg/kg	<0.1	370	26,000(1220)sol	-	-	-	-	-	-	-	-
>EC7-EC8	mg/kg	<0.1	860	56,000(869)vap	-	-	-	-	-	-	-	-
>EC8-EC10	mg/kg	<0.1	47	3,500(613)vap	-	-	-	-	-	-	-	-
>EC10-EC12	mg/kg	<0.2	250	16,000(364)sol	-	-	-	-	-	-	-	-
>EC12-EC16	mg/kg	<4	1800	36,000(169)sol	-	-	-	-	-	-	-	-
>EC16-EC21	mg/kg	<7	1900	28,000	-	-	1.32	-	-	-	-	-
>EC21-EC35	mg/kg	<7	1900	28,000	2.36	-	-	2.29	-	-	-	-
>EC35-EC40	mg/kg	<7	1900	28,000	-	-	-	1.93	-	-	-	-
Total aromatics C10-44	mg/kg	<19	nv	nv	-	-	-	-	-	-	-	-
Total aliphatics and aromatics(C10-44)	mg/kg	<10	nv	nv	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	ug/kg	<10	nv	nv	-	-	-	<200	-	-	-	-
Benzene	mg/kg	<0.009	0.38	27	-	-	-	<0.18	-	-	-	-
Toluene	mg/kg	<0.007	880(869)vap	56,000(869)vap	-	-	-	<0.14	-	-	-	-
Ethylbenzene	mg/kg	<0.004	83	5,700(518)vap	-	-	-	<0.08	-	-	-	-
m/p-Xylene	mg/kg	<0.01	m: 820 p: 790	m: 6,200(625)vap p: 5,900(576)sol	-	-	-	<0.2	-	-	-	-
o-Xylene	mg/kg	<0.01	88	6,600(478)sol	-	-	-	<0.2	-	-	-	-
PCB 28	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 52	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 101	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 118	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 138	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 153	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
PCB 180	ug/kg	<3	nv	nv	-	-	-	-	-	-	-	-
Total 7 PCBs	ug/kg	<21	nv	nv	-	-	-	-	-	-	-	-
Natural Moisture Content	%	<0.1	nv	nv								
Moisture Content (% Wet Weight)	%	<0.1	nv	nv	12	7.4	8.3	9.7	7.6	9.2	27	12
Hexavalent Chromium	mg/kg	<0.6	6	33	-	-	-	-	-	-	-	-
Chromium III	mg/kg	<0.9	910	8,600	7.06	5.72	4.81	11.4	6.01	16.3	7.36	13.5
Total Organic Carbon	%	<0.2	nv	nv	0.265	0.302	0.414	1.78	0.409	0.428	0.324	0.854

Legend

0.45 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold without homegrown produce at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Commercial Threshold at 1% SOM (mg/kg)

\- Results below LOD

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour staturation limit which is presented in brackets

Table 2 – Soil Analytical Results in Trial Pits

Sample ID					TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP10
Laboratory					ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS	ALS
Report					612768	612768	612768	612768	612768	612768	612768	612768	612768	612768
Sample Type					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Date					23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021	23/08/2021
Parameters	**Units**	**LOD**	**LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)**										
Metals														
Antimony	mg/kg	<0.6	nv	nv	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	<0.6	40	640	9.0	9.1	29.6	15.9	9.3	10.5	9.7	9.1	10.1	12.5
Barium	mg/kg	<0.6	nv	nv	63.1	111.0	86.5	142.0	49.5	57.1	66.5	77.3	52.7	92.8
Cadmium	mg/kg	<0.02	85	190	1.31	1.47	1.5	1.27	1.6	1.76	1.74	2.08	1.51	2.44
Chromium	mg/kg	<0.9	910	8,600	6.63	7.84	8.06	7.46	8.1	7.26	6.76	6.32	7.41	11.6
Copper	mg/kg	<1.4	7,100	68,000	14.9	19.6	31.4	41.3	19.2	23.7	21.2	21	20.3	28.1
Lead	mg/kg	<0.7	nv	nv	12.8	13	53.6	209	13.9	17.8	16	13.7	15.2	26.2
Mercury	mg/kg	<0.1	1.2	58vap (25.8)	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	<0.1	nv	nv	1.82	3.74	3.22	2.81	3.03	3.02	3.1	3.09	3.18	2.68
Nickel	mg/kg	<0.2	180	980	21	28.3	25.2	27.7	30.3	34.9	29	37.2	28.6	38.1
Selenium	mg/kg	<1	430	12,000	-	2	-	-	-	-	2	1	1	-
Zinc	mg/kg	<1.9	40,000	730,000	61.3	59.6	103	137	63.5	68.8	66.7	68.6	61.5	101
PAH MS														
Naphthalene	mg/kg	<0.009	2.3	190(76.4)sol	-	-	<0.045	0.015	-	-	-	-	-	-
Acenaphthylene	mg/kg	<0.012	170	83000(86.1)sol	-	-	<0.06	0.021	-	-	-	-	-	-
Acenaphthene	mg/kg	<0.008	210	84000(57.0)	-	-	0.048	0.031	-	-	-	-	-	-
Fluorene	mg/kg	<0.01	170	83000(30.9)sol	-	-	<0.05	0.031	-	-	-	-	-	-
Phenanthrene	mg/kg	<0.015	95	22,000	-	-	0.381	0.415	-	-	0.019	-	-	-
Anthracene	mg/kg	<0.016	2,400	520,000	-	-	<0.08	0.144	-	-	-	-	-	-
Fluoranthene	mg/kg	<0.017	280	23,000	-	-	0.559	1.14	-	-	0.029	-	-	-
Pyrene	mg/kg	<0.015	620	54,000	-	-	0.589	0.948	-	-	0.027	-	-	-
Benzo(a)anthracene	mg/kg	<0.014	7.2	170	-	-	0.33	0.731	-	-	0.020	-	-	-
Chrysene	mg/kg	<0.01	15	350	-	-	0.329	0.657	-	-	0.018	-	-	-
Benzo(a)pyrene	mg/kg	<0.015	2.2	35	-	-	0.324	0.734	-	-	0.0193	-	-	-
Indeno(123cd)pyrene	mg/kg	<0.018	nv	500	-	-	0.234	0.543	-	-	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.023	0.24	4	-	-	<0.115	0.1	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	<0.024	320	3,900	-	-	0.217	0.481	-	-	-	-	-	-
Coronene	mg/kg	<0.02	nv	nv	-	-	-	-	-	-	-	-	-	-
PAH 16 Total	mg/kg	<0.118	nv	nv	-	-	3.61	7.41	-	-	0.162	-	-	-
Benzo(b)fluoranthene	mg/kg	<0.015	2.6	44	-	-	0.457	1.03	-	-	0.0307	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.018	77	1,200	-	-	0.143	0.396	-	-	-	-	-	-
Mineral Oil (C10-C40)	mg/kg	<5	nv	nv	214	-	22.1	21.7	-	-	-	-	-	5.3
TPH CWG														
Aliphatics														
>C5-C6	mg/kg	<0.01	42	3,200 (304) sol	-	-	-	-	-	-	-	-	-	-
>C6-C8	mg/kg	<0.01	100	7,800 (144)sol	-	-	-	-	-	-	-	-	-	-
>C8-C10	mg/kg	<0.01	27	2,000 (78)sol	-	-	-	-	-	-	-	-	-	-
>C10-C12	mg/kg	<1	130	9,700 (48)sol	-	-	-	-	-	-	-	-	-	-
>C12-C16	mg/kg	<1	1100	59,000 (24)sol	-	-	-	-	-	-	-	-	-	-
>C16-C21	mg/kg	<1	65,000 (combined)	1,600,000 (combined)	4.64	-	-	4.12	-	-	1.59	-	-	-
>C21-C35	mg/kg	<1	65,000	1,600,000	205	-	15.9	19.4	-	-	2.07	-	-	3.31
>C35-C44	mg/kg	<1	65,000	1,600,000	21.8	-	1.71	-	-	-	-	-	-	-
Total aliphatics C10-44	mg/kg	<5	nv	nv	232	-	17.7	25	-	-	-	-	-	-
Aromatics														
>C5-EC7	mg/kg	<0.1	370	26,000(1220)sol	-	-	-	-	-	-	-	-	-	-
>EC7-EC8	mg/kg	<0.1	860	56,000(869)vap	-	-	-	-	-	-	-	-	-	-
>EC8-EC10	mg/kg	<0.1	47	3,500(613)vap	-	-	-	-	-	-	-	-	-	-
>EC10-EC12	mg/kg	<0.2	250	16,000(364)sol	-	-	-	-	-	-	-	-	-	-
>EC12-EC16	mg/kg	<4	1800	36,000(169)sol	-	-	-	2.61	-	-	-	-	-	-
>EC16-EC21	mg/kg	<7	1900	28,000	-	-	2.95	35.9	-	-	-	-	-	-
>EC21-EC35	mg/kg	<7	1900	28,000	4.59	-	7.78	182	-	-	-	-	-	-
>EC35-EC40	mg/kg	<7	1900	28,000	-	-	2.49	16.1	-	-	-	-	-	-
Total aromatics C10-44	mg/kg	<19	nv	nv	-	-	-	-	-	-	-	-	-	-
Total aliphatics and aromatics(C10-44)	mg/kg	<10	nv	nv	5.73	-	13.3	237	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	ug/kg	<10	nv	nv	-	-	-	-	-	-	-	-	-	-
Benzene	mg/kg	<0.009	0.38	27	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	<0.007	880(869)vap	56,000(869)vap	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	<0.004	83	5,700(518)vap	-	-	-	-	-	-	-	-	-	-
m/p-Xylene	mg/kg	<0.01	m: 820 p: 790	m: 6,200(625)vap p: 5,900(576)sol	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/kg	<0.01	88	6,600(478)sol	-	-	-	-	-	-	-	-	-	-
PCB 28	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 52	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 101	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 118	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 138	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 153	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
PCB 180	ug/kg	<3	nv	nv	-	-	-	<15	-	-	-	-	-	-
Total 7 PCBs	ug/kg	<21	nv	nv	-	-	-	<105	-	-	-	-	-	-
Natural Moisture Content	%	<0.1	nv	nv										
Moisture Content (% Wet Weight)	%	<0.1	nv	nv	8.1	8.1	8.1	12	8.1	23	9	8.3	6.4	13
Hexavalent Chromium	mg/kg	<0.6	6	33	-	-	-	-	-	-	-	-	-	-
Chromium III	mg/kg	<0.9	910	8,600	6.63	7.84	8.06	7.46	8.1	7.26	6.76	6.32	7.41	11.6
Total Organic Carbon	%	<0.2	nv	nv	0.334	0.458	1.69	9.79	0.372	0.527	0.37	0.439	0.47	1.03

Legend

0.45 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold without homegrown produce at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Commercial Threshold at 1% SOM (mg/kg)

\- Results below LOD

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour stauration limit which is presented in brackets

APPENDIX G

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

Prepared by

AWN Consulting Ltd

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS AND TECHNOLOGY PARK

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

Report Prepared For

Coliers Properties LLC

Report Prepared By

Chonaill Bradley, Senior Environmental Consultant

Our Reference

CB/21/12378WMR01

Date of Issue

29 September 2021

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812
Directors: F Callaghan, C Dilworth,
T Donnelly, T Hayes, D Kelly, E Porter

Document History

Document Reference		Original Issue Date	
CB/20/11566WMR02		29 September 2021	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Chonaill Bradley	Fergal Callaghan
Title	Senior Environmental Consultant	Director
Date	29 September 2021	29 September 2021

Contents Page

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&D WMP) on behalf of Coliers Properties LLC. The development will principally consist of the demolition of the existing former Ricoh building, and all other associated site clearance works and the construction of two data centre buildings (Data Centre A and Data Centre B) at a site at Clonshaugh Business & Technology Park, Clonshaugh, Dublin 17.

This plan will provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations [1], *Protection of the Environment Act 2003* as amended [2], *Litter Pollution Act 1997* as amended [3] and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* [4]. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams. The C&D WMP should be viewed as a live document that will be update by the site construction contractor as and when changing site conditions require it to do so.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998*, Changing Our Ways*[5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste'* [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020 the government released a new national policy document outlining a new action plan for Ireland and its waste to cover the period of 2020-2025. This plan, 'A Waste Action Plan for a Circular Economy' [7], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan 'A Resource Opportunity (2012)'

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already in place (Circular Economy Legislative Package) or in the pipeline. The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken is the development of a high-level, whole of Government Circular Economy Strategy to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity. This strategy was issued for public consultation in April 2021.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* [8] in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m2.

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [9] , published by FÁS and the Construction Industry Federation in 2002 and the Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'* Draft for public consultation [10] (April 2021).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC). The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan to the administrative area, published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste, which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012.*

The *Dublin City Development Plan 2016 – 2022* [10] sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the development are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
  - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
  - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
  - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended;
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended [11.]

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the

incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Developer ensures that the waste contractors engaged by demolition and construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a Waste or Industrial Emissions Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

The subject site comprises the site of former Units 15 and 16 and the former Ricoh Building. The site is located to the north of the Santry River and the R104 Oscar Traynor Road, to the west of Clonshaugh Road, and to the south and east of existing estate roads.

The proposed development, for which a seven-year permission is sought, comprises the following:

- Demolition of the existing former Ricoh building, and all other associated site clearance works (other buildings previously occupying the site were cleared under Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20);
- Construction of two data centre buildings (Data Centre A and Data Centre B), with a gross floor area (GFA) of c. 12,875 sq.m and c. 1,455 sq.m respectively, each over two storeys with plant at roof level;
- Data Centre A will be located in the northern portion of the site, with a parapet height of c.19.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, screened plant, and solar panels at roof level;
- Data Centre B will be located to the south of Data Centre A, with a parapet height of c.12.8 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, and screened plant at roof level;
- Emergency generators and associated flues will be provided within fenced compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- The development includes a diesel tank and a filling area to serve the proposed emergency generators;

- Ancillary structures including a sprinkler tank, security building, and provision of two additional MV substation rooms to the existing substation on site (c. 72 sq.m additional GFA), which was previously constructed in accordance with Reg. Ref.: 2229/19 as amended by Reg. Ref.: 3200/20.
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking and bicycle parking spaces;
- Hard and soft landscaping and planting, lighting, boundary treatments, and all associated works including underground foul and storm water drainage network, attenuation area, and utility cables. .

3.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of the existing buildings and hardstanding areas on site, as well as from the further excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete, etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations and underground services. The development engineers (Clifton Scannell Emerson Associates) have estimated that 32,000m^3 of material will need to be excavated to do so. It is currently envisaged that none of this material will be able to be retained and reused onsite due to the limited opportunities for reuse on site. This material will have to be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 Potential Hazardous Wastes Arising

3.3.1 Contaminated Soil

Site investigations and environmental soil testing were undertaken in February 2020 by Ground Investigations Ireland (GII) and in September 2020 by Clifton Scannell Emerson Associates, Site Investigation Ltd(SIL). Environmental testing was carried out on samples from both samplings. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as ‘inert material’ by an Irish landfill.

In the event that material is excavated for removal from site, any firm engaged to transport waste material from site and the operator of any waste facility that will accept subsoils excavated from this site should be furnished with, at a minimum, copies of the full unabridged laboratory report and HazWasteOnLineTM report for all samples presented in this report.

The material on site if excavated should be removed to the most appropriate facility under the waste categories and LoW codes proposed in the reports prepared by GII and SIL.

The non-hazardous material across the site if excavated should be removed from site to an appropriate facility under either the LoW codes 17 05 04 or 17 09 04. Where during excavation there is noted to be in excess of 2% anthropogenic material, the appropriate LoW code which should be applied is 17 09 04.

If any potentially contaminated material is encountered, it will need to be segregated from clean / inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [12] using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC* [13], which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify DCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

3.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel / oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

3.3.3 Invasive Plant Species

Site invasive species surveys were undertaken by The Moore Group in July and August 2021 the results from these surveys can be found as part of the biodiversity report submitted as part of this application. This included a site walkover survey of the entire site to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011.

There was no evidence of an extensive Japanese Knotweed (*Fallopia japonica*) or any other scheduled 3 invasive species within the redline boundary.

3.3.4 Asbestos

A demolition asbestos survey will be undertaken prior to the demolition of the existing building onsite. As the building was constructed in the 1990s it is not expected that it will contain asbestos or asbestos containing materials.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACMs will only be removed from site by a suitably permitted / licenced waste contractor, in accordance with *S.I. No. 589 of 2010 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All material will be taken to a suitably licensed or permitted facility.

3.3.5 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner / cartridges, batteries (Lead, Ni-Cd or Mercury) and / or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (applicable as of 1 June 2015) (also referred to as the European Waste Code (EWC)) for each waste stream is also shown.

Table 3.1 *Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)*

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

** Individual waste type may contain hazardous substances*

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

The demolition stage will involve the demolition and renovation of a brick warehouse style building on-site. The demolition areas are identified in the planning drawings provided with this application. The anticipated demolition waste and rates of reuse, recycling / recovery and disposal are shown in Table 4.1, below.

Table 4.1 *Estimated off-site reuse, recycle and disposal rates for demolition waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	64.8	0	0.0	85	55.1	15	9.7
Concrete, Bricks, Tiles, Ceramics	367.2	30	110.2	65	238.7	5	18.4
Plasterboard	28.8	30	8.6	60	17.3	10	2.9
Asphalts	7.2	0	0.0	25	1.8	75	5.4
Metals	108.0	5	5.4	80	86.4	15	16.2
Slate	57.6	0	0.0	85	49.0	15	8.6
Timber	86.4	10	8.6	60	51.8	30	25.9
Asbestos	1.0	0	0.0	0	0.0	100	1.0
Total	**721.0**		**132.8**		**500.0**		**88.1**

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* [14] *and the joint EPA & GMIT study* [15].

Table 4.2: *Waste materials generated on a typical Irish construction site*

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	**100**

Table 4.3, below, shows the estimated construction waste generation for the Proposed Development based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m^2, using the waste breakdown rates shown in Table 4.2. These have been calculated from the schedule of development areas provided by the architect.

***Table 4.3**: Predicted on and off-site reuse, recycle and disposal rates for construction waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	281.4	10	28.1	80	225.1	10	28.1
Timber	238.7	40	95.5	55	131.3	5	11.9
Plasterboard	85.3	30	25.6	60	51.2	10	8.5
Metals	68.2	5	3.4	90	61.4	5	3.4
Concrete	51.2	30	15.3	65	33.3	5	2.6
Other	127.9	20	25.6	60	76.7	20	25.6
Total	852.6		193.5		578.9		80.1

In addition to the waste streams in Table 4.3, there will be c. 32,000 m^3 of soil, stones, clay and made ground excavated to facilitate construction of new foundations and underground services. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited and all of the excavated material is expected to be removed off- site for appropriate reuse, recovery and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process. The C&D WMP along with the waste figures will be refined by the construction contractor prior to site works beginning.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on- site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off- site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source, where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed appropriately licensed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste requiring disposal off- site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

During construction, some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (per Article 30 (1) (b) of the Waste Collection Permit Regulations 2007, as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste off- site in their work vehicles (which are not designed for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off- site for appropriate reuse, recycling, recovery and / or disposal

Dedicated, covered, labelled and bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required.

The anticipated management of the main waste streams is outlined as follows:

Soil, Stone, Gravel, Clay and Made Ground

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

When material is removed off- site it could be reused as a by-product (and not as a waste). in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The use of Article 27 will be investigated to see if it is appropriate for this site, when exporting material.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed off- site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on- site, the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off- site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible. If concrete is to be crushed on- site, the appropriate mobile waste facility permit will be obtained from DCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues, etc., will be disposed of in a separate skip and recycled off- site.

Metal

Metals will be segregated, where practical, and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site Manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages / receptacles / pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic, are generated, these will be segregated at source into dedicated skips and removed off- site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip / receptacle will be examined by a member of the waste team (see Section 7.0) to determine if recyclable materials have

been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

Any asbestos or ACM found on- site will be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with *S.I. No. 589 of 2010 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.*

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and / or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on- site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from DCC and the destination of the accepting waste facility will be supplied to the DCC waste unit.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 7.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 7.0) will maintain a copy of all waste collection permits on-Site.

If the waste is being transported to another site, a copy of the Local Authority waste COR / permit or EPA Waste / Industrial Emissions Licence for that site will be provided to the nominated project Waste Manager (see Section 7.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all Local Authorities in Ireland) and kept on-Site along with details of the final destination (COR, permits, licences, etc.). A receipt from the final destination of the material will be kept as part of the on-Site waste management records.

All information will be entered in a waste management recording system to be maintained on-Site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle / recovery / disposal costs associated with the requirement for a waste contractor to take the material off-Site. Clean and inert soils, gravel, stones, etc., which cannot be reused on-Site may be used as access roads or capping material for landfill sites, etc. This material is often taken free of charge or at a reduced fee for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate, which can be offset against the costs of collection and transportation of the skips.

Clean, uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber, from a site than mixed waste.

5.3 Disposal

Landfill charges are currently at around €130 - €150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc., is also used as fill / capping material, wherever possible.

6.0 DEMOLITION PROCEDURES

The demolition stage will involve the demolition of brick style warehouse building on-site. The demolition areas are identified in the planning drawings submitted as part of this application. A formal demolition plan including safety procedures will be prepared by the demolition contractor. However, in general, the following sequence of works should be followed during the demolition stage:

Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including asbestos, ACMs, electrical power lines or cables, gas reticulation systems, telecommunications, unsafe structures and fire / explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily be comprised of metal; however, may also include timbers, doors, windows, wiring and metal ducting, etc.

Removal of Roofing

Steel roof supports, beams, etc., will be dismantled and taken away for recycling / salvage.

Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

7.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the Waste Manager to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the development.

7.1 Waste Manager Training and Responsibilities

The nominated Waste Manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The Waste Manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The Waste Manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

7.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the Waste Manager and, as such, a waste training program should be organised. A basic awareness course will be

held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

8.0 RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or Waste Manager with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by, e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC / LoW

The waste vehicle will be checked by security personal or the Waste Manager to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the Waste Manager on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the DCC Waste Regulation Unit when requested.

Alternatively, each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on site by the main contractor as required.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

9.0 OUTLINE WASTE AUDIT PROCEDURE

9.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated Waste Manager will be provided to the DCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

9.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the demolition and construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

10.0 CONSULTATION WITH RELEVANT BODIES

10.1 Local Authority

Once construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-site, details of the proposed destination of each waste stream will be provided to the DCC Waste Regulation Unit.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

10.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will be collected and transported off- site, and the recycling / reclamation process each material will undergo off- site.

11.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 430 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
7. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
8. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
9. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and* site *Managers* (2002).
10. Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'* Draft *(April 2021)*
11. Dublin City Council (DCC), Dublin City Council Development Plan 2016-2022 (2016)

12. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended

13. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)

14. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

15. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.

16. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).

APPENDIX H

CONSTRUCTION & OPERATIONAL STAGE ASSESSMENT OF ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE IMPACTS

Prepared by

CRDS Archaeological & Historical Consultants

CRDS Ltd., 2 Grosvenor Terrace, Monkstown, Co. Dublin, Ireland.
Tel: (+353) 87 853 9909 Email: info@crds.ie Web: www.crds.ie

CONSTRUCTION & OPERATIONAL STAGE ASSESSMENT OF ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE IMPACTS ASSOCIATED WITH THE PROPOSED DATA STORAGE FACILITY, CLONSHAUGH BUSINESS & TECHNOLOGY PARK, DUBLIN 17

Technical Report Prepared For

AWN Consulting

The Tecpro Building
IDA Business and Technology Pk
Dublin D17 NX50

Technical Report Prepared By

Dr Stephen Mandal MIAI PGeo EurGeol

Our Reference

SM/CRDS/DUB90

Date of Issue

20 September 2021

Table of Contents

EXECUTIVE SUMMARY

This report presents the construction and operational stage assessment of archaeological, architectural and cultural heritage impacts associated with the proposed data storage facility, Clonshaugh Business & Technology Park, Dublin 17. The cumulative impact of the proposed development and the existing developments in the vicinity of the proposed site was also included in the assessment.

The assessment comprised a desk based study of:

- the Record of Monuments and Places for sites within c. 1km of the proposed development site,
- previous archaeological excavations within the townlands of Shrub, in which the proposed development is located, and the neighbouring townlands of Bonnybrook and Kilmore Big,
- the National Inventory of Architectural Heritage for sites within c. 1km of the proposed development site,
- Cartographic sources, and
- Aerial photographic sources.

There are no recorded archaeological or architectural heritage sites within the proposed development site boundary, and no previously unrecorded sites or potential sites were identified in the baseline survey. There is one recorded archaeological site, as listed in the Record of Monuments and Places (DU15-71), and five architectural heritage sites as listed in the National Inventory of Architectural Heritage, within a 1km buffer from the site.

The proposed development site has been substantially disturbed by modern development, such that, should previously unrecorded archaeological features have existed, they would no longer survive. The greenfield portion of the proposed development site, comprising the southern portion of the land adjacent to the Santry River, will not be subjected to ground disturbance during the course of the construction of the proposed development, or be impacted on by the operational phase of the proposed development.

No impacts to archaeological, architectural or cultural heritage are predicted as a result of the proposed development, either at construction stage or at operational stage.

Therefore, no mitigation measures relating to the archaeological, architectural or cultural heritage are required.

The proposed development will not give rise to any archaeological, architectural or cultural heritage impacts and would not warrant preparation of an EIA on these grounds.

1.0 INTRODUCTION

This report presents the construction and operational stage assessment of archaeological, architectural and cultural heritage impacts associated with the proposed data storage facility, Clonshaugh Business & Technology Park, Dublin 17. The cumulative impact of the proposed development and the existing developments in the vicinity of the proposed site was also included in the assessment.

The site is located in Clonshaugh Business and Technology Park, in the townland of Shrub, in the Electoral Division of Coolock, in Civil Parish of Coolock, in the Barony of Coolock, in the County of Dublin (ITM 718547 740208). The Irish name for Shrubs is Fearann na dTor (the land of the tall rock, or bush).

Most of the land surrounding the proposed site is occupied by industrial campuses including pharmaceutical, data centre, manufacturing and commercial uses (see Figure 1).

The study area comprised a buffer of approximately 1km from the Proposed Development site, incorporating the following townlands: Bonnybrook, Kilmore Big, and Shrubs.

2.0 ASSESSMENT METHODOLOGY

2.1 Introduction

The study area comprised a buffer of approximately 1km from the Proposed Development site, incorporating the following townlands: Bonnybrook, Kilmore Big, and Shrubs.

2.2 Baseline Survey

The Record of Monuments and Places (RMP), comprising the results of the Archaeological Survey of Ireland, is a statutory list of all recorded archaeological monuments known to the National Monuments Service. The RMP was established under the National Monuments (Amendment) Act, 1994. The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, the field notes of the Archaeological Survey of Ireland and other relevant publications. Sites included on the RMP all receive statutory protection under the National Monuments Acts 1930 - 2004. The information contained within the RMP is derived from the earlier non-statutory Sites and Monuments Record (SMR); some entries, however, were not transferred to the statutory record as they refer to features that on inspection by the Archaeological Survey were found not to merit inclusion in that record or could not be located with sufficient accuracy to be included. Such sites however remain part of the SMR. The record is a dynamic one and is updated so as to take account of on-going research. The RMP was consulted in the Archives of the Department of Culture, Heritage and the Gaeltacht. The results are given in Figure 1 and Table 1.

The excavations bulletin website (www.excavations.ie) was consulted to identify previous excavations that have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2020. The townlands within the study area were assessed and the results given in Table 2.

Cartographic sources were used to identify additional potential archaeological and cultural heritage constraints. The Ordnance Survey first edition 6" (1837-1842) and second edition 25” (1888-1913) maps were also assessed (see Figures 2 and 3; www.archaeology.ie). A review of aerial photography was also undertaken (see Figure 4).

The National Inventory of Architectural Heritage (NIAH) is a systematic programme of identification, classification and evaluation of the architectural heritage of the State. The Minister for Arts, Heritage and the Gaeltacht is currently using the Inventory as the basis for making recommendations for the NIAH. The results are given in Figure 1 and Table 2.

3.0 RESULTS OF SURVEY

There are no recorded archaeological monuments located within the proposed development site boundary. There is one recorded archaeological monument within the study area which comprises a distance of c. 1km from the proposed development (see Figure 1 and Table 1). This site will not be impacted on, directly or indirectly, by the proposed development, due to its distance from the site.

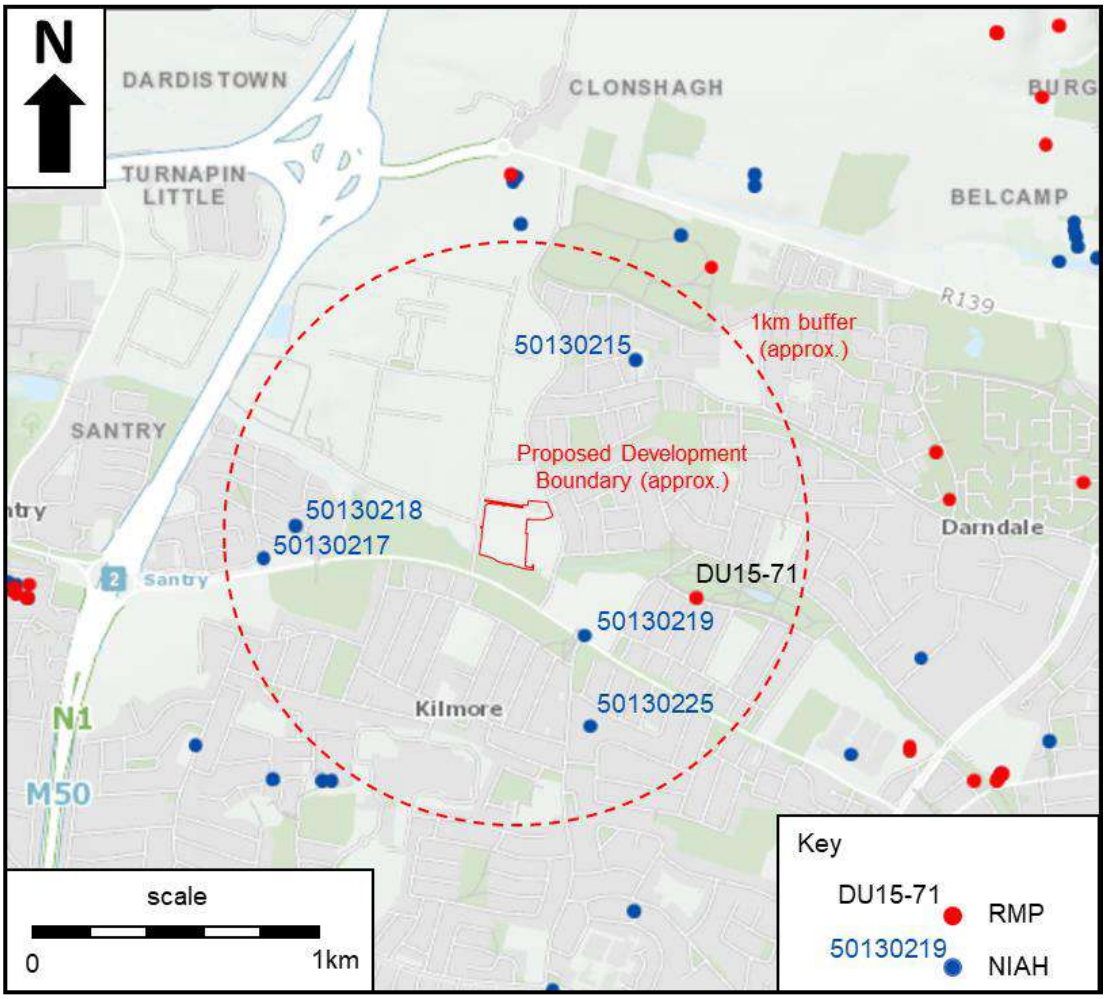


Figure 1 Site location map showing recorded archaeological monuments and architectural heritage sites within c. 1km of the proposed development site (source: www.archaeology.ie).

There are no recorded excavations from the proposed development site boundary. There are two recorded archaeological excavations from within the townlands of Bonnybrook and Kilmore Big, the townlands adjacent to the townland of Shrubs, in which the proposed development site is located (see Table 2).

There are no structures included in the NIAH located within the proposed development site boundary. There are four structures included in the NIAH within c. 1km of the Proposed Development (see Figure 1 and Table 3). These sites will not be impacted

on, directly or indirectly, by the proposed development, due to their distance from the site.

SMR No.	Class	Townland	Description	ITM
DU15-71	Burial mound	Bonnybrook	This site is marked 'fort' on the 1837 edition of the OS 6-inch map and 'site of burials' on the OS 1937-8 edition. It was excavated in 1934 by the National Museum and removed prior to landscaping by Dublin Corporation in 1964 (Appleyard 1985, 162-3). The mound was irregular in shape with many depressions on the surface (Diam. 23m,H 0.07m). The excavation produced skeletons and an iron stirrup at a depth of 0.16m below the sod. Approximately twelve further skeletons were exposed in two levels of the mound in the 1960's operations. No evidence for any structure or grave slabs associated with either level of burial was apparent (Cahill & Sikora 2011, 318-323). There are no visible remains at ground level.	E 719191m, N 739959m

Table 1 Recorded archaeological sites within c. 1km of the proposed development site (source www.archaeology.ie)

Licence No.	SMR No.	Townland	Author	Site type	Notes	ITM
E1057	DU15-71	Bonnybrook	Peter Danaher and Étienne Rynne	Graves of indeterminate date	-	E 719191m, N 739959m
-	DU14-101	Kilmore Big	Nessa O'Connor	Graves of indeterminate date	Burials transferred to coroner	E 723084m, N 727788m

Table 2 Recorded archaeological excavations within townlands of Bonnybrook and Kilmore Big (source www.excavations.ie)

Reg. No	Name	Townland	Date	Original Use	Current Use	Rating
50130215	Priorswood House	Priorswood	1740 - 1760	house	hostel (charitable)	Regional
50130217	Post Box	Kilmore Big	1960 - 1980	post box	post box	Regional
50130218	Larch Hill House	Kilmore Big	1750 - 1830	house	apartment/flat (converted)	Regional
50130219	Post Box	Bonnybrook	1920 - 1940	post box	post box	Regional
50130225	Woodville House	Bonnybrook	1780 - 1820	country house	not in use	Regional

Table 3 Architectural heritage sites as listed in the NIAH within c. 1km of the proposed development site (source www.archaeology.ie)

A review of the Ordnance Survey first edition 6" (1837-1842) and second edition 25" (1888-1913) maps indicate that this land was in use as farmland in the 19th and early 20th centuries. The northeastern portion of the site appears to include some farm buildings, probably associated with the Shrubs House, c. 50m to the east of the proposed development site (see Figures 2 and 3; www.archaeology.ie).

Recent development of the wider area has resulted in the removal of these buildings, and of Shrubs House (see Figures 4 and 5). These development works are substantial and would have included deep excavation, such that if previously unrecorded sub-surface archaeological features have existed, they would have been destroyed. The exception is the southern portion of the site, immediately north of the Santry River, which has not been developed. No features of archaeological, architectural or cultural heritage were identified in this baseline study in this area.

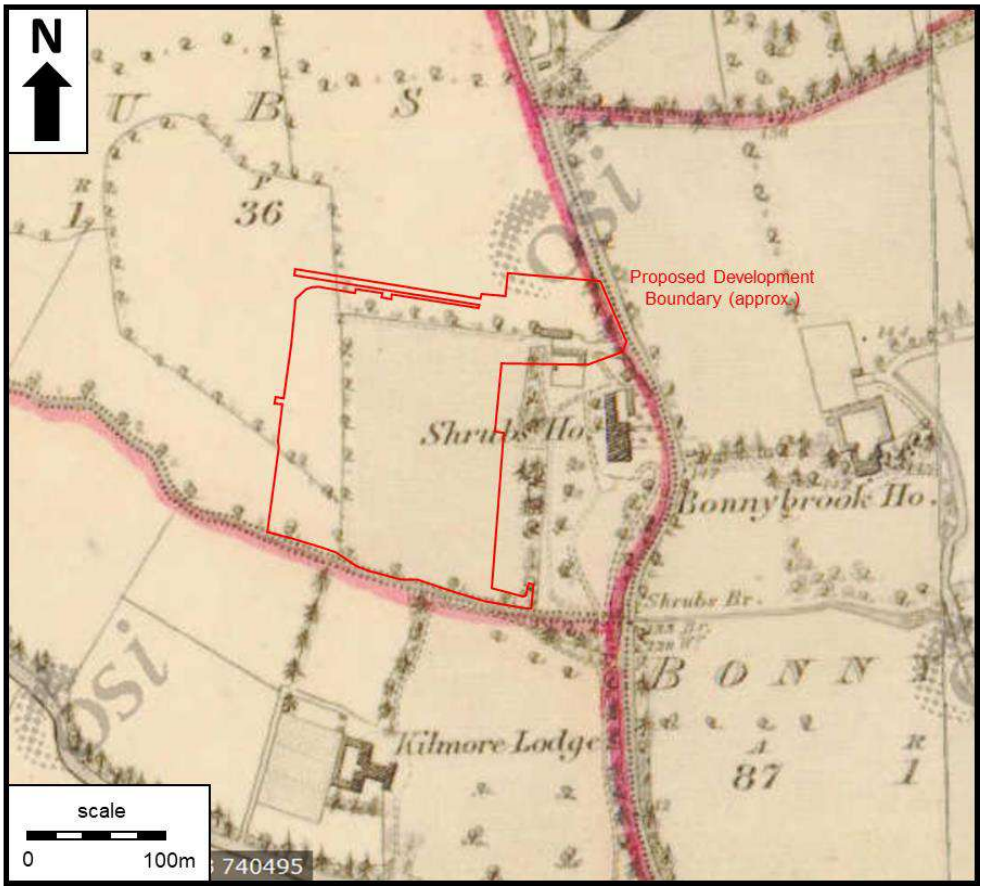


Figure 2 First edition Ordnance Survey Map showing site (base map source: www.archaeology.ie).

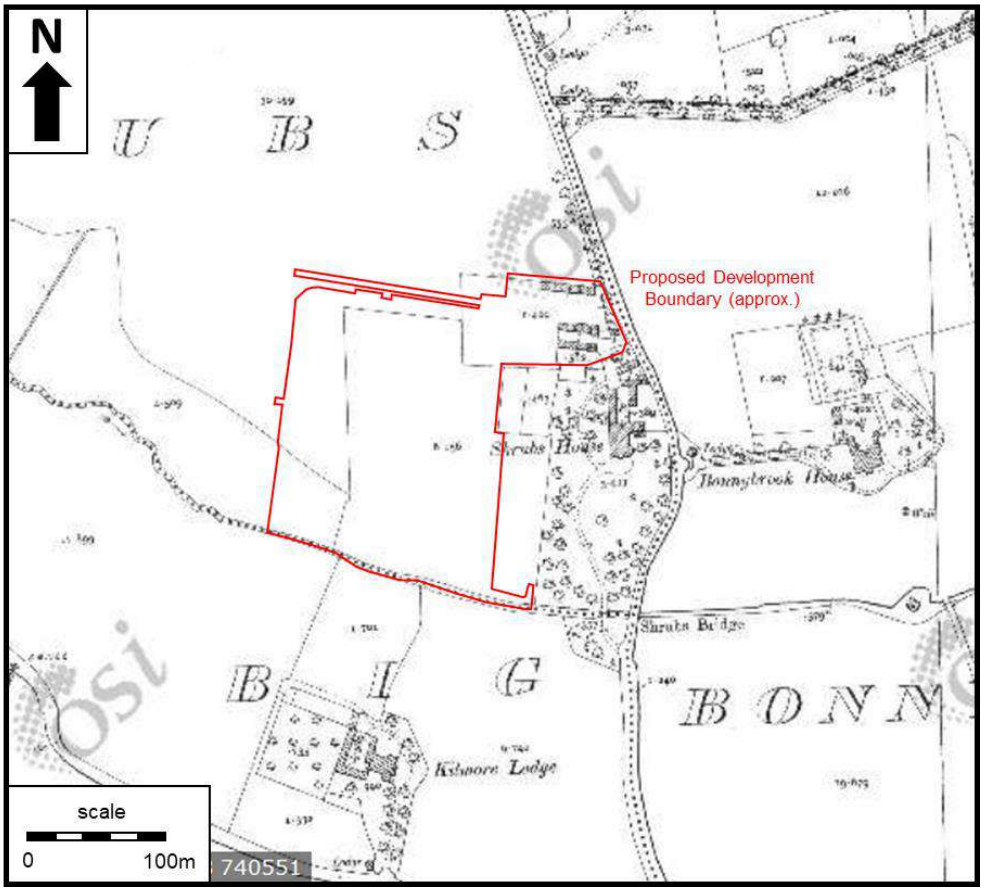


Figure 3 Second edition Ordnance Survey Map showing site (base map source: www.archaeology.ie).

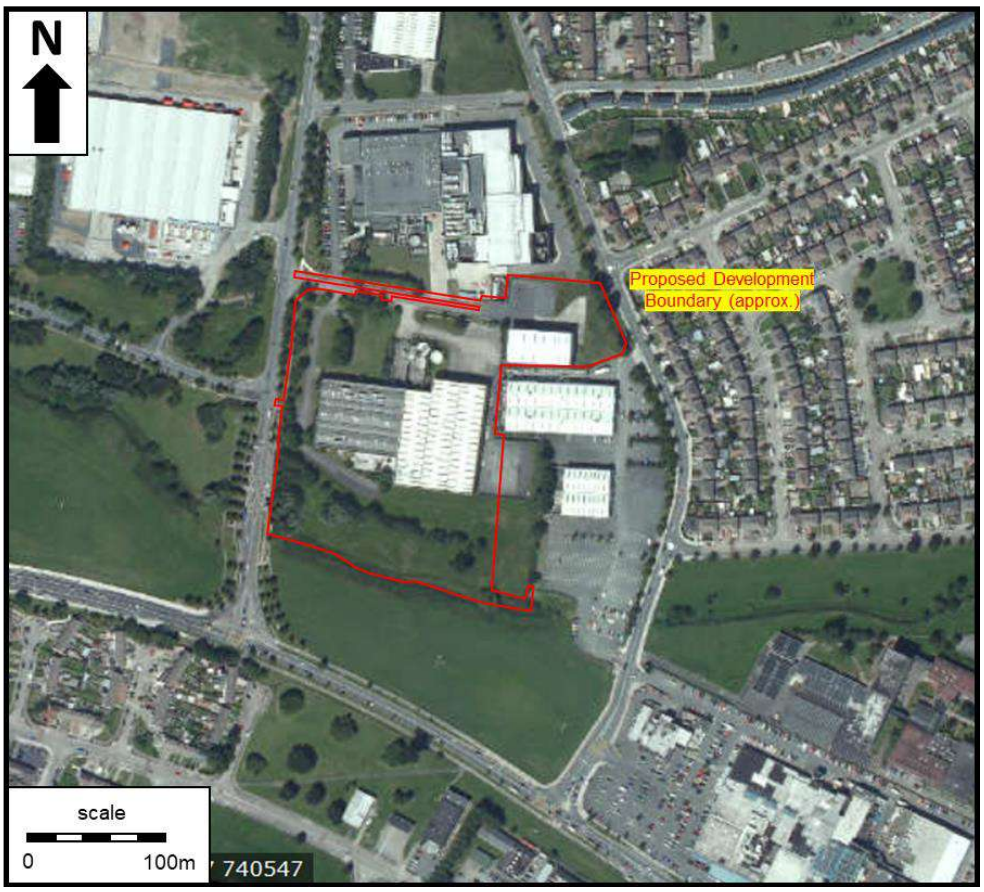


Figure 4: Aerial photograph of the Proposed Development site (source: www.archaeology,ie).

Figure 5: Recent aerial photograph of the Proposed Development site

4.0 POTENTIAL IMPACTS

The proposed development will consist of the redevelopment of previously disturbed land within the footprint of the proposed development site. Should any previously unknown features have been present in these areas, they would not have survived the construction of previous developments.

The proposed development site does include an area of greenfield, in the southern portion of the lands immediately to the north of the Santry River. Although the baseline survey did not highlight any potential features in this area, the potential remains that previously unknown sub-surface archaeological features survive in this area. However, as this portion of the site will not be impacted on during the construction or operational stages(see Figure 6), there will be no impact on any features that may survive below ground level.

5.0 Assessment Summary

No impacts to archaeological, architectural or cultural heritage are predicted as a result of the construction or operational stages of the proposed development.

Therefore no mitigation measures relating to archaeological, architectural or cultural heritage are required.

Should any excavations be required in the greenfield area then It is anticipated that a condition on grant of permission would require that the developer engage the services of a fully licenced archaeologist to coordinate and undertake the required excavation of identified archaeological features in consultation with the National Monuments Service.

The proposed development will not give rise to any archaeological, architectural or cultural heritage impacts and would not warrant preparation of an EIA on these grounds.

In terms of cumulative impact, this area of Dublin was predominantly farmland up until at least the middle part of the 20th century, but has been subjected to very substantial development in the later part of the 20th century and the 21st century. As this proposed development will not impact on archaeological, architectural or cultural heritage, the cumulative impact of this development on the wider area is negligible.

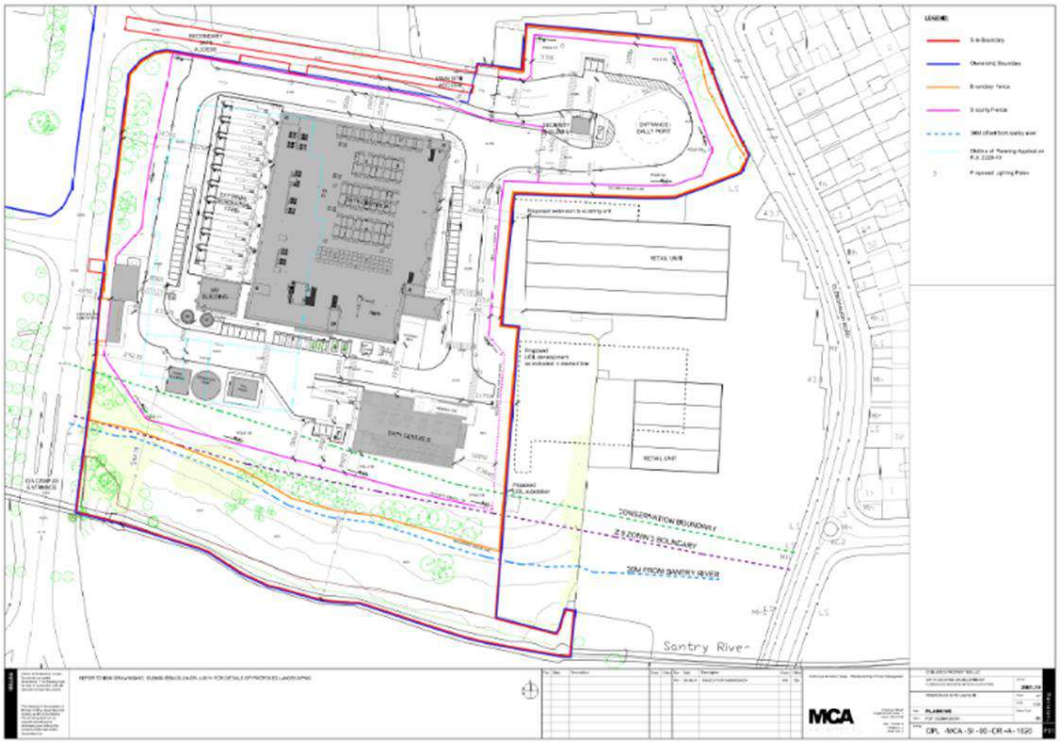


Figure 6: Plan of the proposed development, indicating that the proposed development would not impact on previously undisturbed land.

6.0 References

(1) Appleyard, D.S. 1985 Green fields gone forever: the story of the Coolock and Artane Area. Dublin. Coolock Select Vestry.

(2) Cahill, M. and Sikora, M. (eds) 2011 Breaking ground, finding graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006, 2 vols. Dublin. Wordwell Ltd. in association with the National Museum of Ireland.

APPENDIX I

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Prepared by

Brady Shipman Martin

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

for

PROPOSED DATA CENTRE DEVELOPMENT ON A SITE AT CLONSHAUGH BUSINESS AND TECHNOLOGY PARK

Technical Report Prepared For

Colliers Properties LLC

Technical Report Prepared By

John Kelly
Managing Partner

Date of Issue

5 October 2021

Brady Shipman Martin
Mountpleasant Business Centre
Ranelagh
Dublin D06 X7P8

LANDSCAPE AND VISUAL

1.1 INTRODUCTION

This report provides an assessment of the landscape and visual impacts of the Proposed Development located on lands at Clonshaugh Business and Technology Park. The Proposed Development consists of two data centre buildings and associated ancillary development.

A full description of the Proposed Development and the construction methodology is provided within the EIA Screening Report prepared by AWN Consulting (Description of the Proposed Development).

This report is accompanied by a set of Photomontages of the Proposed Development which are included as *Appendix I Landscape Photomontages.*

The following aspects are particularly relevant to the landscape and visual assessment:

- Design:
  - Form and massing of the Proposed Development;
  - Façade on all above ground structures; and
  - Cognisance of how design elements impact on Views of the Proposed Development from the surrounding area and any effects on the receiving environment, including landscape character.

- Operation:
  - Views of the Proposed Development and any effects on the receiving environment, including landscape character.

- Construction:
  - Views of the Proposed Development and any effects on the receiving environment, including landscape character; and
  - Loss or change of existing features that contribute to the receiving environment as a result of the Proposed Development.

1.2 METHODOLOGY

1.5.1 General

The landscape assessment has considered the likely significant effects of the Proposed Development on the landscape as an environmental resource. The visual assessment has considered the effect of visual change on relevant receptors. Landscape and visual effects have been considered for the construction and operation of the Proposed Development.

Further, to support the assessments, a series of photomontages, illustrating the appearance of the Proposed Development, has been prepared from a range of publicly accessible locations that are representative of the more open views in the surrounding environment. The Photomontage views are included as *Appendix I Landscape Photomontages.*

The following guidelines were considered and consulted for the purposes of the report:

- Dublin City Development Plan 2016-2022;
- EPA Draft EIA Report Guidelines 2017;
- EPA Draft Advice Notes for EIS 2015;
- The Landscape Institute/ Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (3rd Edition);
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report; and
- Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).

The methodology used for the landscape assessment entailed:

- Desktop studies of the site in relation to its overall context locally, regionally and nationally; and
- Visiting the site and its environs in August 2021 to assess the following:
  - Quality and type of views in the area;
  - The extent of the visual envelope, i.e. the potential area of visibility of the site in the surrounding landscape; and,
  - The character and quality of the surrounding landscape in relation to the position of the Proposed Development.

1.5.1 Categorisation of the Baseline Environment

The landscape and visual assessment involved visiting the site and its environs in August 2021 to review the nature and scale of existing development surrounding the site, to identify landscape features, local character and land uses, to identify key views to and from the Proposed Development, and to note receptor sensitivity.

This site based assessment was augmented by reviewing aerial photography, publications and reports and project information included within the planning application and in this report.

1.5.1 Impact Assessment Methodology

The landscape and visual impact assessment for the Proposed Development takes account of the character and nature of the existing site and its surrounds, the location of sensitive landscapes and visual receptors, the sensitivity and significance of the site, and its vulnerability to change.

Classification of significance of effects or impacts is based on Figure 3.5 of the EPA Draft EIA Report Guidelines 2017, as presented below in Figure 1, and on the professional experience of the author in carrying out landscape and visual assessments for over 25 years.

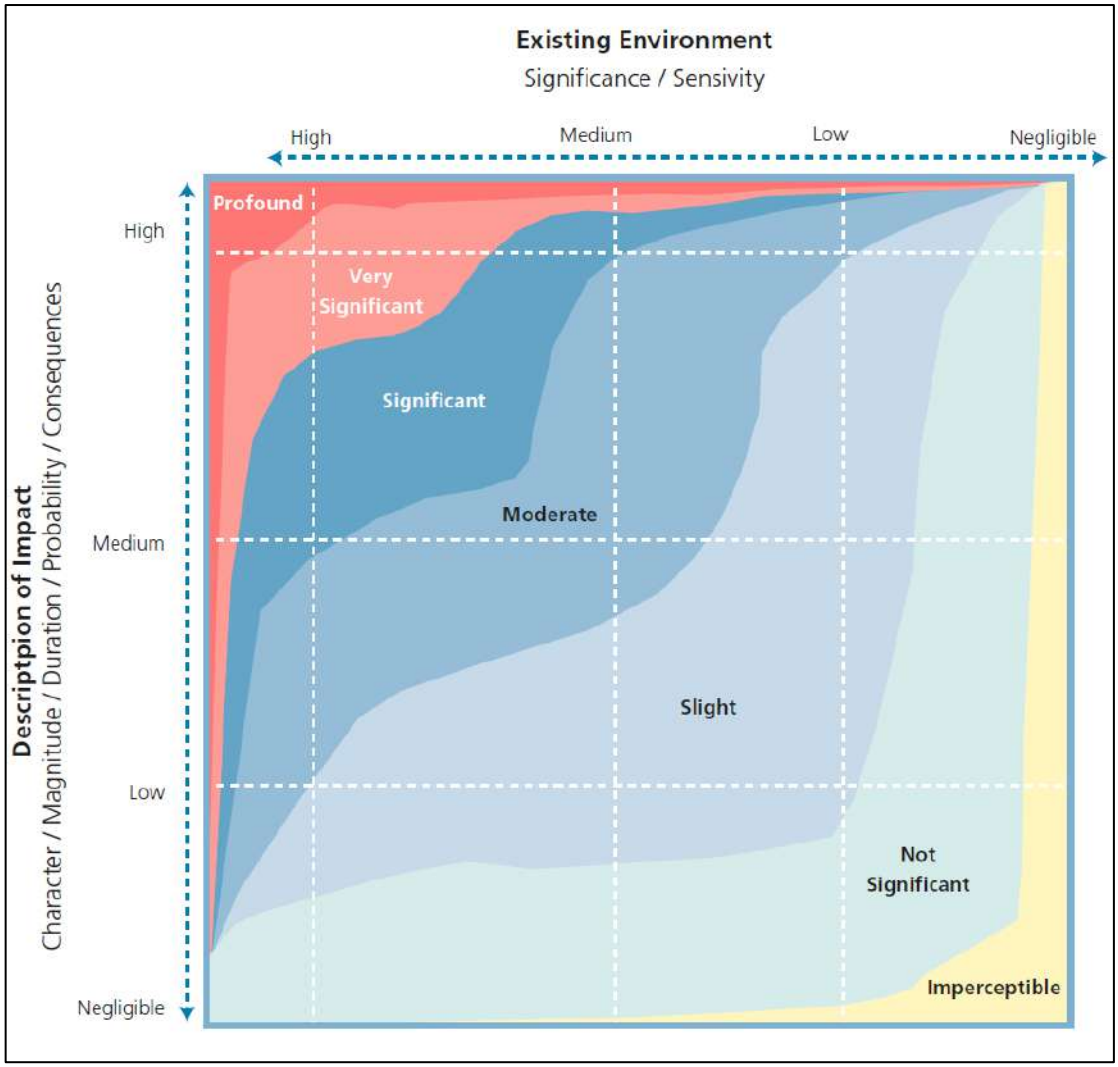


Figure 1 Significance of Effects, extract , Figure 3.5, EPA Draft EIA Report Guidelines 2017.

1.3 RECEIVING ENVIRONMENT

1.3.1 Site Context and Description

The Clonshaugh Business and Technology Park in north Dublin and immediately southeast of the M1 / M50 interchange.

The proposed development site extends to c. 3.75 hectares towards the southeastern portion of the Clonshaugh Business and Technology Park and primarily comprises the site of former Units 15 and 16 which were demolished pursuant to a extant planning permissions on the site.

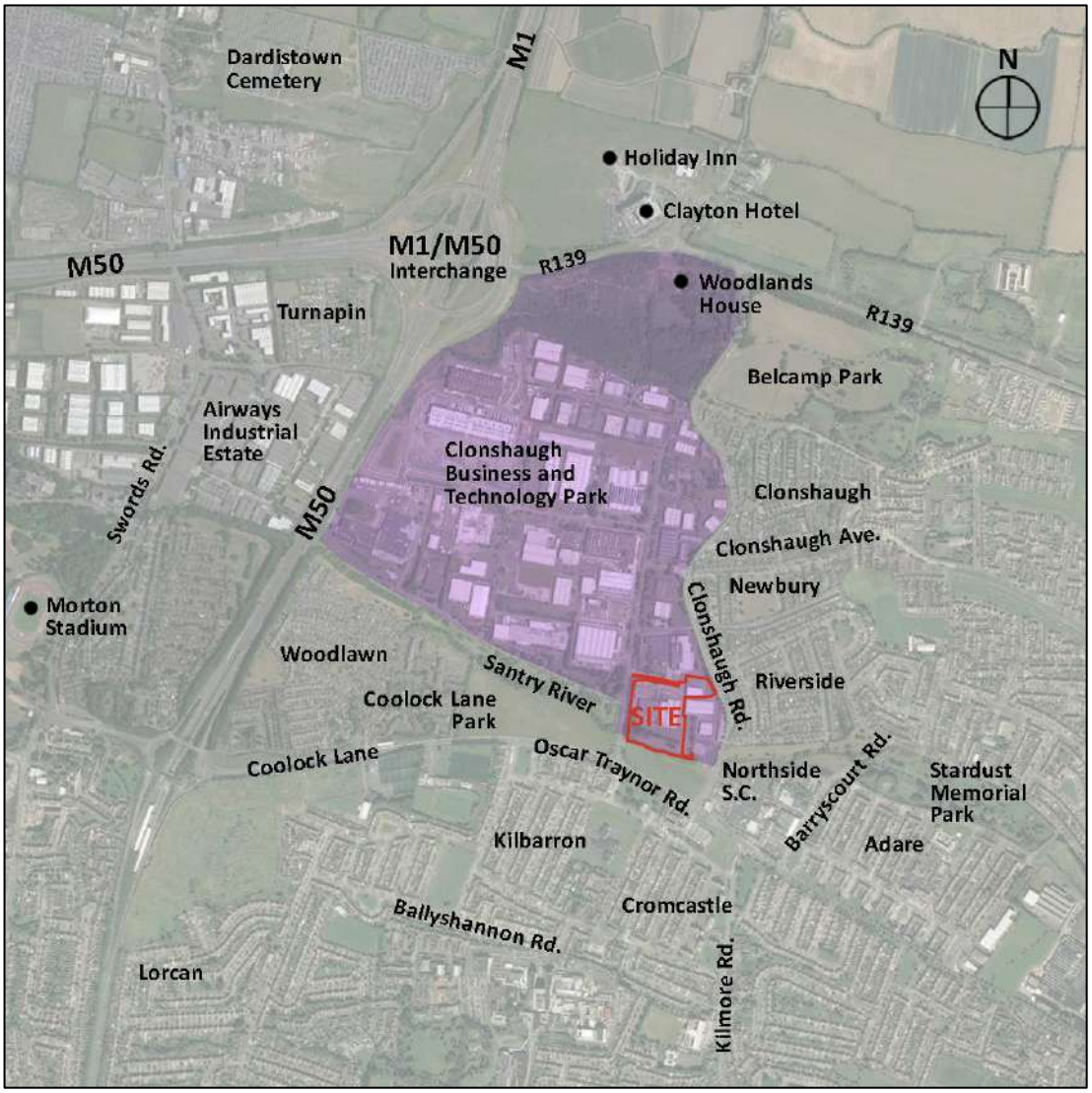


Figure 2 Proposed Development site location and context

The Clonshaugh Business and Technology Park is accessed from the M50 along Coolock Lane and Oscar Traynor Road to the south via a link road that crosses the Coolock Lane Park and Santry River and leads to a main internal access roadway.

The entrance to the Business and Technology Park is defined by a security building and access barriers located just beyond the Santry River crossing. The entrance area is further defined and characterised by mature trees and landscaping that lead from the natural landscaping along the banks of the River Santry and extend along the main roadway into the Business and Technology Park.

Clonshaugh Business and Technology Park is an established and evolving facility extending to c. 85 hectares on the eastern side of the M50. It comprises a range of business, technology and industrial units from smaller sub-divided office units to larger warehouse and more contemporary manufacturing buildings. Development activity within the park is ongoing responding to market demands and includes new developments on brown and green field lands to the northwest of the park and a range of redevelopment, consolidation and regeneration projects elsewhere according to occupant needs.

The northern and western boundaries of the Clonshaugh Business and Technology Park are defined by the R139 and the M1 respectively. Clonshaugh Road defines the eastern boundary and clearly separates it from the established residential areas to the east of Clonshaugh Road. The western side of the road is characterised by a combination of walls, fencing and established landscaping forming a buffer between the road and the larger scale buildings within the Business and Technology Park. The eastern side of the road is characterised by established residential dwellings with front gardens and driveways.

The Santry River corridor and embankments clearly define the southern extent of the Business and Technology Park and also provide a strong buffer between the larger scale buildings within the park and the established residential and amenity areas along the southern side of the river and further south.

1.3.2 The Proposed Development Site

The Proposed Development lands extending to 3.75 hectares comprising the sites of the former Units 15 and 16 and that of the former Ricoh building.

The majority of the development lands, excluding the former Ricoh facility to the northeast, are subject to an extant permission for data centre development permitted under Reg. Ref.: 2229/19, and subsequently amended by Reg. Ref. 3200/20.

The majority of the site is substantially level with former carparks, grass areas, slab levels and internal access roads typically ranging from 43.0m to 44.0m OD. The southern edge of the site comprises the river embankment and is c. 40.0m wide and slopes down steeply to c. 37.0m OD.

At present, the perimeter of the development site secured with painted timber hoarding. Pursuant to the extant permission, Units 15 and 16 have been demolished, substantial site clearance activity has taken place and new substation building has been constructed towards the southern part of the development area. The former Ricoh building remains towards the northeast of the site

The site is characterised primarily as a construction site with varying degrees of mature tree and mixed woodland along public boundaries and simple palisade fencing defining boundaries with adjoining properties.

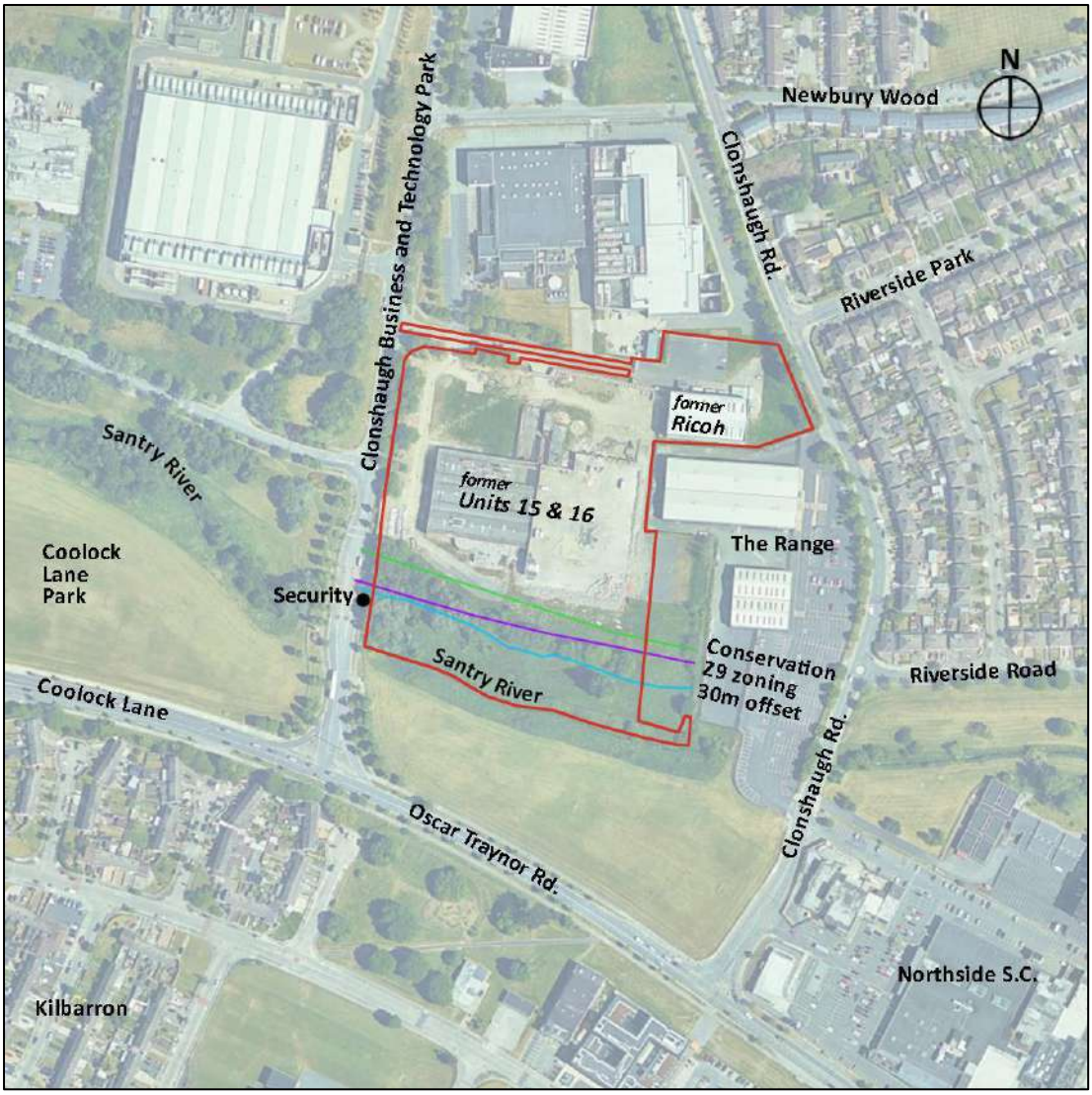


Figure 3 Proposed Development site location and context, overlaid on aerial photograph.

The western side of the site is bound by the main access road serving the Clonshaugh Business and Technology Park. A pedestrian footpath and grass verge separates the carriageway from the site boundary. The grass verge leading from Oscar Traynor Road up to entrance areas of the Business and Technology Park includes early mature Norway Maple trees set against a backdrop of predominantly Crack Willow and Ash with an understory of Elder and Bramble along the banks of the Santry River. Within the development site boundary a substantial area of mixed mature woodland with dense understorey hedging and scrub leads from the Santry River along the western site boundary. The northern part of the western boundary comprises individual mature mixed woodland trees set in a second grass verge.

The northern side of the site is partially defined by a double row of trees including Silver Birch in the roadside verge and Horse Chestnut on the internal grassland. The boundary areas around the former Ricoh building is mostly defined by palisade security fencing between adjacent properties however the boundary with the Clonshaugh Road includes a number of mature Sycamore trees

The eastern side of the site is defined in part by the boundary with the Clonshaugh Road mentioned above and for the balance comprises palisade security fencing marking the boundary with ‘The Range’ facility that lies between the site and the Clonshaugh Road.

The southern part of the site extends to the Santry River and includes the scrub covered river embankment. At the top of the embankment and before any of previously built areas of the site, there is a strong tree screen comprising a double row of mature mixed woodland leading to a double rows of early mature Norway Maple and then to a more extensive area of mature mixed woodland with understory Elder and Bramble at the southwestern corner of the site.

The proposed development site enjoys a high degree of visual enclosure with substantial mature tree screening along the southern and western sides. Visibility from the Clonshaugh Road to the east is limited by virtue of a combination of mature Sycamore trees and early mature roadside trees together with being set back beyond the site area of the Grange.

It is noted that an early 18th century house known as Woodlands.is located at the northern end of the Clonshaugh Road. Woodlands House, and the Glasshouse at Woodlands, are both protected structures, (NIAH No. DU014-056; and RPS Nos. 1907 and 1908). Woodlands House and the Glasshouse are over c.1.1km from the development site and beyond its zone of visual influence.

1.3.3 Landscape Planning and Land Use Zoning

The proposed development site is within the Clonshaugh Business and Technology Park which is within the northern extent of the Dublin City administrative area the Dublin City Development Plan 2016-2022 sets out the planning policies and objectives to guide development.

The Clonshaugh Business and Technology Park lands are mostly zoned **Z6: Employment/Enterprise** – *To provide for the creation and protection of enterprise and facilitate opportunities for employment creation"*.

The southeasternmost portion of the Clonshaugh Business and Technology Park lands are **Zoned Z4: District Centre** – *To provide for and improve mixed-use facilities"*.

The southern edge of the Clonshaugh Business and Technology Park lands is defined by the Santry River Park and is zoned **Z9: Amenity / Open Space Lands / Green Network** zoned *"Z9 – To preserve, provide and improve recreational amenity and open space and green networks."*

The Santry River Park is also designated as a Conservation Area.

Beyond the Clonshaugh Business and Technology Park, land uses to the east and south in particular include **Z1: Sustainable Residential Neighbourhoods** – *"To protect, provide and improve residential amenities"*; **Z9: Amenity / Open Space Lands / Green Network** and **Z15: Institutional and Community** – *To protect and provide for institution and community uses. "*.

Additionally, there are a number of areas around the junction of the Oscar Traynor Road and Kilmore Road, including the Northside Shopping Centre and the southeastern portion of the Business and Technology Park that are zoned **Z4: District Centre** – *To provide for and improve mixed-use facilities"* and there is a specific objective in the Dublin City Development Plan 2016-2022 to establish the Northside Key District Centre (KDC) at this location.

The proposed development site includes areas of Z4 (former Units 15 and 16), Z6 (former Ricoh lands) and Z9 (Coolock Lane Park and Santry River) zoned lands.

The southern ownership boundary of the proposed development site is defined by the Santry River and includes areas of Z9 zoned lands. It is noted that in securing the extant planning permission, a 30m setback from the Santry River had to be established for any works and that no buildings could be located within the Conservation Area. This approach is retained as part of the current development proposal.

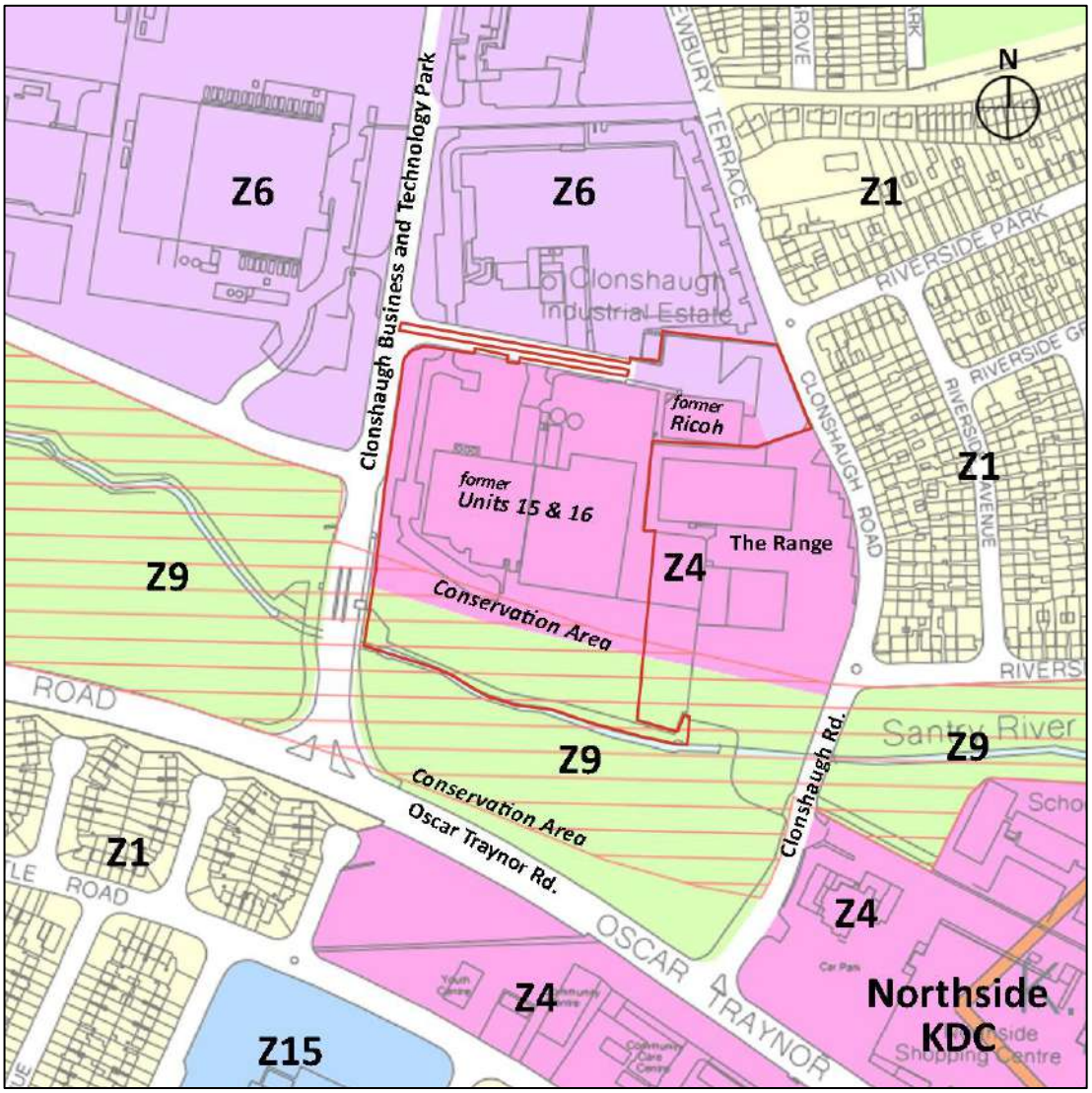


Figure 4 Dublin City Development Plan land use zoning

The proposed development includes reinforcement of the riverbank tree planting along the Santry River to maximise biodiversity and enhance the amenity value of the Santry River Park.

The Santry River Corridor is identified as being part of the Green Infrastructure Network for Dublin City extending from west of Coolock as far as the North Bull Island.

There are no listed or scenic views, no landscape or amenity designations or protected trees pertaining to the Proposed Development site, and no protected structures or National Monuments on the Proposed Development site. There is a protected structure, Woodlands House, and the Glasshouse at Woodlands House, (NIAH No. DU014-056; and RPS Nos. 1907 and 1908) c. 1.1km to the north that are considered outside of the zone of visual influence of the development.

1.3.4 Summary of Significance and Sensitivity of the Existing Landscape and Visual Environment

The Proposed Development site is not considered to be significant or sensitive from a landscape and visual aspect. The lands are appropriately zoned until recently comprised former industrial units that were part of the overall established Clonshaugh Business and Technology Park.

The Clonshaugh Business and Technology Park comprises large and small scale, traditional and contemporary industrial and high technology developments. While its western and northern boundaries are defined by the M50 and R139 respectively, lands to the east, southeast and south are predominantly residential in use and incorporating open amenity space and other community facilities.

The closest residential developments are along the eastern side of Clonshaugh Road between Riverside Road and Riverside Park. The Range retail facility and surface carpark lies between the Clonshaugh Road and the majority of the proposed development site such that frontage of the development onto the Clonshaugh Road is limited to that of the former Ricoh site. Nonetheless, any potential landscape and visual effects from the vicinity of these properties must be considered.

The Santry River corridor and Coolock Lane Park are important elements of the green infrastructure network and represent a substantial local amenity. Potential landscape and visual effects from the vicinity of these properties must also be considered.

1.3.5 Consented Development

There are a number of development within Clonshaugh Business and Technology Park that are either consented or under construction. The majority of these are remote from the proposed development site and are not considered relevant to potential landscape and visual impacts.

It is noted that one recently granted permission (Reg. Ref.: 3865/20; ABP Ref.: ABP-310695-21) is for a new Lidl supermarket in place of the smaller of the two buildings of ‘the Grange’ to the immediate east of the development site. This consented development is considered further below where appropriate.

1.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development will consist of the construction of two data centre buildings and associated ancillary development including:

- Demolition of the existing former Ricoh building and completion of all other site clearance works;
- Construction of two data centre buildings as follows:
    - Data Centre A with a gross floor area (GFA) of c. 12,875m^2 over two storeys including two mezzanine levels with a parapet height of c.19.8m and screened plant at roof level;
    - Data Centre B with a gross floor area (GFA) c. 1,455m^2 over two storeys with a parapet height of c.12.8m and screened plant at roof level;
- Installation of emergency generators and associated flues within fenced compounds adjoining each of the two data centre buildings (11 no. for Data Centre A and 1 no. for Data Centre B).
- Bunded diesel storage and filling area to serve the emergency generators;
- Ancillary structures including a sprinkler tank, water tanks, pump building and security building;
- Extension of previously constructed MV substation building by c. 115m^2 to include two additional MV substation rooms;
- Construction of underground foul and storm water drainage network, attenuation area, and utility cables;
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision car parking and bicycle parking spaces; and,
- Hard and soft landscaping and planting, lighting, boundary treatments.

1.5 LIKELY SIGNIFICANT EFFECTS

New development has the potential to impact on the immediate site environs, the surrounding site context, or both. The quality of impacts can be positive, neutral or negative, and the significance of impacts is determined by the particular characteristics of the development and the existing context.

1.5.1 Do-Nothing Scenario

In the event that the Proposed Development does not proceed, the lands are likely to either remain in their present condition until such time as an alternative development consistent with the land use zoning is granted permission and constructed. Alternatively, the extant permission for data centre development (as amended) may be developed.

1.5.2 Assessment of Effects During Construction

During construction of the Proposed Development which is anticipated to take approximately 48 months from the commencement of construction to both buildings being fully operational, potential landscape and visual effects will arise from:

- Site establishment including provision of contractors compound and completion of security fencing and site hoarding, etc.;
- Establishing construction access gates along the existing internal access road along the northern site boundary;
- Site clearance to include demolition of the former Ricoh building, tree felling, and excavation and disposal of old floor slab, foundations and decommissioned underground utilities;
- Erection of tree protection measures;
- Earthworks to establish formation levels for construction;
- Excavation for access roadways, foundations and underground utilities;
- Stock-piling of topsoil and subsoil for later reuse in landscaping and/or offsite removal for appropriate reuse/recovery/disposal;
- Access and egress of construction traffic for material import and export;
- Construction of internal access roadways, marshalling and parking areas;
- Erection and operation of tower cranes;
- Construction traffic movement on site;
- Construction site lighting;
- General construction activity, including construction and security personnel, and construction machinery;
- Gradual emergence of the Proposed Development on the site;
- Construction of site boundary security fencing;
- Provision of landscaping and planting etc.; and,
- Completion and commissioning of the development.

Effects on Landscape Character

Effects on landscape character during construction will be temporary to short-term, and will generally vary from ***not significant*** to ***moderate***, and from ***neutral*** to ***negative***.

Within the site itself, construction activity will give rise to two new high technology buildings in place of a number of former industrial developments and will be a contemporary redevelopment of the site. While removal of selected mature boundary trees will be necessitated for construction, the proposed development includes extensive new tree planting particularly along the Santry River corridor and the Clonshaugh Road frontage. Additionally, ancillary spaces with the development site will incorporate mixed pollen-rich and bio-diverse planting areas as well as amenity grass areas and wild-flower meadow grass area. Effects on landscape character will be ***short-term***, ***moderate*** and ***neutral.***.

Beyond the immediate site area, the setting of the site and visibility towards the site area ranges considerably depending on the local context. The mature trees towards the south of the site are readily visible from along Coolock Lane and Oscar Traynor

Road looking across the open grassland of Coolock Lane Park in the middle ground. Effects on landscape character will arise from the construction activity and gradual emergence of new building structures beyond the mature trees and will be ***short-term***, ***slight to moderate*** and ***negative***.

Clonshaugh Road is relatively open to the south where it overlooks the open middle ground of Coolock Lane park and the surface carpark of The Grange. Further north, the road corridor becomes more enclosed along its western side by a combination of walls, fencing, grass verges and a variety of early mature and mature trees. The roadside boundary treatment affords a high degree of visual screening between the road and the larger scale buildings within the Business and Technology Park. Where partial views through the boundary are possible, they are typically towards middle ground carparking, marshalling or grass areas that provide a setback between the road and the larger buildings. Effects on landscape character will be ***short-term***, ***moderate*** and ***neutral***.

Within the Clonshaugh Business and Technology Park, the internal roadways are typically characterised by rows of mature trees and generous verges providing strong visual enclosure along the road and substantial visual screening of the larger buildings. Similarly, views from within Clonshaugh Business and Technology Park towards the development site are substantially restricted by intermediate rows of trees and landscape buffers. Effects on landscape character of the wider Business and Technology Park will be ***short-term***, ***not significant*** and ***neutral***.

Effects on Views

Effects on views during construction will be ***temporary*** to ***short-term***, and will also vary from ***not significant to moderate***, and from ***neutral*** to ***negative***.

Coolock Lane, Coolock Lane Park and Oscar Traynor Road are characterised by built residential development along the southern side and the open linear park of Coolock Lane Park along the northern side. The northern edge of Coolock Lane Park is strongly defined by mixed mature woodland along the Santry River corridor. The woodland boundary affords occasional glimpse views to elements of large scale industrial buildings further north within Clonshaugh Business and Technology Park.

Moving eastwards along Coolock Lane and Oscar Traynor Road, the extent of tree screening along the Santry River reduces and the larger scale industrial buildings of The Grange together with the larger scale retail, commercial and educational buildings around Northside Shopping Centre become readily apparent.

Effects on views will vary along Coolock Lane and Oscar Traynor Road from ***short-term***, ***moderate to slight*** and ***neutral to negative*** depending on whether the emerging construction is seen in relative isolation or in the context of other large scale buildings.

Moving along Clonshaugh Road, visibility towards and into the proposed development site is relatively open where the road adjoins the Coolock Lane Park and the surface carpark of The Grange but becomes substantially more enclosed north of the Santry River. Similarly, construction activity and the emergency of the new development will be more readily visible along the southern portion of Clonshaugh Road but only intermittently visible further north from Riverside Road to Riverside Park and Newbury Wood. Such intermittent views will mostly include surface parking, marshalling and landscape areas and established industrial buildings in the middle ground between the road and the proposed development site.

Effects on views will vary along Clonshaugh Road from ***short-term***, ***moderate and not significant*** and ***negative to neutral*** depending on the degree of enclosure afforded by the Clonshaugh Road boundary.

Within the Clonshaugh Business and Technology Park, the proposed development is designed to continue the established approach of providing double tree lines along generous roadside verges so that the integrity and strongly landscaped identity of the main access avenue is maintained and buildings are set back within their sites. Effects on views will ***short-term***, ***not significant*** and ***neutral***.

1.5.3 Assessment of Effects During Operation

Effects on Landscape Character

Effects on landscape character during operation will be long-term and will generally vary from ***not significant*** to ***moderate***, and from ***neutral*** to ***negative***.

Coolock Lane, Coolock Lane Park and Oscar Traynor Road present an open suburban parkland landscape characterised by open grassland and playing fields within the park and contained by mixed mature woodland along the Santry River. The woodland forms a visual screen between the park and the established Clonshaugh Business and Technology Park to the north. The western, southern, and eastern edges of the park are defined by residential developments as well as sporting, community and retail developments of varying scales. The western end of Coolock Lane Park is more distinctive for its parkland character informed by the relatively uninterrupted woodland boundary to the north . The eastern end is less enclosed and the presence of industrial, retail, commercial and community developments signals the emerging Northside Key District Centre.

Effects on landscape character along the open Coolock Lane Park to the south will vary from ***moderate to slight***, and from ***negative to neutral***.

The southern portion of Clonshaugh Road is central to the emerging Northside Key District Centre and overlooks the open middle ground of Coolock Lane Park and the surface carpark of The Grange and the development site is partially visible in the distance. The proposed development is likely to present a distinctly new development from the southern end of Clonshaugh Road in the context of The Grange and elements of other existing business and technology park buildings. Moving north along Clonshaugh Road, the visual enclosure of the western road boundary increases and there is a substantial reduction in awareness of the Business and Technology Park to the west.

Effects on landscape character along Clonshaugh Road will vary from ***moderate*** and ***neutral*** along the southern part of the road to ***slight and neutral*** continuing further north.

Within the Clonshaugh Business and Technology Park, the strongly tree lined and landscape internal roadways provide the overarching character of the Clonshaugh Business and Technology Park. The design of the proposed development continues that established boundary treatment and avenue landscaping and effects on landscape character within Clonshaugh Business and Technology Park will generally be imperceptible except in the immediate locality of the site where they will be ***moderate*** and ***neutral***.

Effects on Views

Effects on views during operation will be long-term and will also vary from ***moderate*** to ***imperceptible***, and from ***neutral*** to ***negative***.

The open linear suburban parkland of Coolock Lane Park is characterised as an open suburban parkland comprising grassland, pathways and playing fields contained along its northern side by mixed mature woodland and otherwise by a combination of residential, sporting, educational, commercial and retail developments. Views of the western end of the park from the adjoining Coolock Lane are relatively uninterrupted by built development. The character of the eastern end is influenced by the presence of industrial, retail, commercial and community developments signalling the emerging Northside Key District Centre.

Effects on views will vary along Coolock Lane and Oscar Traynor Road from ***short-term***, ***moderate and negative*** to ***moderate and neutral*** depending on whether the new development is seen in relative isolation or in the context of other large scale buildings.

Clonshaugh Road leads northwards from Oscar Traynor Road. The southern portion of the road is characterised as an emerging suburban district centre with a range of building typologies and scales including some of the industrial buildings within the Clonshaugh Business and Technology Park. Moving northwards along Clonshaugh Road, the western side of the road becomes more enclosed by boundary walls, fencing, trees and landscape verges so that the road develops a more residential character with only intermittent glimpse views through the western boundary to the industrial buildings beyond.

Effects on views will vary along Clonshaugh Road from ***moderate and neutral*** towards the southern end of the road to ***not significant and neutral*** from Riverside Road to Riverside Park and Newbury Wood.

Clonshaugh Business and Technology Park is characterised by avenues that are strongly defined by rows of trees and generous landscape verges such that the range of different development typologies can be absorbed within the overall setting. Effects of views within Clonshaugh Business and Technology Park will generally be imperceptible except in the immediate locality of the site where they will be ***moderate*** and ***neutral***.

1.6 MITIGATION MEASURES AND MONITORING

1.6.1 General

The existing mixed species mature tree planting along the southern side of the development site along the Santry River is to be protected and retained and existing landscaping along the river embankment will be reinforced by interplanting new mixed woodland species and planting semi-mature trees. This will ensure the efficacy of the visual screening afforded by the southern boundary planting and well as enhancing the vitality and biodiversity of the river embankment.

A group of nine trees along the inside face of the dense woodland planting to the southwest of the development area will need to be felled to facilitate establishment of a continuous clear perimeter security zone. Similarly, another four existing trees along the inside western boundary will be felled to provide clear security sightlines however, the balance of trees along the western boundary will be interplanted with mixed woodland species to as to reinforce visual screening as well as enhancing biodiversity.

The site layout has been optimised to facilitate maximising the western and southern landscape boundaries and to ensure that the larger Data Centre Building A is set back into the site so as to minimise potential visual impact to the south in particular.

The northern site boundary is defined by a secondary road running between neighbouring facilities. Three existing Sliver Birch roadside verge trees and seven early mature Horse Chestnut along the northern site edge will be felled to facilitate establishment of a continuous clear security zone along the northern boundary.

The eastern boundary along the Clonshaugh Road is limited to c. 65.0m of road frontage and comprised three mature Sycamore and one mature Oak that are to be protected and retained. A zone of new mixed woodland will be planted inside the site boundary providing an additional c. 5.0m width of woodland planting.

A perimeter security zone will be finished with permeable gravel and ancillary areas planted with ornamental and seasonal pollen rich and biodiverse planting species, amenity grasses, wild flower native grasses and native low level scrub planting.

Mitigation measures are inherent in the site layout and architectural design of the proposed building elements. The larger and taller Data Centre A building will be located towards the north of the site where it is more remote from the residential dwellings and the Coolock Lane Park. The smaller and lower Data Centre B building will be towards the southern side of the site where the established southern mixed woodland tree screening can substantially screen the smaller building.

The design of the individual buildings ensures that the scale and massing of the structures are effectively modulated, layered and broken down using variations in height, materials, and colouring.

Mitigation During Construction

During construction, the contractor will ensure that the site is managed and maintained in an orderly manner and in accordance with the Construction Environmental Management Plan (CEMP), with particular care and attention to perimeter areas.

All existing trees that are to be retained within the Proposed Development site, and peripheral to the site area, will be fully protected in accordance with BS5837:2012 at the outset of site establishment, and will remain in place for the full duration of construction.

Site hoarding will be established and maintained in place during construction to limit visibility between the site and adjoining areas, and to limit potential light spill from construction activity, including potential light spill into adjoining properties and onto the adjoining motorway infrastructure.

Monitoring During Operation

All landscape works will be established in accordance with the detailed plans and specifications provided by the Landscape Architects, and any breaches or defects in tree protection measures or site hoarding that might occur will be reinstated immediately.

1.6.2 Monitoring

Monitoring During Construction

During construction, the contractor will ensure that the site is managed and maintained in an orderly manner and in accordance with the Construction Environmental Management Plan (CEMP), with particular care and attention to perimeter areas that might give rise to adverse landscape and visual effects from outside the construction site

Monitoring During Operation

All landscape works will be maintained in line with normal landscape maintenance / management works and failed and/or defective works will be made good, as required, on a regular basis.

1.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

Predicted Landscape and Visual effects are described with reference to a series of Accurate Visual Representations (AVRs) included in *Appendix I Landscape Photomontages*, and include views from twelve locations that are representative of the views towards the site from primary public and residential edges along the south and east as well as a more distant location to the east and a number of locations within the Clonshaugh Business and Technology Park.

The locations of the AVRs are indicated on Figure 1.0 View Location Map in *Appendix I Landscape Photomontages*, and for each view, the following variations are provided:

- As Existing, showing the current baseline situation; and
- As Proposed, showing the Proposed Development; and, where relevant,
- As Proposed with Cumulative, including the permitted LIDL development (Reg. Ref.: 3865/20; ABP Ref.: ABP-310695-21) within 'The Grange'.

While Clonshaugh Business and Technology Park extends to the north and west of the proposed development site, the area is not considered to be sensitive to development of this nature as it comprises multiple developments that are broadly consistent with the Proposed Development. As such, views within the Clonshaugh Business and Technology Park are limited to the immediate locality of the development only.

Cumulative effects, arising from development described in Section 1.5.1 above, are described below where applicable with reference to the appropriate AVR.

Views 1 to 4, *Figures 1.1.1 to 1.4.1* illustrate the open parkland character of Coolock Lane Park moving eastwards along Coolock Lane and Oscar Traynor Road. The open parkland and the mature woodland tree screening along the northern side of the park are distinctive when travelling through the built suburban context of the north city. Towards the western end of the park, the primary built feature is the regional roadway with only peripheral awareness of other building context including occasional glimpses of elements of industrial buildings behind the woodland tree screening.

Moving eastwards, the entrance to the Clonshaugh Business and Technology Park becomes apparent crossing the park and additional buildings of varying scales and typologies become part of the context of the emerging Northside Key District Centre at Clonshaugh Road.

Figures 1.1.2 to 1.4.2 include the proposed development and illustrate the addition of a new high-technology building presenting above and behind the southern tree screening. The extent of visibility changes with distance with approximately the upper half of the Data Centre A being visible from view locations 1 and 2 further to the west and visibility reducing eastwards to include only partial visibility of the uppermost elements of Data Centre A and Data Centre B above the intervening treetops.

The building presents the southern façade as the entrance façade with high quality architectural materials and greater definition and articulation of different elements of the façade. Additionally, the western façade of Data Centre A includes the steel support structures containing the generator flues. The support structures are clad in a number of shades of permeable mesh panelling providing a semi-transparent, contemporary and distinctive character.

Landscape and visual effects will vary from west to east from ***moderate and negative*** but becoming ***moderate and positive*** over time as the building establishes a contemporary high-tech landmark structure signalling the overall Clonshaugh Business and Technology Park, and becoming ***slight and negative/neutral*** further east towards the Northside Key District Centre.

Views 5 and 6, *Figures 1.5.1 to 1.6.1* illustrate the open aspect along the southern portion of the Clonshaugh Road along Coolock Lane Park and towards the development site and including 'The Grange' retail outlet and surface carpark together with some built elements located deeper into the Clonshaugh Business and Technology Park.

Figures 1.5.2 to 1.6.2 include the proposed development and illustrate a substantial new high-technology development set back beyond the tree screening and incorporating changes in height, materials and colour so as to articulate the overall development assist in stepping it down towards the Santry River to the south. Landscape and visual effects are ***moderate and neutral*** as the development is a contemporary additional to an established and evolving Business and Technology Park.

Figures 1.5.3 to 1.6.3 include the cumulative development of the permitted Lidl supermarket taking the place of the smaller of the two buildings operating as 'The Grange' and some the existing surface carpark. Cumulative landscape and visual effects are ***moderate and neutral***.

View 7, *Figures 1.7.1* is from c. 500m east of the development site along the Santry River where Barryscourt Road crosses the river. From this location the linear park extends westwards towards the proposed development site. The lands falls sharply towards the Santry River where substantial mature trees line the river corridor and mature parkland trees are located on the northern side of the park. The trees permit glimpse views to some of the dwellings on Riverside Road and the boundary and some of the building of Coláiste Dhúlaigh are apparent along the southern edge of the park.

Figure 1.7.2 includes the proposed development however all but the upper parapet of the eastern elevation of the smaller Data Centre B is partially visible between the gaps in the intermediate trees. The full height and extent of Data Centre A is screened by the larker parkland trees. Landscape and visual effects are ***not significant*** and ***negative.***.

Views 8 to 10, *Figures 1.8.1 to 1.10.1* are from the northern portion of Clonshaugh Road at Riverside Road, opposite 'The Grange' and at Riverside Park opposite the former Ricoh building. Clonshaugh Road rises substantially from the Santry River Crossing and western boundary comprises to the Clonshaugh Business and Technology Park comprises a combination walls, fencing, grass verges, road side trees and mature boundary trees that permits varying degrees of views through the boundary. Where views are possible, views are into the middle ground of the surface carpark and buffer landscape of 'The Grange' and the former Ricoh facility. In instances, the existing buildings of 'The Grange' or the former Ricoh facility substantially limit any more distant visibility beyond those buildings.

Figures 1.8.2 to 1.10.2 include the proposed development. In Views 8 and 9, the proposed development is substantially screened by the foreground buildings occupied by 'The Giant' and landscape and visual effects are ***not significant*** and ***neutral. In*** View 10, the former Ricoh building will be demolished under the proposed development and the marshalling and security area of the proposed development will be located in its place. The As Proposed view includes the marshalling and security area as well as elements of both Data Centre A and Data Centre B. The new security fencing close to Clonshaugh Road will be partially visible however the proposed woodland trees will infill between the fence and the existing mature boundary trees along Clonshaugh Road. Landscape and visual effects will be ***moderate*** and ***neutral*** as the new development replaces the existing and the larger elements are set further away from the residential road.

Figures 1.8.3 to 1.9.3 include the cumulative development of the permitted Lidl supermarket in place of the smaller of 'The Giant' buildings. Cumulative landscape and visual effects will ***be slight/moderate*** and ***positive*** as the proposed development building will replace the existing industrial shed with a higher quality supermarket development and assist in establishing a publicly accessible and 'animated' edge facing the Clonshaugh Road.

Views 11 and 12, *Figures 1.11.1 to 1.12.1* are from within Clonshaugh Business and Technology Park from the internal avenues leading southwards and eastwards towards the development site. Both views illustrate the campus style tree lined avenues that are characteristic of Clonshaugh Business and Technology Park.

Figures 1.11.2 to 1.12.2 include the proposed development and demonstrate how the overall building forms will be contained and set back by the established avenue tree canopies. Landscape and visual effects will be locally ***slight*** and ***positive***.

1.8 RESIDUAL EFFECTS

Residual landscape and visual effects are considered to range from ***slight/moderate*** and ***negative***, to ***imperceptible*** and ***neutral*** as the Proposed Development becomes a distinctive landmark high technology building signalling the presence of the entire Clonshaugh Business and Technology Park.

The proposed development is carefully integrated within the established site with suitable stepping down, buffer zones and landscaping along the more sensitive site boundaries so as to protect the residential amenity and the open space amenity in the immediate locality of the site.

1.9 REFERENCES

- Dublin City Development Plan 2016-2022;
- EPA Draft 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2017).
- EPA 'Draft Advice Notes for preparing Environmental Impact Statements' (2015).
- The Landscape Institute/ Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (3rd Edition).
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report.
- Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).

APPENDIX I (i)

LANDSCAPE PHOTOMONTAGES

Prepared by

Brady Shipman Martin

Appendix I Landscape Photomontages

for

Project No. 6899
Proposed Data Centre Development at Clonshaugh Business and Technology Park

for

Client: Colliers Properties LLC

Date: 30 September 2021
Document Number: RP02

Brady Shipman Martin
Mountpleasant Business Centre
Ranelagh
Dublin D06 X7P8

Tel: +353 (0)1 208 1900
Email: mail@bradyshipmanmartin.com

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

CONTENTS AMENDMENT RECORD

This report has been issued and amended as follows:

REVISION	DESCRIPTION	DATE	PREPARED BY	CHECKED BY
00	View Location Map and 12 no. of Phototmontages	29 September 2021	KM	JK
01	Revision to 5 no Photomontages	29 September 2021	BP	JK
02	Revision to 2 no Photomontages	30 September 2021	BP	JK

PHOTOMONTAGE TABLE OF CONTENT

Day:	29	29	30
Month:	09	09	09
Year:	21	21	21

FIGURE NUMBER	REVISION
1.0	00 01 01
1.1.1	00 00 00
1.1.2	00 01 02
1.2.1	00 00 00
1.2.2	00 00 02
1.3.1	00 00 00
1.3.2	00 00 00
1.4.1	00 00 00
1.4.2	00 01 01
1.5.1	00 00 00
1.5.2	00 01 01
1.5.3	00 01 01
1.6.1	00 00 00
1.6.2	00 01 01
1.6.3	00 01 01
1.7.1	00 00 00
1.7.2	00 00 00
1.7.3	00 00 00
1.8.1	00 00 00
1.8.2	00 01 01
1.8.3	00 01 01
1.9.1	00 00 00
1.9.2	00 00 00
1.9.3	00 00 00
1.10.1	00 00 00
1.10.2	00 00 00
1.11.1	00 00 00
1.11.2	00 00 00
1.12.1	00 00 00
1.12.2	00 00 00

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

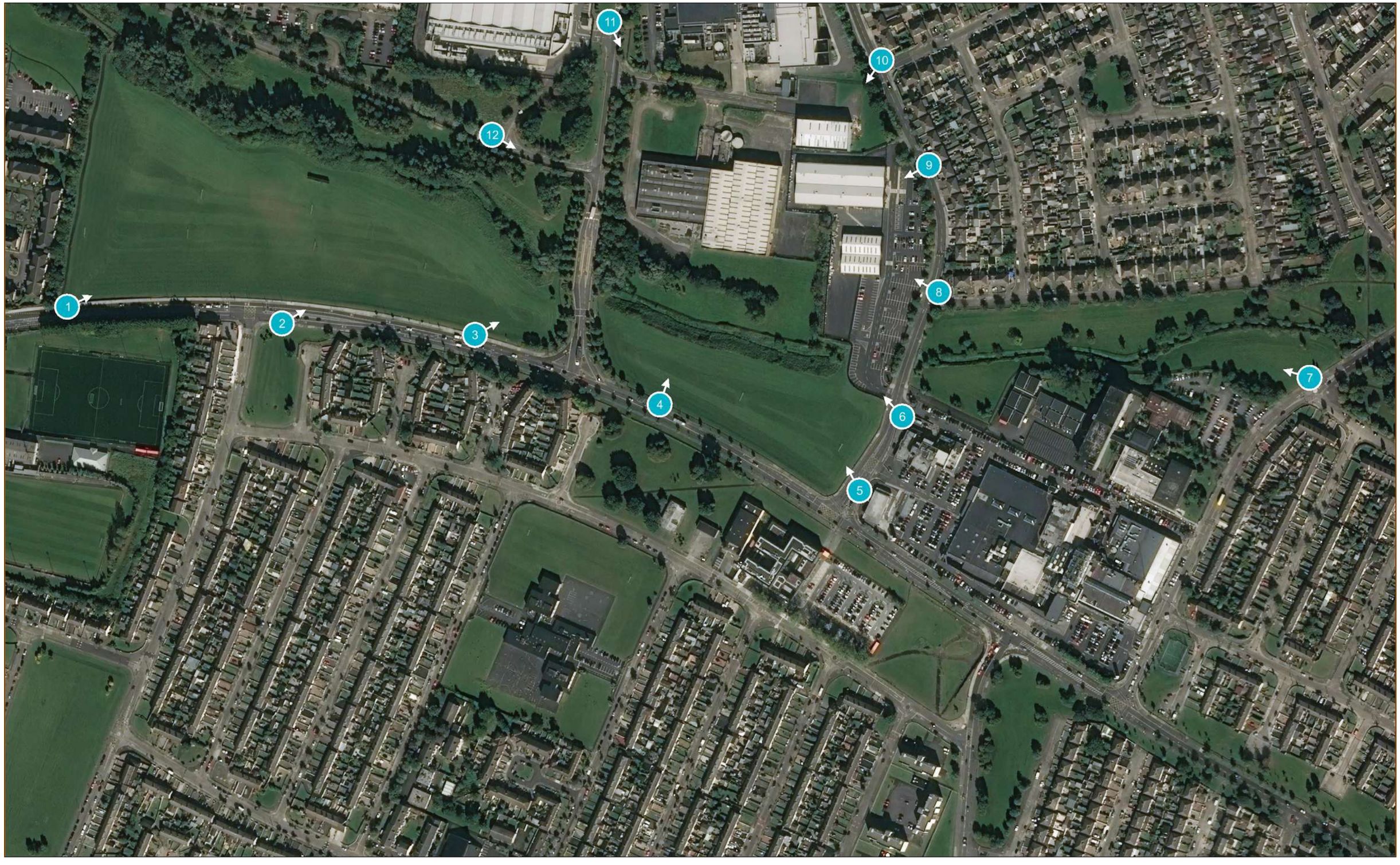


Figure: 1.0 View Location Map

Rev: 01

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.1.1

Rev: 00
View 1
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.1.2

Rev: 02
View 1
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.2.1

Rev: 00
View 2
As Existing

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.2.2

Rev: 02
View 2
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.3.1

Rev: 00
View 3
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.3.2

Rev: 00
View 3
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.4.1

Rev: 00
View 4
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.4.2

Rev: 01
View 4
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.5.1

Rev: 00
View 5
As Existing

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.5.2

Rev: 01
View 5
As Proposed

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.5.3 **Rev: 01**

View 5

As Proposed with cumulative Permitted LIDL Development

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.6.1

Rev: 00
View 6
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.6.2

Rev: 01
View 6
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.6.3 **Rev: 01**

View 6

As Proposed with cumulative Permitted LIDL Development

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.7.1

Rev: 00
View 7
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.7.2

Rev: 00
View 7
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

					ANGLE OF VISION / LENS FOCAL LENGTH				
< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm		70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.8.1

Rev: 00
View 8
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.8.2

Rev: 01
View 8
As Proposed

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.8.3 **Rev: 01**

View 8

As Proposed with cumulative Permitted LIDL Development

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.9.1

Rev: 00
View 9
As Existing

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.9.2

Rev: 00
View 9
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.9.3 **Rev: 00**

View 9

As Proposed with cumulative Permitted LIDL Development

BSM Brady Shipman Martin. Built. Environment. Est. 1968

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

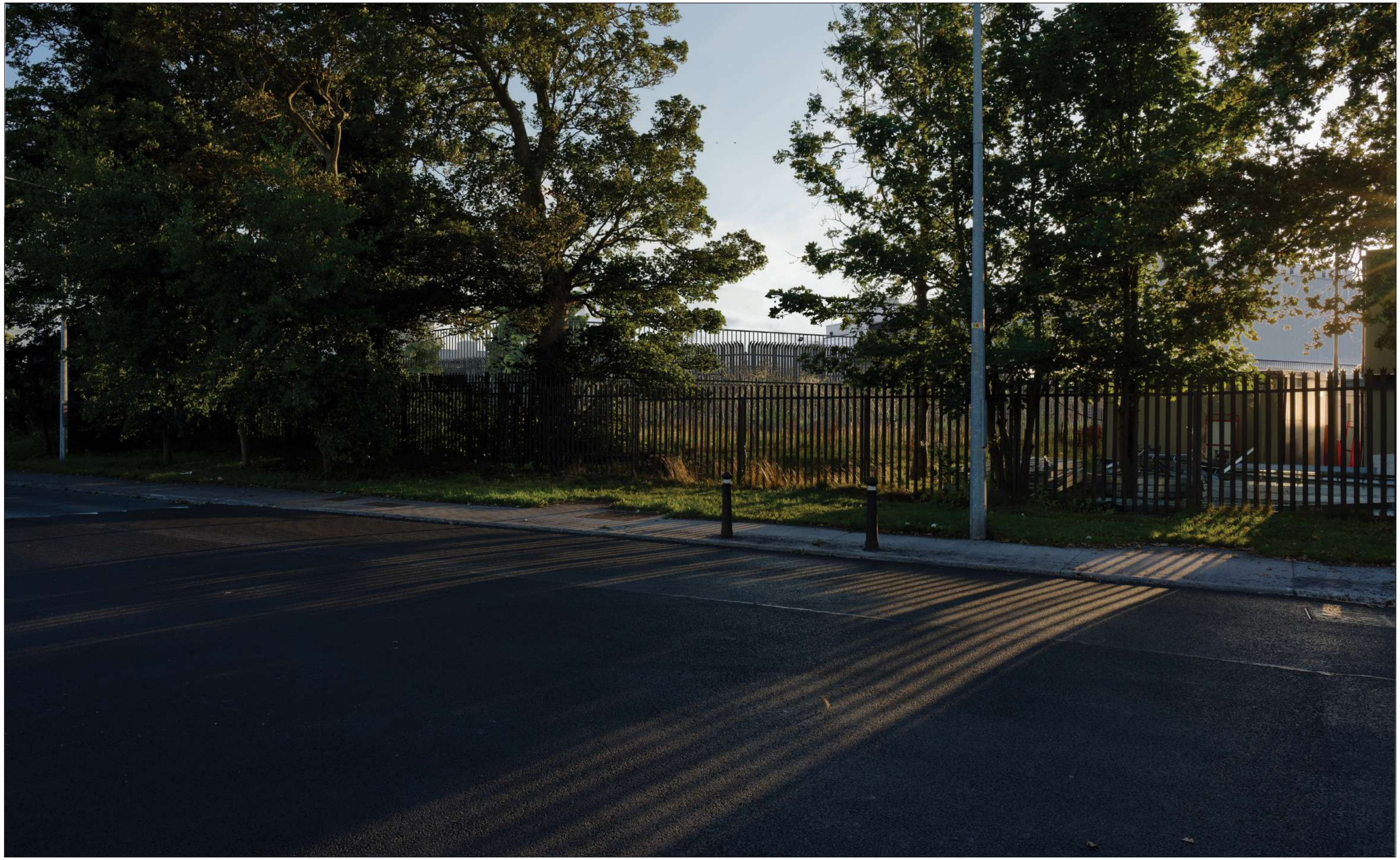
					ANGLE OF VISION / LENS FOCAL LENGTH				
< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm		70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.10.1

Rev: 00
View 10
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021



< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.10.2

Rev: 00
View 10
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.11.1

Rev: 00
View 11
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

					ANGLE OF VISION / LENS FOCAL LENGTH				
< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm		70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.11.2

Rev: 00
View 11
As Proposed

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.12.1

Rev: 00
View 12
As Existing

BSM Est. 1968 Brady Shipman Martin. Built. Environment.

Project Number:	6899	Document Number:	RP02	Revision:	02
Project Name:	Proposed Data Centre Development at Clonshaugh Business and Technology Park	Document Title:	PHOTOMONTAGES	Date:	30 September 2021

< 73.7° / 24mm	< 65.5° / 28mm	< 54.4° / 35mm	< 39.6° / 50mm	< 28.8° / 70mm	ANGLE OF VISION / LENS FOCAL LENGTH	70mm / 28.8° >	50mm / 39.6° >	35mm / 54.4° >	28mm / 65.5° >	24mm / 73.7° >

Figure: 1.12.2

Rev: 00
View 12
As Proposed

BSM Brady Shipman Martin. Built. Environment. Est. 1968